FRAMEWORK CONTRACT NO ENV.C.3./FRA/2009/0043

DETAILED DATA COMPARISON USING VIN FOR UNCERTAINTY ASSESSMENT WITHIN THE CO_2 MONITORING DATABASE ESTABLISHED UNDER ART.8 OF REGULATION (EC) NO 443/2009

Service request #7 for Framework Contract on Vehicle Emissions

Final Report

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TNO innovation for life

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1 BACKGROUND

The European Union has committed itself to a 20% reduction of its greenhouse gas (GHG) emissions, and of 30% in case other major economies make comparable efforts. Transport is one of the main emitting sectors, and the only one that continues to grow substantially. Road transport is responsible for the majority of the overall transport emissions, and the EU strategy to reduce CO_2 emissions from light duty vehicles sets out a number of measures to achieve this objective. The main tool of this strategy to reduce CO_2 emissions from passenger cars is Regulation (EC) No 443/2009, which was adopted in 2009.

The monitoring system so designed leaves a margin for uncertainty as described in Service Request 5 (SI2.608320) of Framework contract ENV.C3/FRA/2009/0043 (SI2.550571). The report of Service Request 5 indicated that certain errors can only be estimated or removed, if more information is available from each Member State's monitoring system or if the scope of data to be submitted according to Regulation (EC) No 443/2009 is changed, e.g. by introducing the Vehicle Identification Number (VIN).

2 OBJECTIVE OF THE WORK

Therefore the Commission requires assistance in:

- enquiring the Member States on their monitoring practises for specific issues that need to be harmonised across the EU (Task 1);
- performing an inter-comparison exercise on data at the level of individual vehicles to assess the benefit of using VINs as a vehicle identification code (Task 2 and 3);
- assessing of different methods to estimate the error margin (Task 4) and
- helping the EEA in verifying the notifications from the vehicle manufacturers for the 2011 data (Task 5).

3 TASK 1: MONITORING PRACTISES

Above mentioned study for DG Climate on the identification and evaluation of problematic issues in the CO_2 Monitoring identified a number of errors that may or may not occur depending on the monitoring practise in each Member State. In order to understand those errors in more depth a questionnaire has been elaborated, addressing in particular:

1) Temporary registrations,
2) Missing registrations,
3) Geographical coverage,
4) Update of the type approval database.

In addition to the above issues, information on Multistage vehicles is of interest. A questionnaire on this topic has also been elaborated and send out together with the questionnaire on vehicle monitoring practices.

Deadline for answering those questionnaires was September 21st 2012.

A reminder Email has been sent out to the WG Members on 31.08.2012 and 08.10.2012.

17 Member States answered the questionnaires, some completely and some partly. The result can be found in the following chapters.

3.1 First time registrations

On the basis of the verification of the EU CO_2 emissions data by manufacturers, there seems to be a certain number of registrations of new M1 vehicles subject to EC type approval that are either missing or appearing twice in the dataset. If that number is significant it may have an impact on the calculation of the performance of a specific manufacturer in terms of its average CO_2 emissions.

It is clear that sales data from manufacturers and the registration data may not always completely correlate, i.e. a car can be sold by a manufacturer quite some time before it is registered. A new car may also be imported or exported between EU Member States by independent dealers or private owners which may lead to vehicles being registered elsewhere than expected by the manufacturer.

In order to get a better understanding of the number of registrations reported to the Commission, detailed information is required on the different registration procedures in the Member States. More precisely, which type of registration is considered as a first time registration and taken into account for the purpose of the monitoring and reporting of CO_2 emissions under Regulation (EC) No 443/2009.

For the purpose of this questionnaire the following definitions should apply:

- **Permanent registration** of a new vehicle: means an administrative authorisation of permanent validity for the entry into service in road traffic of a new vehicle;
- **Short time registrations** of a new vehicle: an administrative authorisation of permanent validity for the entry into service in road traffic of a new vehicle which is given back by the car owner within 30 days after the registration.
- **Temporary registration** of a new vehicle: an administrative authorisation of limited validity for the entry into service in road traffic of new vehicle.

The information that is looked for concerns only new M1 vehicles subject to EC type approval, i.e. not new vehicles that are individually approved or national small series[1].

[1] Unless you find that the issues raised in the questions below are specifically relevant for these categories of vehicles please indicate this in your replies.

1. Do you consider the following registration types as a first registration of a new vehicle that should be reported under Regulation (EC) No 443/2009:

a. A permanent registration of a new vehicle?

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

b. A temporary registration of a new vehicle for the entry into service in your country?

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	FI	CZ	ES	PT	BE
Yes	No[2]	Yes	Yes	No[3]	No[4]	Yes	No	No	Yes	No[5]	Yes	Yes	No	No	Yes

Portugal specified their procedure in detail: "*Our legal framework allows for the issuing of temporary vehicle registrations, though there are different scopes to be considered.*

1) Temporary registrations following the definition included in point 4.4 of the guidelines on the monitoring and reporting of CO_2 emissions from light duty vehicles, i.e. registration lasting a few weeks for allowing vehicles to be exported, are granted by the customs authority, Autoridade Tributária e Aduaneira (AT). This registry is managed by AT and the associated data isn't integrated on our central vehicle registration database. There is also an independent numbering system associated with these registrations that differs from the general series. When (and if) these vehicles are to be "permanently" registered in Portugal they have to follow the normal procedure established for the registration of new vehicles. The temporary registration data is discarded in this new registration procedure.

2) Temporary registrations for rehearsal and testing purposes are granted to vehicle manufacturers by the regional departments of IMTT, which are responsible for recording and maintaining this data. Likewise, this data isn't integrated on our central vehicle registration database and when these vehicles are "permanently" registered they have to follow the normal procedure established for the registration of new vehicles. The temporary registration data is discarded in this new registration procedure."

[2] For test drives.

[3] NL does not allow temporary registrations.

[4] For Dealer plates.

[5] EL does not allow temporary or short term registrations (see Question 9).

c. A temporary registration of a new vehicle for the purpose of transit from your country to another Member State where it will enter into service and be permanently registered?

SE	AT	LV	DE	NL	SK	BG	FR	DK	EL	FI	CZ	ES	PT	BE
Yes	No	Yes	Yes	No	Yes	No	No	Yes[6]	No	Yes	Yes	No	No	Yes

Most MS do not know how temporary registrations for the purpose of transit are being dealt with in other MS. France clarified that article 2 (1) of 443/2009 (definition of new vehicles) is applicable and the procedure to be followed is therefore clear to everybody.

Several MS mentioned the notification procedure established on Article 5 (2) of Directive 1999/37/EC. Through this the MS should receive a communication from the Member State where the vehicle has been re-registered. Nevertheless the nature of the registration procedure (first registration or otherwise) is not always disclosed. One MS mentioned that they are only sporadically informed upon re-registrations in other MS.

2) Are following registration types being reported as a new registration according to Regulation 443/2009? Please fill in the following tables and indicate the approximate number of registrations per year.

- Permanent registrations

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- Short time registrations[7]

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
N.A.	Yes	No	Yes	No	No	No[8]	No	N.A..	Yes	No	No	Yes	Yes	No	No	N.A.
	39000 (2011)		98000			0			0	0						

- Temporary registrations

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	No	Yes	Yes	No[9]	Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	No	Yes
2436 (2011)[10]		135	50000			0 (2011)			0	0			24000	2600		1600

[6] Yes but not likely to happen due to the high tax in DK.

[7] N.A. means not applicable, thus registration type does not exist in the respective MS.

[8] LT stated that they do not have such registrations.

[9] NL does not allow temporary registrations.

[10] Vehicles will be incorporated into the monitoring in reporting year 2013.

Belgium specified the organisations for which plates/registrations are being considered as temporary:

- Royal court,
- Eurocontrol[11],
- Executive organs,
- Military,
- Members of parliament, ministers and EU officers.

- Other forms of authorisation of entry into service of limited validity (e.g. transit to other country).

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	PT	BE
No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes[12]
									0	0					1800

- Diplomat vehicles

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes	Yes
121 (2011)	500 (2011)	50				3	1000		0			110	500			700

3. In case of permanent or temporary registration: Does the registration authority keep the CoC?

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Yes	No	Yes	Not always	No	No	Yes[13]	Yes	Yes	No[14]	Yes	Yes[15]	No	No	No	n.a.[16]	No

The CoC either stays:

- with the vehicle/vehicle owner (AT, NL, SK[17], ES[18], BE, CZ) or
- with the manufacturer/ manufacturer representative (DK, FI),
- with the registrations authority (DE[19]).

[11] European Organisation for the Safety of Air Navigation.

[12] Only transit plates considered.

[13] CoC is stored for 5 years.

[14] CoC-data is digitally transferred to the registration authorities.

[15] In case of permanent registration.

[16] *"We mainly use the TAD to gather the necessary data for the registration of new vehicles. Only in a diminutive number of cases associated to parallel/private imports of new vehicles we make use of the CoC data. All this data is uploaded in a central type-approval database (SIVH)."*

[17] In case of permanent registrations.

[18] Since the CoC is not used in Spain the document substituting it stays with the vehicle owner.

[19] It should be kept by the registration authority. Reality shows that the CoC sometimes is handed out to the applicant.

b. Is the CoC invalidated[20]?

DE, CZ and SK mentioned that the fact that a vehicle has been registered is being noted upon the CoC. SK specified that this is not being done in the case of temporary registrations and that the authority that permanently registered that vehicle should mark the CoC accordingly.

4. What is the registration procedure for new M1 (=never been registered before) vehicles that have been bought in another Member State[21]?

a. Are they considered

- as a new registrations?

SE	AT	LV	DE	NL	SK	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Yes	Yes	Yes	Yes	Yes	Yes[22]	Yes	Yes[23]	Yes	Yes[24]	Yes[25]	Yes[26]	Yes[27]	No	Yes	Yes

- as a re-registration of a second-hand car?

SE	AT	LV	DE	NL	SK	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	No	No	No	No	No[28]	No	No[29]	No	No	No	No[30]	No[31]	Yes	No	No

b. Can this differ depending on which is the Member State of origin?

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No

[20] One MS correctly mentioned that a CoC cannot be invalidated as it is an official document. The question is therefore posed incorrectly. It should have been: Is the CoC is marked in anyway following registration to prevent it from being used again for first registration?

[21] The question had been understood differently by the MS. After reviewing the answers and some written exchange the questions had to be changed afterwards by adding "(= never been registered before)".

[22] Original answer was No, but was clarified afterwards via Email.

[23] If the vehicle was never registered before.

[24] Only if these vehicles have not been registered in another MS.

[25] Only if they have never circulated abroad.

[26] if vehicles are new and they are not registered in another Member State (permanently or temporary).

[27] if the vehicles have not been registered yet in the EU.

[28] Original answer was Yes, but was clarified afterwards via Email.

[29] Original answer was yes with the comment if the vehicle was registered before. In the sense of the questions this means no.

[30] Original answer was yes with the comment if the vehicle was registered before. In the sense of the questions this means no.

[31] Original answer was yes with the comment if the vehicle was registered before. In the sense of the questions this means no.

Lithuania specified their different procedure for two MS:

"1) Germany – if the new vehicle comes from Germany with the CoC together with a temporary registration certificate marked with the first registration date, the vehicle would be registered as second-hand.

2) Austria - if the new vehicle comes from Austria with the CoC together with a temporary registration certificate but with no information of the first registration date, the vehicle would be registered as new."

5. Is the Member State of origin of the new vehicle notified of the registration (temporary or permanent) by your authority?

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Yes	unknown	unknown	Yes[32]	Yes[33]	Yes	depends	No	No	No	Yes	No	Yes[34]	Yes	No	No	Yes

a. If No, do you know if the Member State of origin is informed of this in any other way?

Bulgaria, France[35], Spain, Denmark, Italy and Portugal negated this question, which is a clear incompliance with regard to the obligation to notify the Member State of original registration in the case of the re-registration of a vehicle (Article 5 (2) of Directive 1999/37).

b. If Yes, how long approx. does it take from the registration in your country until you have notified the Member State of origin?

LT: If the new vehicle was temporarily registered, the Member State of origin would be informed of the re-registration according to the Directive 1999/37/EC (Article 5, Paragraph 2).

EL: The notification takes place in about 2 months as Directive 1999/37/EC and its amendments have determined.

FI: The Member States of origin are notified monthly; a report is sent on the first day of following month.

CZ: Information is sent monthly. But only in the case of re-registration, i.e. that the vehicle has been registered in the EU (even if only temporarily).

BE: The data are send monthly via Eucaris[36].

[32] Only if the vehicle was actually registered within that state.

[33] Only in case of re-registration.

[34] if a vehicle is permanently registered in Finland.

[35] France mentioned a notification system between MS concerning **used** vehicles.

[36] DE and NL use Eucaris for the same purpose.

DE, SK and SE mentioned that it take less than a month. SK specified that the information is made available via an open website[37].

6. If your authority is notified of a re-registration in another MS of a new vehicle originating from your country, does this affect whether this vehicle is being reported according to Regulation (EC) No 443/2009?

SE	AT	LV	DE	NL	SK	LT	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	No	No	No	No	No[38]	No	No	No	No	No	No	No	No	No	No

7. Are there any other forms of new vehicle registrations in your country that may be considered as a first registration for the purposes of Regulation (EC) No 443/2009?

SE	AT	LV	NL	LT	Fr	DK	EL	IT	FI	CZ	ES	BE	SK
No	No	No	No	No	No	No	No	No	No	No	No	No	No

The Slovak Republic commented here that *"if a vehicle has been registered in another country and is considered to be new (previous registration no more than six months old; max. 6 000 km), it is not covered by the reporting obligations under Regulation (EC) No 443/2009".*

Slovakia specified that vehicles which have been registered in another MS before and had given temporary registration plates are considered 2nd hand vehicles. In case of vehicles which have been registered in another MS before but are still considered to be new due to their length of registration and the total driven kilometres are not reported to the Commission

8. In case that a new vehicle is being transferred from your country to another Member State, is there - in your view - a significant risk that

a. the same vehicle is reported twice or more to the Commission as a first registration?

SE	LV	DE	NL	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No	Yes

[37] http://www.telecom.gov.sk/index/index.php?ids=91863.

[38] It is stated above that these vehicles are also included in reports drawn up pursuant to Regulation (EC) No 443/2009. It is for the country of destination to include it in future reports.

b. the vehicle will never be reported as a new registration to the Commission?

SE	LV	DE	NL	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT
No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	unknown[39]

9. If you replied No to either a or b in question 8, which are in your view the main reasons why the vehicle will be accurately reported to the Commission?

Following reasons were stated:

- DE: Germany does not get to know when a vehicle that was registered in Germany for the first time gets a new registration in another MS .
- LT: In 2011 there were no transit registrations of the new vehicles (only permanent registration).
- FR: Each Member State shall take into account the definition of a new vehicle and the scope of 443/2009.
- EL: Greece does not have temporary or short time registration procedures. Therefore they do not expect that a car which had been registered in Greece for the 1st time, will be counted again as a 1st time registration in another country. Greece believes that it might have to do with the definition of temporary, or short time registrations of the MS that have such procedures and the way that the destination MS (that re-registers cars with temporary plates) treat these registrations. So, a car, theoretically, may be reported (according to the regulation 443/2009) from both (origin and destination country), or none.
- FI: Registration reports are sent between the Member States although there is no absolute certainty that all cases are covered.
- ES: Permanent registration should be respected by all Member States.
- PT: If the vehicle is not permanently registered, then there won't be significant double counting issues since the vehicle won't be included in our data submission. On the other hand if the vehicle is permanently registered in Portugal and then re-registered in another Member State then Portuguese authorities include it in the data submission - even if the latter has informed us that the vehicle has been re-registered.

[39] We don't have the necessary data to support either option.

10. If you replied Yes to either a or b in question 8, which are in your view the main reasons why these errors may happen in the monitoring and reporting of registrations under Regulation (EC) No 443/2009?

- DE: It is not necessarily an error in the monitoring. It is rather an error in the national approval procedure (if an authority registers a vehicle as a new registration although this vehicle was already registered as a new registration in another MS).
- SK: This cannot be ruled out, but we have no records of such a situation.
- LT: In Lithuania the new vehicle could be registered with transit registration and the first registration date would be marked. In the other Member State this vehicle possibly could be registered as second-handed.
- FR: The risk of error is also related to the quality of information documents such as certificate of conformity, WVTA, registration certificate, data base, etc..
- DK: The vehicle is not registered in DK, and is therefore a new vehicle which is to be reported by the MS where it is registered.
- CZ: Issuing of dual registration documents (standard reg. doc. and sometimes – in certain MS CoC used for registration)[40]. The Czech Republic mentioned additionally that the poor communication between MS regarding re-registration is one reason that such double registration is possible.
- BE: Data are sent monthly by Eucaris. If countries do not consult Eucaris, there is a risk of reregistering the vehicle as new vehicle. Because the data are sent monthly, there is a delay of maximum two months before the export country is informed.

3.1.1 Summary

The Commission has clarified in the Monitoring Guidelines from reporting year 2011[41] onwards, that temporary registrations should be incorporated into the CO_2 monitoring if this is the first registration of the vehicle. Nevertheless Member States still seem to deal differently with temporary and short time registrations since some include them into their submission and some do not.

Following table gives an overview about the differences.

[40] This issue had already been mentioned during the meeting in Prague in January 2013. According to the Czech Republic the COC original and its duplicate look very much alike and that due to that, vehicle owners could register the vehicle more than once for the first time in the EU, although this behaviour is clearly an illegal act.

[41] Monitoring Guidelines, version 4, 2013: "*Missing records or the double counting of records may also occur when a*

Table 1: Overview of MS answers to the question which registration type is being reported as a new registration according to Regulation (EC) no. 443/2009

Type of registration	SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	IT	FI	CZ	ES	PT	BE
Permanent registrations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Short time registrations	N.A.	Yes	No	Yes	No	No	No	No	N.A.	Yes	No	No	Yes	Yes	No	No	N.A.
Temporary registrations	No[42]	No	Yes	Yes	N.A	Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	No	Yes

Only nine MS indicated the number of temporary registrations, amounting to ~81.000 vehicles. The majority (94%) of those registrations is being reported according to Regulation (EC) no 443/2009.

Five MS indicated the number of short time registrations, amounting to 137.000 of which all are reported according to Regulation (EC) no 443/2009.

For all those MS which allow temporary registrations, but do not report them (AT, BG, FR, EL, IT, ES, PT) and for all MS which did not answer this question (LU, UK, DK, RO, SI, EE, CY, MT, CZ, PL) follow up investigations should be initiated.

The topic of vehicles which were bought in another MS proved to be a bit more complicated.

Lithuania clearly stated that it depends on the country of origin whether such vehicles are considered as new or used. The Slovak Republic also mentioned a different procedure in relation to the length of registration and driven kilometres. Spain answered in a surprising way by stating that new M1 bought abroad are considered as used[43]. These answers make only sense when taking the definition of the Directive 2006/112/EC on the common system of value added tax for new motorised land vehicles into account. The respective definition of Directive 2006/112/EC Article 2 (2)a i and b i reads as follows:

[...] "*the following shall be regarded as 'means of transport', where they are intended for the transport of persons or goods:*

(i) motorised land vehicles the capacity of which exceeds 48 cubic centimetres or the power of which exceeds 7,2 kilowatts;" [...] *"(b) These means of transport shall be regarded as '**new'** in the cases: (i) of motorised land vehicles, where*

vehicle is first registered temporarily in one Member State and then permanently registered in another. In order to avoid errors in the data set due to the transfer of new motor vehicles between Member States, it is appropriate to consider the temporary registration as the first registration of the vehicle which should be reported in the CO2 data set. Where a Member State only reports permanent registrations in the CO2 data set, it has to verify whether a temporary registration of the same vehicle in another Member State will be included in the CO2 data submission of that Member State or not."

[42] This will change in 2013.

[43] Since the question is slightly ambiguous (see following explanation), it was further investigated whether this statement was really true. No answer was received on that matter, but it is considered as unlikely that the given answers were meant that way as this would result in counting all imported and new M1 vehicles as used vehicles. This would provoke a significant data gap if compared to other sources and until now no evidence for this could be found.

The question "What is the registration procedure for new M1 vehicles that have been bought in another Member State" had been understood differently by the MS. Most MS understood it in the way that the vehicles has been bought abroad and never been registered there (otherwise it could not bee considered a new M1).

*the supply takes place **within six months of the date of first entry** into service or where the vehicle has travelled for no more than 6 000 kilometres."*

While SK mentioned that these vehicles are not counted towards the CO_2 monitoring Lithuania confirmed that they are being reported to the Commission in case of Austrian vehicles without known first date of registration. The latter case used to be unproblematic, since AT did not report temporary registrations. But the issue:

- can now be potentially problematic, since all MS are requested to report temporary registrations,
- was problematic when LT received vehicles from MS which counted temporary registration (like DE), but did not deliver the information about their first time registration to LT.

So double counting of vehicles is possible. In addition, it also facilitated due to the observed incompliance of Article 5 (2) of Directive 1999/37 requesting MS to notify the Member State of original registration in the case of the re-registration in their country. In theory, Eucaris[44] should avoid this, but except for BE and the NL, it is not known which MS use Eucaris for this purpose.

3.1.2 Recommendation for corrective action

Besides enforcing the notification obligations according to Article 5 (2) of Directive 1999/37, further clarifications and amendments of the Monitoring Guidelines could help to streamline procedures. A proposal for such clarifications and amendments is presented in following table.

Table 2: Proposal for a table to be used in the monitoring guidelines

Status of imported vehicle	Considered as … in the		To be counted towards the CO2 monitoring of Regulation (EC) no 443/2009
	national monitoring[45]	international monitoring	
Never registered elsewhere	New	New	Yes
Registered elsewhere for > 6 months or has travelled > 6000km	Used	Used	No
Registered elsewhere in EU 27 for < 6 months or has travelled < 6000km	New	New	**No**
Registered elsewhere in NON- EU 27 for < 6 months or has travelled < 6000km	New	New	Yes
Registered elsewhere in NON- EU 27 for < 3 months[46]	New	New	Yes
Registered elsewhere in NON- EU 27 for > 3 months	unclear	Used	No

[44] EUCARIS is the EUropean CAR and driving license Information System which enables countries to share their car and driving licence registration information and/or other transport related data helping among other to fight car theft and registration fraud (Eurcaris.net, 2013).

[45] This column is for illustrative purposes only.

[46] As defined in Article 2(2) of Regulation (EC) no 443/2009: "*1. This Regulation shall apply to motor vehicles of category M1 […] which are registered in the Community for the first time and which have not previously been registered outside the Community […] . 2. A previous registration outside the Community made less than three months before registration in the Community shall not be taken into account.*"

In addition, practical cases could be discussed in more detail. So, for example, the LT case could be addressed as follows, provided that that all MS agreed to annually report temporary registrations. "In case that a vehicle was purchased and registered in another EU MS, but has run less than 6000 km and an unknown date of first registration, these vehicles shall not be counted toward the CO_2 monitoring according to Regulation (EC) no 443/2009".

Overall it can be stated that streamlining and/or a better interlinkage of the different legal documents dealing with registrations would certainly help to avoid different procedures within the MS. A good example is the current discussion of a new Commission proposal on the simplification of transferring motor vehicles from one MS to another[47]. This proposal addresses in Article 6 (1) and (2) temporary *registrations for transfers to another Member State:*

"1. Any person that has purchased a vehicle in another Member State and where that vehicle does not have a registration certificate may request the vehicle registration authority to issue a temporary registration certificate of a vehicle in view of its transfer to another Member State. The temporary registration certificate shall be valid for a period of 30 days.

2. Upon receipt of the request for the temporary registration certificate referred to in paragraph 1, the vehicle registration authority shall immediately gather the information on the data items set out in Annex I directly from the vehicle registration authority of the Member State where the vehicle is registered, in accordance with Article 7, and transfer the data to its own register."

Explanations of the proposal state that *"Article 6 ensures that the intra-EU trade of second-hand vehicles is made easier, by harmonised rules on the temporary registration of motor vehicles. Such rules are necessary in the first place for persons purchasing a motor vehicle in another Member State, in order to enable them to drive the vehicle to their own Member State in view of its final registration there. When a motor vehicle already registered in a Member State is sold to a person established in another Member State, the seller will probably deregister the motor vehicle at the moment that the vehicle is sold. The seller will probably not allow the buyer to drive the motor vehicle carrying the registration number of the former. Therefore, a temporary registration system is indispensable to improve the functioning of the market of second-hand motor vehicles and to ensure that the gap between the registration in the first Member State and the new registration in the second is temporarily bridged."*

The intention of the new procedures regarding temporary registrations addresses clearly only used vehicles. This explains also the wording of Article 6 (2) where "*the Member State where the vehicle is registered"* is mentioned, which can not apply to owners of new M1 who request a temporary registration. Therefore the potential of the proposal to bring more clarity and coherence to the handling of re-registrations of vehicles which have been registered for the

[47] COM (2012) 164 final Regulation of the European Parliament and of the Council simplifying the transfer of motor vehicles registered in another Member State within the Single Market, Brussels, 04.04.2012.

first time in another MS is limited. It is suggested that, in particular Article 6, is extended and/or reformulated, so that it applies also for new vehicles.

3.2 Missing/Delayed registrations

Manufacturers claim that numerous vehicles are either registered with a significant delay from the date of purchase or are not reported at all in the European CO_2 emissions data base, set up under Regulation (EC) No 443/2009.

As mentioned above, sales and registration data usually does not coincide. Nevertheless, there might be reasons that registrations are indeed either missing or delayed significantly. Those reasons can only be identified by MS authorities and are usually system immanent.

1. **What is the average time needed for the registration of a vehicle, counted from receipt of the application for registration by the registration authority to the handing over of the registration documents to the applicant?**

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	FI	CZ	ES	PT	BE
1 day[48]	5 min.	40 min	20 min.	≤ 1 day	Imme-diately	1 day	30 min	1 day[49]	1 day[50]	1 day	< 1 minute	15 min	< 1 day	6 days	2 days

Portugal explained in more detail their system: "*Since there are several entities that take part in the vehicle registration procedure our best estimate is that in normal circumstances it will be needed an average of 6 days for the completion of this procedure. Nonetheless following the customs authority's request for the issuing of a registration/license number, IMTT will process that request and this registration will be readily available and accountable for the CO_2 emissions monitoring procedure. This is not the case with parallel/private imports of new vehicles where the monitoring data is only made available subsequently.*"

2. **Do the registration authorities enter the registration data in real time into the central database on registrations?**

SE	AT	LV	DE	NL	SK	LT	BG	FR	DK	EL	FI	CZ	ES	PT	DE
Yes	Yes	Yes	depends[51]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[48] It takes three to four days from registration until the registration certificate reaches the owner of the vehicle.

[49] If the application file is complete.

[50] The registration documents are send via post, which prolongs the process slightly.

[51] The registration authorities have the technical means to transmit registration data both in real time and in batch mode. About 80 % of the registration data is exchanged in real time, 20 % in batch mode.

a. If No, how much delay can be expected between registration at the office and availability of the data in the central database?

DE: in batch mode up to one day.

3. Do you as a rule process all registration applications within the year in which the application was submitted?

SE	AT	LV	DE	NL	LT	BG	FR	DK	FI	CZ	ES	PT	BE
Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

If Yes,

a. at what date do you close the data collection?

SE	AT	LV	DE	NL	BG	DK	EL	FI	CZ	ES
Early Feb.	30th December	30th December	31th December	31th December	31th December	31th December	Last working day of the year	31 th December	31 th December	31 th December

b. How is dealt with late submission from the registration authorities

SE	AT	LV	NL	FR	DK	FI	CZ	ES
n.a..	Reported in following year	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

If No,

How many vehicles are approximately being missed annually?

DE: In Germany's initial answer it was estimated that approximately 800 are being missed annually due to the data collection closing date of 31th of December. Those registrations will also not be reported in the next year data submission. Since the submission of the questionnaire Germany has changed its procedure. From reporting year 2012 onwards all vehicles which were registered in the reporting year but submitted by the registration authorities to the KBA in January the year after will be included into the data delivery. According to the KBA, 90-95% of these late submissions occur in January of the following year, i.e. 5-10% of the late registrations made in the previous year will still not be included in the report (40-80 registrations).

PT: Approximately 0,5% of the vehicle registered in a given year are not included in the monitoring data. These registrations refer to the above mentioned parallel/private imports of new vehicles. PT is currently addressing this issue trying to establish the best way to overcome it.

BE mentioned that this number cannot be checked.

Will these vehicles be reported within the next year?

While Austria indicated that any missing vehicles will be reported within the next monitoring year, Germany indicated that it is not being done and Belgium did not answer this question sufficiently.

2) If registrations are not reported under Regulation (EC) No 443/2009 (i.e. registrations appear to be missing) which is in your view the most likely reason:

a. The monitoring procedure did not working flawlessly;

b. The registration procedure did not work flawlessly;

c. There are national (e.g. fiscal) rules, EU rules or company practise that may impact on the preferred timing of a registration (i.e. benefits/disadvantages for the owner, dealer bonus calculation etc.);

d. Other reasons.

7 Member States answered this question and a-c were seen as the most likely reasons. All got the same number of votes (4).

The reasons for the respective answer were following:

Answer a:

Not sufficient reasons were stated by those MS which indicated a.

Answer b:

DE: The database of the KBA is based on the data that the admission offices provide. If the office workers there don't work correctly we have just a little opportunity to correct the data afterwards (DE).

LT: The transit registration procedure (see 3.1 paragraph 4) of the new vehicles raises the possibility that these vehicles will not be reported under this Regulation (LT).

(ES): Some mistakes when introducing data were made.

(FI): There are different kind of systems to collect registration data in MS.

Answer c:

SK: If it is more advantageous for an owner not to register his vehicle until the following year, the reason for any delay is not investigated. The vehicle in question will be included in reports for the year in which it is registered.

PT: We're not stating that the monitoring and registration procedures are full-proof, but from past experience we do consider the major source of delays might be associated with company practises following commercial objectives and seeking to prorogue the payment of registration fees.

CZ: Issuing of dual registration documents and some companies are registering more at the end of the year due to tax reason, etc..

General:

Greece mentioned two reasons for new car being registered in Greece and not reported under Reg. 443/2009 although it should, could be a result of the fact that it is a car of a diplomat or It is a car of a non-EU country that came for registration in our country in less than 2 months from the 1st registration in the non-EU country. This is because, the Greek database does not keep information of the country of origin of a used car. Nevertheless the Greek authorities mentioned that the number of such cars is supposedly be very small due to national limitations and some other limitations of the last 2 years.

The Netherlands stated that the Dutch reporting is accurate and coincides with the NL manufacturer data (no questions/remarks up till present).

3.2.1 Summary

Four MS (AT, DE, PT, BE) mentioned that they have late submissions which might lead to situation that vehicles are being missed for a respective reporting year. This usually means that although the registration is made within the respective reporting year, this information is not transferred within that period of time from the registration authorities to the CO_2 monitoring authority when they close the data uptake for internal review or until the data is being transferred to the EEA. These registration are therefore missing within the data submission of the specific year.

There are different counter measures taken in those MS. AT counts these vehicles into the next reporting period, Germany takes into account registrations reported by the registration authority until the end of January of the next year. Any remaining registrations that are not be reported by that date are not included in the CO2 monitoring dataset (appr. 40-80 vehicles). Portugal still works on a procedure to overcome this difficulty, they miss approximately 0,5% of the annual registrations (in 2011 this would have been ~800 vehicles). Belgium did not identify its counter measures.

3.2.2 Recommendation for corrective action

Although the number of affected vehicles is fairly low, harmonising can still be advised here. A combination of prolonging the data collection period[52] e.g. at least until the end of January and including late comers after January into the next reporting year[53] could help to eliminate this error source altogether.

[52] Not the closing data for registration, this needs to be the last day of the reporting year (31. December)

[53] And maybe marking them accordingly.

3.3 Excursus Aston Martin

The questionnaire targeted issues for new M1 vehicles subject to EC type approval, i.e. not new vehicles that are national small series or individually approved. The situation can be very different for those vehicles as the example of Aston Martin shows:

Aston Martin notified that ~ 60% of their 2011 sales have not been reported by the MS as being registered. Therefore Aston Martin notified numerous vehicles in the majority of MS.

In order to clarify whether the notification by Aston Martin should or should not be accepted, the MS presumed to be missing most of the Aston Martins were contacted (DE, BE, IT, UK and FR) and asked for clarifications. Aston Martin provided VIN based data in order for the MS to run against their data.

The result of this analysis will be discussed per contacted MS:

3.3.1 Germany

The claim of Aston Martin (AM) was to a large extent correct. From the 605 Aston Martins which were indicated by the manufacturer to be missing about 100 vehicles were never registered in Germany and 24 vehicles have been assigned incorrectly by Aston Martin[54]. In conclusion this means that 481 Aston Martin vehicles were missing within 2011 data set submitted by Germany.

The reasons for these missing vehicles are the following:

In order to register a vehicle in Germany registration document part II is necessary. This document is most of the time handed over by the manufacturer resp. dealer to the car buyer in Germany. Therefore imports and individually type approved vehicles (IVA) usually lack this document. Since IVAs are not to be reported in a detailed way to the Commission, these cases are ignored and focus is set upon the imports.

In Germany part II of the registration document contains a national code number (TSN). This code number allows the registration authorities to upload the technical type approval data from a central server hosted by the central registration authority (KBA) and to verify the information provided upon the registration document.

If a vehicle is missing these registration documents and therefore the TSN, the registration offices search the database for a matching data set based on the technical features of the vehicle. If this research is not successful the registration authority issues the document based on the CoC or a certificate from a technical inspection association. These documents do not contain a specific TSN like e.g. 389 but only a general “000” number. Then the

[54] In detail this is the AM Cygnet, whose base manufacturer is Toyota. In this case Toyota will be the responsible manufacturer in accordance with Article 3(3) of Regulation (EU) No 1014/2010. This has been proven by a CoC provided by Germany.

registration authorities submit their registration data to the KBA, who uses firstly the TSN for matching the technical data and the registration data. In case of TSN 000 such a match is not possible and a plain text search of the TVV in combination with the ETAN is performed with the aim, to find type approval data for verification of the technical data. Since the ETAN is not a obligatory field according to Directive 1999/37 it is therefore not always submitted by the registration authorities. Due to that the verification of the vehicle category is hampered or even impossible. In the latter case the existence of a M1-type approval cannot be proven and the vehicle is not counted towards the CO_2 monitoring. In 2011 18250 vehicles could not be assigned to a type approval document in Germany. How many of those were new M1 vehicles cannot be said. But it is clear that among these were vehicles from Aston Martin- a manufacturer which produces exclusively M1 vehicles.

In conclusion this means that vehicles which have been registered in Germany are not being reported to the Commission in case no M1-type-approval could be identified.

In order to solve this problem, the KBA and other MS have started to host a CoC based database. This CoC database will overcome such difficulties since the CoC data from the manufacturer[55] is used directly for the registration process. Therefore contact between Aston Martin and the KBA was facilitated by Ökopol.

3.3.2 Belgium

The Belgian authorities matched up 83 of the 122 vehicles indicated by Aston Martin with their information.

Eight of the 83 vehicles were actually registered in a different reporting year (2010 and 2012) and not as stated by AM in 2011[56].

One vehicle could be identified as a 2nd hand import and having Germany as the country of first registration.

In summary this means that 74 vehicles can be matched by VIN for both data sets and reporting year 2011.

Belgium specified that 39 vehicles indicated by AM were never registered in Belgium and that Aston Martin failed to indicate the VIN of 20 vehicles which were registered in Belgium in 2011.

In conclusion this means that all the 94 vehicles registered in Belgium were clearly accounted for and that the additional 28 registrations claimed by Aston Martin could not be proven in case of Belgium.

It was tested whether some of the missing vehicles could be found in the Dutch dataset stemming from VIN comparison task, but none of the vehicles had been registered in the Netherlands.

[55] For details, please refer to German description of the registration system in Service request 5 "Identification and evaluation of errors in the CO_2 monitoring database established under art.8 of Regulation (EC) No 443/2009", Ökopol & TNO 2012.

[56] One vehicle had been registered temporarily in 2011 as a demonstration vehicle (Z-plate).

3.3.3 Italy

The claim of Aston Martin was to a large extent correct. Italy mentioned that in 2011 there was a mistake in their system which they were able to resolve. Details on the specific nature of the error were not disclosed.

3.3.4 UK

The UK authorities matched up 912 vehicles indicated by Aston Martin with their information. Aston Martin claimed to have registered an additional 47 vehicles in the UK in 2011. The UK authorities found that 34 of the 47 vehicles had a different year of registration than 2011, so the UK was right to exclude them. The remaining 13 vehicles were initially registered by Aston Martin as prototypes and were permanently registered later. Whether they should have been part of the UK submission can be disputed at the least.

Therefore the claim of Aston Martin could not be proven.

3.3.5 France

Aston Martin claimed that 37 vehicles were sold in France in 2011. France claimed to have registered 32 Aston Martins. 30 vehicles could be matched based on their VIN. The delta is two vehicles for the OEM data set and 7 vehicles for the French data set.

France was able to clarify why those 7 vehicles were not included. Three vehicles were registered only in 2012 as used vehicles. For four vehicles France could not find any correspondence within their system. They remarked nevertheless that those AM were sold by a dealer located in Monaco. If these vehicles were also registered in Monaco and this is suggested by the data, their and the absence of the used vehicles is completely in compliance with Regulation (EC) No. 443/2009.

3.3.6 Netherlands

During the VIN comparison (see chapter 4) a brief comparison has been performed also with the Dutch Aston Martin data. The Netherlands stated to have registered 26 AM while AM stated to have sold 33. 24 AM could be matched based on the VIN[57]. 2 vehicles were missing within the AM dataset, because the dealer selling the cars are situated in Switzerland and France. The criteria used by AM to sum up their annually sold vehicles per country is based on the location of the dealer. Based on a phone conversation with Aston Martin their data supports the Dutch finding as the plates were indicated by the French and Swiss dealer to be Dutch.

[57] This is a general match. The information from both data sources can nevertheless differ. I.E. the same VIN can be sold in a different year than registered or the information about the vehicles status (new or used) can differ.

From the 33 vehicles indicated by AM to be registered in 2011 in the NL, the Dutch authorities rejected 19. 5 of those vehicles were registered for the first time in a different Member States (DE, UK) and one vehicle had already been registered in 2010. 13 vehicles were never registered in the Netherlands.

3.3.7 Summary

The claim of Aston Martin was mainly correct regarding Germany and Italy. However Italy mentioned that the flaw was a singularity in 2011. Germany adapted its procedure in order to be able to receive more hits for Aston Martin. In addition Aston Martin can actively increase the number of hits in Germany by using the KBA-CoC-database. In case of UK, Belgium, Netherlands and France the claims of Aston Martin could not be proven. The authorities did prove that these vehicles were rightfully reported or not reported according to Regulation (EC) No 443/2009. They also mentioned that vehicles are also missing within the data set submitted by Aston Martin.

3.4 Geographical coverage

The EU has territories outside the European mainland. Some of these territories are part of the European Union, but not part of the customs union and vice versa. Therefore some of these territories should be taken into account for the data delivery under Regulation (EC) No 443/2009 to the EU Commission and some should not. Although the number of registrations in the territories is presumably low, their impact on the calculation of the average CO_2 emissions particularly in the case of small volume manufacturers could still this be noticeable. In order to get a better understanding of whether this is a problem, we would like to ask all Member States having such territories to briefly state in following table whether the vehicles of the respective region are reported or not. This table has been generated by DG Clima and was slightly amended by Ökopol. Therefore it does not represent any official opinion about political affiliation to an EU MS, but is simply meant to understand which regions/territories are included/excluded in the Member States reporting of CO_2 emissions data. The table furthermore includes regions which do not have an M1 vehicle fleet and it is also not exhaustive. Additional information from the respective MS would therefore also be very welcome.

Territories of EU Member States	EU MS which should respond whether the CO2 monitoring data of this region are in/or excluded	Territories reported (please fill in an X for the correct answer)		Reason for in/exclusion	Approximate number of annually registered new M1
		Yes	No		
Kleinwalsertal*	AT	X			
Kleinwalsertal*	DE		X		
Büsingen am Hochrhein*	DE	X			
Helgoland*	DE	X			
Faroe Islands	DK		X	Not same system	
Greenland	DK		X	Not same system	
Mount Athos*	EL		X		
Canary Islands*	ES	X			35000
Ceuta*	ES	X			1600
Melilla*	ES	X			1500
Åland*	FI		X	Only mainland data is covered	500
Saimaa Canal	FI	X			
Malyj Vysotskij	FI		X	Lease expired 2010 - belongs to Russia	
Basel / Mulhouse airport*	FR		X		
Clipperton island*	FR		X	Deserted reef ring	
French Guiana*	FR		X		
French Polynesia	FR		X		
French Southern and Antarctic Lands[58]	FR		X		
Guadeloupe[59]*	FR	X			
Martinique*	FR	X			
Mayotte*	FR		X		

[58] including the French Scattered Islands in the Indian Ocean.

[59] since 2007 excluding Saint Barthelemy and Saint Martin.

Territories of EU Member States	EU MS which should respond whether the CO2 monitoring data of this region are in/or excluded	Territories reported (please fill in an X for the correct answer)		Reason for in/exclusion	Approximate number of annually registered new M1
New Caledonia	FR		X		
Réunion*	FR	X			
Saint Barthelemy	FR		X		
Saint Martin*	FR		X		
Saint Pierre and Miquelon	FR		X		
Wallis and Futuna	FR		X		
Campione d'Italia*	IT	X		They are part of Italy	
Livigno*	IT	X		They are part of Italy	
Aruba	NL		X		
Caribbean Netherlands[60]	NL		X		
Sint Maarten	NL		X		
Curacao	NL		X		
Azores*	PT	X			
Madeira*	PT	X			
Akrotiri and Dhekelia	UK				
Anguilla	UK				
Bermuda	UK				
British Antarctic Territory	UK				
British Indian Ocean Territory	UK				
British Virgin Islands	UK				
Cayman Islands	UK				
Guernsey[61]	UK				
Jersey	UK				
Montserrat	UK				
Pitcairn Islands[62]	UK				
Saint Helena[63]	UK				
Turks and Caicos Islands	UK				
Falkland Islands	UK				
St. Georgia & South Sandwich islands	UK				
Gibraltar*	UK/ES				
Isle of Man	UK				

*Territories that are part of the EU and fall within the scope of Regulations (EC) No 443/2009 and (EU) No 510/2011

3.4.1 Summary

With the exemption of the UK, all MS concerned replied to the questionnaire. A minority of MS did indicate the number of affected registrations. This implies that it is not always possible for them identify where the vehicles are registered. It would have been particularly interesting to have these numbers for those territories reported according to Regulation (EC) No. 443/2009, the Caribbean islands and all Islands relatively close to Africa. Those territories have most

[60] Bonaire, Saba and Saint Eustatius.

[61] together with Alderney, Herm and Sark.

[62] Pitcairn, Henderson, Doucie, Oeno.

[63] with Ascension Island and Tristan da Cunha.

potential to have vehicles within their data which are usually not marketed in EU 27 and are therefore notified as incorrect by the manufacturers. Whether this is true for the 38100 vehicles reported by Spain for the Canary Islands, Ceuta & Melilla can not safely said, but it can also not ruled out.

Also this analysis shows that there are some few EU territories[64] that are not included into the monitoring although it is mandatory. If the population of these territories and the same ratio between population and annual new M1 registration as in EU 27 is taken into account, the approximate number of missing vehicles is 12.000. Nevertheless it not known whether the OEM count all those territories towards EU 27.

Since some MS do not include territories which should be part of the data submission according to Regulation (EC) no 443/2009, they are not in compliance with the Regulation. Although the associated error is potentially low, it can be a source for data differences. Furthermore it is possible that vehicles usually not marketed in EU 27 are part of the data submission. Nevertheless they will most likely be individually approved and therefore not be noticeable within the data.

3.4.2 Recommendation for corrective action

In addition to possible legal consequences for the non complying MS, it should be further investigated which of the territories are counted at OEM level as sales in EU 27 and which are not. If differences are being identified the procedures should be aligned.

[64] Mount Athos, Åland, Basel / Mulhouse airport, French Guiana, Mayotte, Saint Martin

3.5 Update of the type approval database

Vehicles can receive a type approval extension which cites different CO_2 and/or mass values than the initial type approval. Depending on the system it is possible that the type approval based registration information is updated with a certain lag of time leaving no choice for the registration authorities but to link outdated information to a registration. But it is also thinkable that numerous vehicles are still being sold based on the initial type approval data and that by an accidental mismatch those vehicles receive the CO_2 or mass values of the extended type approval resulting also in an incorrect combination. As it cannot be completely ruled out that such data flaws occur in some Member States and for some manufacturers, the method implemented in those Member States which use type approval based information for the monitoring requirement of Regulation (EC) No 443/2009 needs to be better understood.

1) Do some or all of the parameters to be reported according to Regulation (EC) No 443/2009 stem from type approval documents, i.e. not the certificate of conformity?

Six MS (LT, DK, FI, CZ, BE, BG) answered that none of the information stems from the type approval documents. AT mentioned that usually all the parameters stem from the CoC, but some (or all) parameters can be modified by individual approval authorities when granting a modification of a vehicle. The modified data is stored immediately in the registration database.

Five MS (LV, DE, NL, FR, PT) mentioned that all parameters stem from the type approval documents.

In two Member States they use both sources (EL, SE).

Following table shows the respective details.

	SE		LV		DE		NL		SK & ES		FR		EL		PT	
Parameters	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
All		X	X		X		X		unclear[65]		X			X	X	
If No, which exactly																
Type approval number		X											X			
Type approval extension number		X											X			
Manufacturer name	X												X			
Type		X											X			
Variant		X											X			
Version		X											X			
mass		X												X		
CO_2		X												X		
wheelbase		X												X		
axle track		X												X		

[65] In Slovakia, the vehicle manufacturer is responsible for completing the report correctly. Reports are based on data from registration certificates; there is no longer any systematic monitoring to establish whether the data they contain match those in the CoC. Spain mentioned that this information can not be given due to the fact that there is a specific Spanish document collecting technical data of the vehicle.

In case that some or all of the parameters to be reported stem from type approval documents:

2) How long does is take to update the technical database of the registration authorities with the new information (corrections and revisions to extension(s))?

LV	DE	NL	SK	BG	FR	EL	PT	BE
10 days	1 day	1 day	immediately	2 days	continuously[66]	≤ 1 week	2-4 days	immediately

- *DE: "It is not known whether the admission office recalls and uses the daily information updates or not."*
- *ES: "Once a vehicle is registered, there is no possibility to update the technical database as the manufacturers are the one filling the database at the beginning".*[67]
- *PT: "For the majority of situations, which concern vehicle type-approvals granted by other Member States, the type approval data is electronically submitted by the official manufacturers' representatives (ROM) through a network application linked to SIVH. Before full integration in SIVH*[68]*, this data has to undergo an automatic validation procedure to check for inconsistencies (abnormal values, missing data, …). Upon completion of this procedure, which will roughly take 2-4 days, this data is readily available to support the registration of new vehicles."*
- *BE: "The technical data are sent with the preregistration of the vehicles by Febiac (representative of the manufacturers and importers of vehicles on the road and their suppliers in Belgium) to the registration authority. For individual vehicles the technical data are filled at the counter from the CoC. So the data are obtained immediately."*

3) How exactly is ensured that the registration is linked to the correct type approval information, in particular when the initial type approval has been changed?

- *LV: "Data from exact type approval extension are taken during registration procedure."*
- *DE: "Our datasets (type approval and registration datasets) contain additional information: a code for the type, variant and version. However certain changes have no effect on these codes. In Germany this problem is solved by the introduction of an additional field in the registration*

[66] See Annex.

[67] For details please refer to the short description of the Spanish registrations system in Service request 5 "Identification and evaluation of errors in the CO2 monitoring database established under art.8 of Regulation (EC) No 443/2009", Ökopol & TNO 2012.

[68] Portuguese type approval database.

documents. Our German field "17", which is linked to the European field "K", registers if any changes in regard to these codes were made".

- *NL: "The Type approval database and the registration database use the same keys (TAN, Variant, Version, Extension). Modified or new data are transferred from the TA database to the registration database by a daily batch run."*
- *SK: "This is not specifically monitored; after the registration certificate is issued, the vehicle manufacturer forwards all the data on the certificate to the vehicle registration system in electronic form."*
- *BG: "We are using the data from the CoC, issued for the exact vehicle."*
- *EL: "The registration data related to the Reg. 443/2009 are based on the C.o.C., so, the answer to the above question depends on the question if the C.o.C. is correct, or not."*
- *FI: "Straight data link between registration system and vehicle importer."*
- *ES: "In order to ensure the correct type approval information, manufactures usually create the document some days before the vehicle would be registered."*[69]*.*
- *PT: "We rely on the official manufacturers' representatives (ROM) to submit accurate data. Just an initial comment. Each record integrated in SIVH relates to a combination vehicle type/variant/version of a given type approval or extension for which the system generates and assigns a national approval number. When a ROM or citizen submits the registration request at the customs authority (AT) it has to disclose the associated national approval number (PT)."*
- *BE: "The type approval database is filled with the technical data that we receive via the preregistration of the vehicles, or with data filled in at the counter from the CoC. In case of errors, eg when a vehicle is presented with a TAN, Variant and version that already exists in the homologation database, but with other technical data, the homologation documents are consulted in ETAES. For vehicles homologated in Belgium the type approval database consists of the homologation data."*

Please explain in detail how the link is being done exactly, e.g. with these mind games:

A citizen would like to register a new M1 vehicle and presents the vehicle documents including a TAN and/or national code[70] at the registration authority. This information is being used by the registration authority to match the information within the technical database of the registration authority and the information indicated on the vehicle documents.

CASE A: For the code only one correct entry in the technical database is available. A mismatch can only happen deliberately or by making a typo.

CASE B: The registration officer sees that for the respective code various extensions are available which have different CO_2, mass and footprint values.

[69] This is considered as pre-registration step, for details please refer tothe short description oft he Spanish registrations system in Service request 5 "Identification and evaluation of errors in the CO2 monitoring database established under art.8 of Regulation (EC) No 443/2009", Ökopol & TNO 2012.

[70] A national code like the ZTP in the Czech Republic or the CNIT in France.

SK answered generally that *"the Slovak Ministry of Transport is responsible for permitted combinations of vehicle types, bodywork types and vehicle categories, for which code values are used. In the case of certain other technical data, minimum and maximum permitted values are established.*"

For both cases mentioned above: How exactly is ensured that the registration officer:

- Case A: does not make typos?
- Case B: links the registration to the correct type approval extension?

Please explain in detail the procedure and assess to which extent this manual working step might lead to incorrect assignments of technical data towards registration numbers.

Case A:

- *LV: "Theoretically mismatch is possible, practically double check of the type approval number is ensured."*
- *DE: "Each code has a so called checking device: A single digit check number which is generated using the modulo 11 method. That way we secure that typos do not result in a mismatch."*
- *SK: "Ideally, all technical data are sent electronically by the vehicle manufacturer to the vehicle registration system. These data remain unchanged at the registration stage; only the vehicle owner and the allocated registration number are added."*
- *FI: "Supervision of vehicle inspection."*
- *ES: "In Spain, national code has got a control figure. If the code is wrong, the system automatically detects it."*
- *"PT: There is no mechanism in-place to prevent typos, though they might be identified in the following phases of the registration procedure."*
- *BE: "The system indicates that the TAN/version/variant does not exists.".*
- *EL: "It is not ensured. It is a matter of responsible work. We are looking for ways to avoid typos."*
- *BG: "The owner presents the CoC for the exact vehicle."*

Case B:

- *LV: "Data which are necessary for the registration are automatically taken from data base according to the exact type approval extension number."*
- *DE: "Each extension has a different check number. That number is also generated using the modulo 11 method."*
- *NL: "In general the NL registration process is an automated process where the applicant (official importer) enters the TVV key which is*

checked during the registration process. For individual registrations the officer connects to the TA database and uses pull-down menus to link to the correct type approval."

- *SK:"In the case of already registered vehicles, decisions on extending type approval are taken by the district transport office, which forwards the technical data received electronically from the vehicle manufacturer to the vehicle registration system, where they are used when issuing new documents."*
- *BG: "We are using the data from the CoC, issued for the exact vehicle."*
- *EL: "It is not ensured. It is a matter of responsible work."*
- *FI: "Supervision of vehicle inspection."*
- *ES: "Only one date is possible for each extension. In case a vehicle has got more than one extension, a code will be related to each item."*
- *PT: "By entering the national approval number the customs official won't have to make any selection, there's only one set of data/features associate with that number."*
- *BE: "when a vehicle is registered via the counter, the technical data have to be checked by the person who enters the data into the system.".*

3.5.1 Summary

Updating of the type approval database takes one day or even less for most MS which have answered this question. For the other MS this procedure takes between 2-10 days. A certain delay in updating the type approval data can therefore be expected for most MS. The number of affected vehicles by delayed type approval update can not be estimated.

Typos during the registration process are avoided by using control figures (DE, ES, BE), via electronic information received from the car manufacturer/dealer (SK), via the CoC presented by the car owner (BG), supervision procedures in the registration procedure (LV, FI, PT) or due to responsible work (EL).

The correct linkage between registration and type approval information is ensured by automatised processes leaving no choice for the respective officers (LV, NL, SK, ES, PT), control figures (DE), via the CoC presented by the car owner (BG), supervision procedures in the registration procedure (FI, BE) or due to responsible work (EL).

From those MS having answered the questions regarding update of type approval information no indication of severe incompliance can be identified. Nevertheless the checking procedures show a large variety from automatised processes and scientific methods like using control figures to trusting in the responsible performance of clerks. These different approaches might also be a reflection of the annual number of registered vehicles, as automatic processes are often only cost effective at certain economies of scale.

Therefore no recommendation for corrective action can be given.

3.6 Using the VIN for eliminating specific errors

SR 5 concluded that the error sources due to:

- non-inclusion of certain EU territories,
- slow update of TA databases and
- missing/double counted registrations

can neither be identified nor removed by the Commission or the OEMs and that the only means to identify these errors sources are the VINs. Therefore the VIN comparison had the intention to quantify the identified error and to assess to what extent the VINs would help to remove the error sources. Following table summarises the error sources and presents some information about the number of vehicles potentially affected. The indicated number of vehicles stem from different MS and is therefor neither complete nor representative. The table can therefore only give a rough indication of the extent of involved vehicles.

Table 3: Overview error sources

Error source	No of answers	no of affected vehicles (year)	Quantification relates to following entity
1. Missing registration due to			
a) to temporary registrations	9	5.063	ES, SE
b) belated data submission	14	1.600 (2011), 800 (est. 2012)	PT, DE
2. Double counting due to temporary registrations	1	unknown	LT
3. Geographical coverage	11	~ 12.000[71]	FR, FI, EL
4. Type approval update	15	unknown	-

In case of **temporary registration** enforcement and harmonising procedures would suffice in order to eliminate the error source altogether, an introduction of the VIN is not justifiable for this error source. The same holds true for **belated registrations** which are submitted to the central registration authority so late that they cannot be submitted to the EEA for inclusion into the monitoring. A harmonisation in procedures suffices here.

Most MS indicated that they report all **territories** which are part of the EU. Only for some French Islands and two very small parts of Finland and Greece incompliance was observed. The number of vehicles missed has been based on a very rough analysis and is therefore bound to a high uncertainty. In addition it is not known which territories are being in-or excluded by the individual manufacturers. The usage of the VIN would certainly identify which of

[71] In case of incompliance (e.g. one data set has not been transmitted as usual), the associated number of missing vehicles can be much higher (depending on the "forgotten" territory).

the territories are counted resp. left out of the OEM data. This information can be gathered also by asking the OEM accordingly.

From those MS having answered the questions regarding **update of type approval** information no indication of severe incompliance can be identified. Nevertheless the checking procedures show a large variety from automatised processes and scientific methods like using control figures to trusting in the responsible performance of clerks. How many vehicles might be affected by the incorporation of outdated type approval information had not been asked, but it is unlikely that any quantification is possible. For this error source in theory the VIN could be of help, but in reality the VIN helps the OEM in determining the exact number of vehicles which have to be considered 100% in a given reporting year. If this number is determined by them, a comparison of registered TVV-TAN-TANExtension could be done, but would not be sensible as they already can see any deviations based on the VIN. The TVV-TAN-TANExtension has up to now not been considered sufficient by several OEM to identify the number of registered vehicles.

Overall the identified error sources can be tackled by enforcing the relevant legal background and by harmonising procedures. An introduction of the VIN is not necessary for addressing them is not necessary.

3.7 Multistage vehicles

Article 3 items 4-10 of the Type Approval Directive 2007/46/EC (TAD) lists and defines the different ways to type approve vehicles. Those are:

- national type-approval,
- EC Type approval,
- individual approval,
- multi-stage type-approval,
- step-by-step type approval,
- single-step type-approval,
- mixed type-approval.

For vehicles produced in small series and/or individually approved, Article 22, 23 and 24 set out further requirements.

Depending on the approval path taken vehicles are classified based on Article 3 item 18, 20 and 21 of the TAD as:

- Base vehicles,
- Completed vehicles,
- Complete vehicles.

Completed vehicles which have been type approved via multi stage are commonly referred to as multistage vehicles (MSV). It is currently unclear how many of the **N1 vehicles** to be reported according to Regulation (EU) No 510/2011 are indeed MSV. But it could be clarified how MSV are type approved by a recent study carried out by [TNO 2012][72]:

"It was found during interviews and questionnaires from several stakeholders that at the moment most MSV are approved according to IVA (estimated at around 80%), following national rules and processes. This means that those vehicles are checked at local TS (Technical Services) against national criteria. The base vehicle manufacturer has no information regarding what happens with these base vehicles. For vehicles falling under IVA there are currently no processes in place which guarantee that the correct CO_2 value will be transferred to the Member State registration authority. It is advised to integrate a system for correct data transfer at the level of the member states registration and at (local) approval. [...].

For WVTA (Whole Vehicle Type Approval) the situation is different. WVTA is typically done for larger series of vehicles all sharing more or less the same

[72] Development of a method for the measurement and monitoring of CO2 emissions for N1 multi-stage vehicles Final report for the European Commission - DG Enterprise and Industry, Performed under FRAMEWORK CONTRACT ENTR/F1/2009/030.1, Lot no.4, "Eco-Innovation Techniques in the Field of the Automotive Sector", Specific contract SI2.594774, 16 February 2012

vehicle characteristics. There is a contract between the manufacturer of the base vehicle and the second stage manufacturer and both know what will be built onto the base vehicle. In this dialogue, the right information could easily be transferred for instance via the corresponding Certificate of Conformity (CoC) requested by the Final Stage manufacturer from the Base Vehicle manufacturer. In such cases, the Base Vehicle Manufacturer already knows the final CO_2 value. At the present time, based on the member states registration databases, it is very difficult to evaluate the fleet of MSV with regard to its CO_2 emissions and its mass."

[TNO 2012] subsumed that the total division of the different type approval systems for MSV is as follows:

- *"Individual Approval IVA (+/-80%).*
- *Whole Vehicle Type Approval, WVTA (EU) (+/-20%)*
- *National Small Series (a few %, which can be higher for individual Member States)"*

Based on Annex II B.7 of Regulation (EU) No 510/2011 the manufacturer of the base vehicle is responsible for the overall CO_2 values of the completed vehicles. Furthermore the Commission is required to*:"…ensure that the manufacturer of the base vehicle has timely access to the mass and to the specific emissions of CO_2 of the completed vehicle…".* According to [TNO 2012] *"the latter point means that the chosen method would have to ensure that the OEM is able to receive the data on CO_2 from completed vehicles which use the OEM's base structure.*" The TAD currently obliges only to measure CO_2 emission for the base vehicle [TNO 2012]. Although a revision of the TAD is in progress, these changes will affect only the data of reporting year 2014. Nevertheless Article 8 of Regulation (EU) No 510/2011 obliges the EU Member States to record i.e. mass and CO_2 values from N1 vehicles already from 01.01.2012.

Therefore it is crucial to understand which information is currently and in future available for the type approval and registration authorities in relation to **N1-MSV**. Following questions aim at clarifying that.

3.7.1 Data to be provided for reporting period 2012-2013

Detailed information on the participating MS can be found in annex 7.4.

a. Which information is available for the mass/CO_2 values of the base vehicle and the complete(d) vehicles for **TYPE APPROVAL AUTHORITIES?**

Entity	**Parameter**	**Is the information on CO2 value and mass for the type approval authorities for vehicles being type approved via ... available? Please indicate YES or NO**											
		national type-approval		individual approval		multi-stage type-approval (WVTA)		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	6	6	5	7	9	4	8	4	* see comment below		7	5
	mass value	6	6	5	7	8	5	7	5			6	6
Completed vehicle	CO2 value	9	4	7	6	10	3	9	3			8	4
	mass value	11	2	10	3	11	2	9	3			8	4
Complete vehicle	CO2 value	10	2	9	4	*		11	1	11	2	10	2
	mass value	11	1	11	2			11	1	11	2	10	2

b. Which information is available for the mass/CO_2 values of the base vehicle and the complete(d) vehicles for **REGISTRATION AUTHORITIES?**

Entity	Parameter	Is the information on CO2 value and mass for vehicles being type approved via .... available for the registration authorities? Please indicate YES or NO											
		national type-approval		individual approval		multi-stage type-approval (WVTA)		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	6	7	4	8	7	7	7	7	*		6	7
	mass value	5	8	4	8	6	8	6	8			5	8
Completed vehicle	CO2 value	10	5	7	6	10	4	9	5			9	4
	mass value	12	4	10	3	11	3	10	4			9	4
Complete vehicle	CO2 value	12	2	10	3	*		13	1	13	1	12	1
	mass value	13	1	12	1			13	1	13	1	12	1

c) Which information **will be available for reporting year 2012 and 2013** to be submitted to the European Commission based on Regulation (EU) No 510/2011?

Entity	Parameter	Is the information on CO2 value and mass for the registration authorities for vehicles being type approved via .... available? Please indicate YES or NO											
		national type-approval		individual approval		multi-stage type-approval (WVTA)		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	5	7	4	7	6	7	5	7	*		4	7
	mass value	4	8	3	8	5	8	4	8			3	8
Completed vehicle	CO2 value	9	5	7	5	10	4	8	5			7	4
	mass value	11	4	9	3	11	3	9	4			7	4
Complete vehicle	CO2 value	11	2	10	2	*		12	1	12	1	10	1
	mass value	12	1	11	1			12	1	12	1	10	1

***Germany** stated that although multi-stage type approval for complete vehicles and single step type approvals for base and completed vehicles are not very common, they can be granted[73]. They further mentioned that a registration authority usually cannot see a difference between step-by-step, single-step or mixed procedure approvals.

The Netherlands mentioned furthermore: *"The CO2-monitoring however should not use the approval-procedures mentioned in article 6 (1) of the regulation. But should also take the articles 22, 23, 24,25 into account to determine what the approval status is.*

There are 4 approvals: 3 type-approvals, 1 individual:

- EC Small Series
- National Small Series
- EC-type approval (unlimited numbers)
- Individual approval (one vehicle)
- harmonized
- national

*The **multi-stage type- approval** procedure is possible in which more approval stages are needed to complete the vehicle(-type). In case of an Individual approval the previous stages may be type-approvals. (article 25)*

The multi-stage TYPE-approval has three forms of completion:
- Incomplete vehicle
- Complete vehicle
- Completed vehicle

In most of the EC-member states incomplete vehicles are not registered and plated.(NL: not)
Also incomplete individual approvals are not common use (NL: not).
Whether the individual approval is complete or completed is also in al lot of cases not stated in the documents."

SK: „*Only complete vehicles may be registered in Slovakia. Data on the processing of base vehicles, completed vehicles and complete vehicles are not recorded at present. With regard to reporting obligations, therefore, only complete vehicles – including all techical data and CO_2 values – appear in the vehicle register. A vehicle's CO_2 emission values are obviously determined by its final form, the actual reference mass being the key factor for vehicles having the same engine. Under Regulation 510/2011, data is to be monitored from the beginning of 2012, and efforts are currently being made to find the optimum solution. Consequently, the data for many vehicles could be incomplete or missing in the reports compiled for 2012. There will probably not be any simple way of correcting such data in the future. In the following table, the method of roadworthiness approval is not a key factor; in all cases, the vehicles are assumed to be in their final form."*

FR*: "Reporting for 2012 and 2013 will be not complete due to the calendar of obligation to be EU type-approved for N1 vehicles in 2007/46. Available*

[73] Therefore the postulate of the questionnaire is not correct.

information concern registered N1 vehicle, only those covered by an WVTA both for complete and completed vehicles. Up to now, they do not include vehicles registered in N1 were covered by a national approval. Distribution of new N1 vehicles registrations 2011: 174,975 vehicles taken into account for the report regarding 417,646 totally registered. First 4 months 2012: 76,280 N1 vehicles taken into account for the report regarding 130,115 totally registered. 471 registrations only in MSV. Moreover, the other reason of the non-completed report for 2012-2013 is that the text amending 715/2007 and 2007/46 to introduce the DAM for the calculation of CO2 emissions of N1 MSV is not up to now voted[74]*, (and MS will need to have time to entry into force correctly)."*

Detailed questions:

1) Is it possible for you to identify the number of N1 registrations type approved as MSV?

SE	LV	DE	NL	SK	BG	FR	EL	IT	FI	DK	ES	PT	BE
No	No	No	depends	No	No	depends	No	Yes	No	No	No[75]	No	No

a. Please explain your answer in detail:

Those MS which claimed that such an identification is not possible mentioned that a respective identifier is missing within their systems. DE mention also that such a feature is not claimed in Regulation 1999/37/EC.

Those MS which answered positive or differentiated mentioned that it is only possible if the EU type approval process has been passed since i.e. several manufacturer names are then available. One MS mentioned in addition that a manual query has to be carried out for identifying these vehicles.

b) If yes, how many % of the total N1 to be reported according to Regulation (EU) No 510/2011 are MSV in your country?

The NL answered that only very little of the total N1 will be reported as most of them do not have EU type approval for the last stage and are registered as IVA. Italy estimated that 50-80% of the N1 to be reported are MSV. France mentioned above that in 2012 only very few vehicles are MSV[76].

[74] The procedure now adopted - see Commission Regulation (EU) No 143/2013 of 19 February 2013 amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards the determination of CO 2 emissions from vehicles submitted to multi-stage type-approval.

[75] will be available in the future.

[76] As of the first 4 months of registration.

2. Is it possible on the basis of the completed CoC to identify the OEM of the base vehicle and to report this information?

SE	LV	DE	NL	SK	LT	FR	EL	IT	FI	DK	ES
Yes	No	No	No	No	No[77]	No	Yes	Yes	No	No	Yes

France answered very detailed and stated that:

"The name of the base manufacturer is not stated in the final stage vehicle's CoC, but it is on the base vehicle's CoC. The final stage manufacturer only files the changed items or the empty items of his own CoC, but he does not copy the values of the base CoC. For the registration process, you shall have the 2 CoCs in order to have all the items filled, to complete the registration certificate. It is possible then to identify the name of the base manufacturer, but it is not an item of the registration certificate according to directive 1999/37. The report of the name of the OEM will be possible only for final stage vehicles EU type-approved, but not directly. The link is only done with the number of the base WVTA."

3. Is it possible to monitor the mass in running order of the base vehicle as well as the TVV and TAN for that vehicle for all new registrations of completed N1 vehicles?

SE	LV	DE	NL	SK	LT	BG	EL	IT	FI	DK	ES	PT	BE
No	No	No	No	No	No[78]	No	No	Yes	No	No	No	No	Depends

Main difficulty seems to be that information from the base vehicles is not mandatory for registering a vehicle according to Directive 1999/37/EC. Some MS also mentioned that either a proper IT link for this information has not yet been established or that the IT system is not designed in a way to integrate this information.

4. Does the registration authority have access to the CoC of the incomplete vehicle (the base vehicle) at the time of registration of the completed vehicle?

SE	LV	DE	NL	LT	FR	EL	IT	FI	DK	ES	BE
No	No	Yes	depends	No	Yes	Yes	Yes	Yes	No	No	No

[77] Mostly no.

[78] In most cases No.

In some MS the CoC is kept in the possession of the manufacturer and only selected information is being transferred to the authorities.

Again access to the CoC of the base vehicle resp. its content by the registration authorities is not mandatory.

Furthermore France pointed out that access has not to be mistaken with its usability of the data. The usability is defined on administrative and technical level. First the registration authorities would be required to take certain information from this CoC and then the IT system would have to be adapted.

The last comment is again a reference to Directive 1999/37/EC.

5. If the CoC is not used as the primary data source, can the relevant parameters be retrieved from type approval data for the 2013 reporting?

SE	LV	DE	NL	LT	FR	EL	IT	FI	DK	ES	PT
N.A.	No	Yes	depends	N.A.	Yes	No	Yes	No	No	Yes	No

Several MS mentioned that in particular the ranges indicated in the type approval document hinder the retrieval of specific data. The Netherlands mentioned that it is possible if a vehicle has a WVTA or if the last stage has an EU type approval. For most MSV though data of the base vehicle is not registered or referred to.

3.7.2 Data to be provided for reporting period 2014 and onwards

Commission Regulation (EU) No 143/2013 amending Directive 2007/46/EC and Regulation (EC) No 692/2008 introduces a new method requiring the use of default added mass (DAM) in order to measure the associated CO_2 value of the completed vehicle. These amendments will be obligatory from 01.01.2014. The new method requires that a default added mass is determined reflecting the reference mass of the completed vehicle. The default added mass is used for the testing of the base vehicle on a dynamometer. The default added mass is calculated using the mass in running order and the technically permissible maximum laden mass of the base vehicle. The default added mass or the mass in running order (MRO) and **t**echnically **p**ermissible **m**aximum **l**aden **m**ass (TPMLM) of the base vehicle should therefore be reported within the detailed data to be submitted to the Commission.

For this procedure the certificate of conformity of the completed N1 will be amended to include the following key parameters:

- Name of the manufacturer of the base vehicle
- Type, variant and version (TVV) code of the base vehicle
- Type approval number (TAN) of the base vehicle, including extension number
- Mass in running order of the base vehicle

In addition, the above parameters will also be included in the individual approval certificate for all MSVs that fall under individual approval.

With the CO_2 emissions calculated according to the new formula, Member States should monitor the following parameters for all MSVs:

- Manufacturer name of completed N1,
- Manufacturer name of incomplete vehicles,
- TVV + TAN of the completed N1,
- TVV + TAN of the incomplete vehicles,
- Mass in running order of the completed N1[79],
- Technically permissible maximum laden mass (TPMLM) of the completed N1[80],
- Mass in running order of the base vehicle.

[79] if the mass in running order of the completed vehicle means that the reference mass of the completed vehicle exceeds 2610 kg, the vehicle is out of scope.

[80] it should be the same as the TPMLM of the base vehicle.

Questions:

1. Can you confirm that the TPMLM stated in the CoC of the completed N1 is the same TPMLM as that of the base vehicle?

SE	LV	DE	NL	LT	FR	EL	IT	FI	BE	SK
Yes	No	No	No	No	No	Yes	Yes	No	No	No

Most MS stated following reasons for the difference of the TPMLM of the base vehicles if compared to the TPMLM of the completed vehicle:

- *LV: "Every case can be individual and depends on manufacturers of base and completed vehicle."*
- *DE: "There is no rule that hampers the stage manufacturer to enlarge the TPMLM. There is even no rule to give a TPMLM in the first stage."*
- *NL: "The essence of multi stage type approvals is that in a specific stage the (technical) characteristics of the previous stage can be modified. Therefore the TPMLM can vary between stages; e.g. if an additional axle is installed."*
- *SK: "Slovakia can provide only F.1 data from registration certificates; this is the maximum permissible gross laden mass. They do not record the TPMLM (technically permissible maximum laden mass) at all and cannot provide such data."*
- *LT: "TPMLM of the completed vehicle could be less than TPMLM of the base vehicle."*
- *FR: "The TPMLM can be changed (but rarely) by the second stage manufacturer."*
- *FI: "There is a possibility of changing TPMLM related components to the base vehicle and thus the TPMLM is changed."*
- *EL: "Greece stated that they are able to check the values of the CoC."*

2. In the case of individually approved completed N1 are there any specific obstacles to monitoring the parameters referred to above?

SE	LV	DE	NL	LT	IT	FI	PT	BE
No	No	No	Yes	No	No	Yes	Yes	Yes

Several issues were seen by the MS:

- *LV: "TVV and mass in running order of the base vehicle could be not available."*
- *DE: "Not in case the registration authority provides all relevant data. But to DE understanding individually approved N1-vehicles do not fall under the scope of Reg. (EC) 510/2011."*
- *NL: "Competed N1's hardly ever have type approved last stage. The Dutch registration has no link to the base vehicle/type approval and they register complete(d) vehicles only. In case of a MSV no data of the base vehicle is registered or referred to."*
- *FR: "Concerning TPMLM of a completed N1 individually approved, it will be very difficult to monitor it (as explained above)."*
- *PT: "Along with the necessary adaptations in the structure of the type-approval databases Portugal mentioned that they have to provide adequate training to our staff working at the regional departments since they are responsible for the individual approvals processes and for uploading the associated data into the type-approval databases"*
- *BE: "Belgium only has the data if the base vehicle is preregistered*."

3. Are there any specific issues which from your point of view still need to be addressed also after the changes of the TAD/CoC?

Only few MS responded to this question. SE did not seen any difficulties if the TAD/CoC will be adapted accordingly.

Following problems were mentioned:

- Slovakia considered it essential that the requirement to monitor data on base, completed and complete vehicles for the purposes of fulfilling reporting obligations be reflected in Regulation 510/2011. *"The final versions of the xml and xsd datasets also need to be published sufficiently well in advance. If this is not done, it will not be possible to provide the data in question in an effective manner."*
- LT: *"All CoC must be provided to registration authority (including base vehicle and multistage approval)*."
- *Competed N1's hardly ever have type approved last stage. NL registration has no link to the base vehicle/type approval.".*

3.7.3 Summary

The MS clearly indicated that for MSV the required information according to Article 8 of Regulation (EU) No 510/2011 will not be available until the emission targets will become binding in calendar year 2014. Whether from this year onwards the data can be delivered in the envisaged way can also be questioned as it was clearly mentioned that the TPMLM (which is the basis for calculating the DAM) can differ between the base vehicle and the completed vehicle. The answering MS disagreed when deciding if the type approval information was sufficient for providing the necessary information for the MSV. In particular based on the information from the Netherlands and the recent experience with the ranges indicated within the type approval information, it is clear that the type approval information alone will not provide the level of detail necessary for multistage vehicles. Very different information was also submitted regarding the annual number of MSV in the different MS. It was mentioned that most of them are IVA anyway (NL), that the number of MSV is very high (IT) or very low (FR). The number of MSV reps. their way of approving them is indeed crucial regarding the data availability according to Regulation (EU) No 510/2011. If they are mainly individually approved the data is most likely not prepared to be submitted to the Commission as the information is only available locally. If this is true for a large number of N1 as stated by TNO (2012) and IT, the data completeness will be insufficient for the majority of N1 and the information will have large differences to the information available at manufacturer level.

4 TASK 2/3: INTER-COMPARISON OF VIN DATA BETWEEN THE MEMBER STATES AND OEM

Numerous manufacturers cited the lack of the Vehicle Identification Number (VIN) as one reason for not being able to completely verify the 2010 CO_2 monitoring data. In order to assess whether the introduction of the VIN have significant advantages in comparison to the current system, some comparative work between VIN based Member State and OEM data has been carried out. The request for data is enclosed in the Annex.

4.1 OEM participation

3-4 manufacturers having a large number of registrations should have been chosen for the comparison and among those should have been at least one Member from JAMA.

This analysis has been presented and discussed with ACEA and JAMA on July 6th 2012. The request for data is enclosed in the Annex. No binding participation was signalled during or after that meeting. Therefore ACEA and JAMA were again contacted via Email on August 10th 2012 on the same subject. Feedback was received by Ford and Volkswagen and they confirmed their participation.

In order to incorporate more manufacturer and in particular one JAMA member four more large manufacturers were contacted directly in August 2012. No positive feedback was received.

4.2 MS participation

3-4 Member States with a high number of registered vehicles or about 2 Member States with a high number of registrations and about 2-3 Member States with a low number of registrations should have been chosen for the comparison.

Together with the two questionnaires mentioned above also a request for participation has been sent to the Member of WG IV (see separate Annex). Due to the very limited feedback another appeal was sent to the MS authorities in the beginning of October 2012. Only the Dutch authorities confirmed their participation and submitted their data 13.12.2012.

The following table gives an overview about the submitted VIN based data per data provider.

Table 4: Submitted data

Source	Netherlands	Ford	Volkswagen
Manufacturer		X	X
VIN	X	X	X
Make	X	X	X
Type Approval Number	X	X	-
Type	-	X	-
Variant	X	X	-
Version	X	X	-
Commercial name	-	X	-
Mass	-	-	X
CO2	-	X	X
Category (M1,N1)	M1	M1, N1	M1, N1
Additional fields	-	X	X
Year	2011	2010, 2011	2010, 2011

Only a limited number of analyses was possible as not all of the requested information was submitted by the individual data providers.

4.3 Results

The VIN comparison was carried out between January and March 2013 and came to following conclusions:

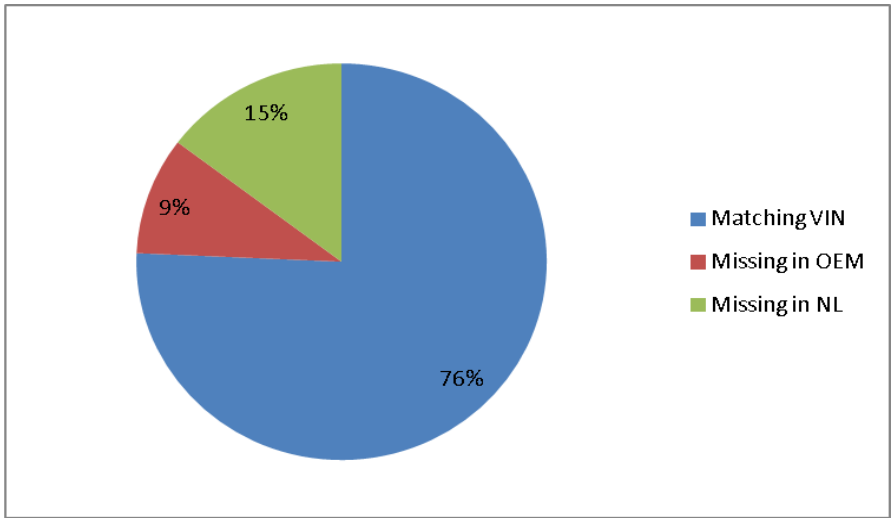


Figure 1: Overall result of the VIN comparison

The majority of VIN from both data sources could be matched. Nevertheless 15% of the VINs held by the Dutch authorities could not be matched by those provided by the OEMs and 9% of the VINS held by the OEMs could not be

matched with the Dutch dataset. The split-up per data source and manufacturer is shown in the table below.

Table 5: Results of the VIN comparison per manufacturer

Source	Manufacturer	No. of vehicles	No. of vehicles having corresponding VIN in OEM data	No corresponding VIN
NETHERLANDS				
	Volkswagen	60588	44066	16522
	Ford	41201	41158	43
	Ford CNG-Technik	134	134	0
Source			**No. of vehicles having corresponding VIN in NL data**	
VOLKSWAGEN	Volkswagen	68024	50842	17182
FORD	Ford Werke GmbH	46020	37809	8211

4.3.1 Reasons for missing vehicles in the Dutch data set

Table 5 shows that ~25.000 vehicles could not be matched with the Dutch data set although the OEMs claimed to have sold these vehicles in 2011. The Dutch authorities were able to provide additional information about these vehicles (see figure below).

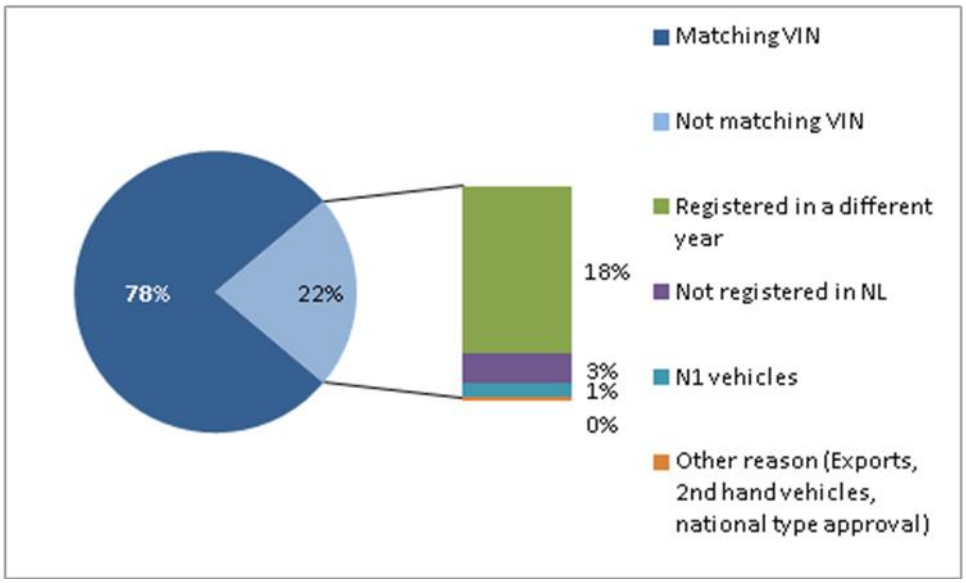


Figure 2: Reasons for missing vehicles in Dutch data set

The main reason for the non-matching VINs is the fact that the sales date and date of registration do not concur.

14% of the vehicles indicated by the OEMs were never registered in the NL. A minority of vehicles (~1%) were not part of the Dutch data set because they were N1, 2nd hand vehicles, IVA or exported to another country.

4.3.1.1 Sales date vs date of registration

A more detailed analysis of this issue revealed that 50% of the vehicles that could not be matched were sold in December 2011 but registered in 2012 (see next figure).

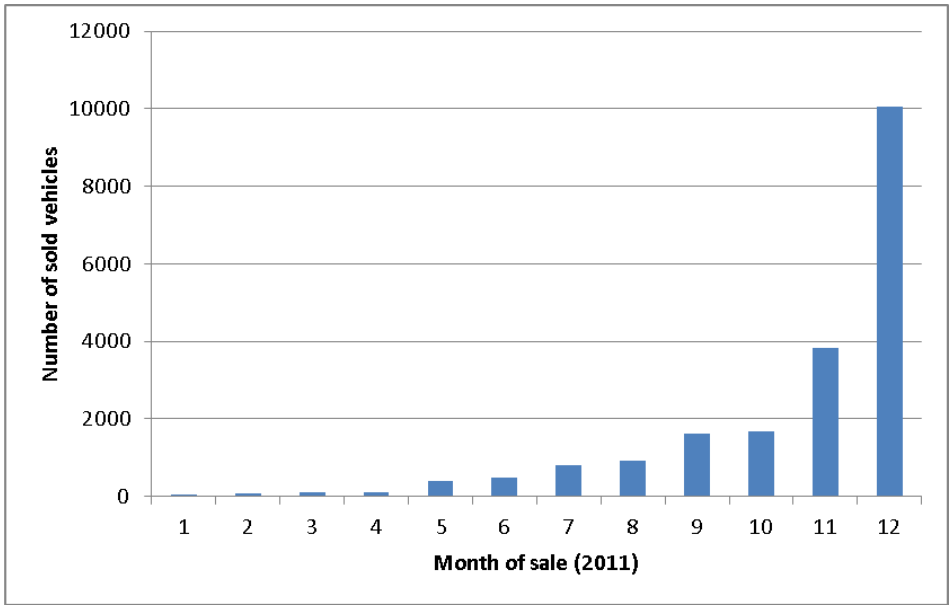


Figure 3: Missing vehicles in the Dutch data set and their month of sale

The Netherlands have a real time link between local registration authorities and the central database for registrations. All registration applications are being dealt with within the year in which the application for registration was submitted. Temporary registrations are not allowed in the NL. Therefore there is no evidence that the Dutch registration system causes delays in the registration once a registration application has been duly submitted.

The reasons for the delay between sale and registration is therefore very likely to be found outside the Dutch registration system and might be closely connected to the information which the OEM receives from the respective dealer.

4.3.1.2 Cross border registrations

The second prominent issue within the Dutch data set were the 3% non-matched vehicles which were never registered in the Netherlands, but had been sold there according to the OEM. Based on former experience, it was expected that these vehicles were most likely to be found in other Member States. Therefore the neighbouring countries of the Netherlands, namely Belgium and Germany, were asked for their participation. The respective “missing” VINs

were submitted to BE and DE authorities in order for them to run a search in their respective registration databases.

80% of the non-matched vehicles were found in those two countries and predominantly in Germany (79%). In conclusion this means that although these vehicles were sold by a Dutch dealer, they were actually registered in another MS.

The remaining missing 20% (~ 700 vehicles) are most likely also registered in one of the other MS. To contact them in search for the remaining vehicles was not considered to be reasonable, as the result would very likely not change much. In addition some of the “missing” vehicles might also have been registered outside the European Union (e.g. in Switzerland), and can therefore not be traced further.

4.3.1.3 Other reasons

Regarding the N1 vehicles that were indicated by the OEMs, the Dutch authorities specified that those vehicles have actually been nationally type approved by the Netherlands and do not have a European type approval. Most of the indicated vehicles belonged to the manufacturer Volkswagen Nutzfahrzeuge (= commercial vehicles).

The remaining non-matched VINs indicated under “other” were not further analysed as their total number is insignificant.

4.3.2 Reasons for missing vehicles in the OEM data set

Table 5 shows that ~17.000 VINs held by the Dutch authorities could not be matched with VINs in the OEM data set, despite the fact that those vehicles had been registered in 2011 in the Netherlands. The OEMs were able to provide additional information about these “missing” vehicles (see figure below).

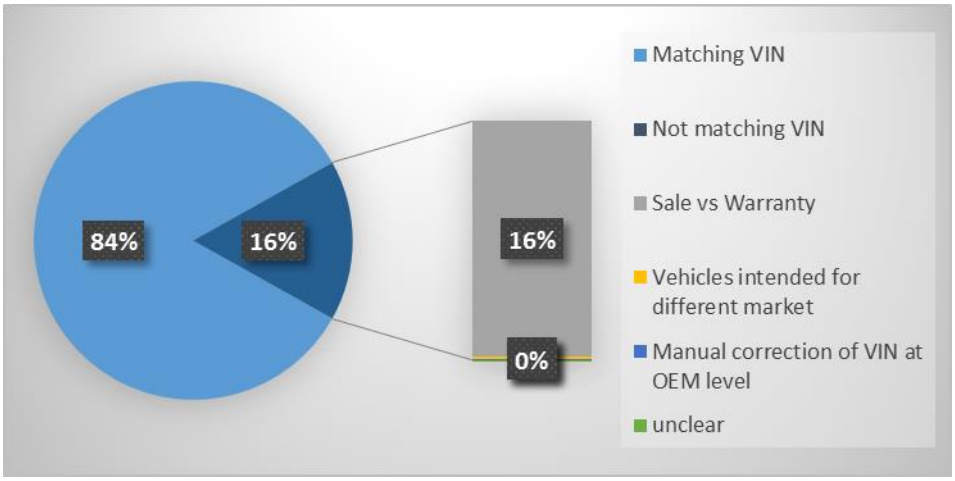


Figure 4: Reasons for missing vehicles in OEM data set

According to the OEMs the majority of the missing VINs was related to vehicles sold in 2010. When checking those VINs against the date on which the warranty started, the OEMs could confirm that for ~16.358 vehicles the warranty started

in 2011 although they were sold in a different year (mainly 2010). A few vehicles (165) were intended for a different European market, 43 had not been submitted by the OEM although they should have been and 2 VIN could not be identified properly.

It can therefore be concluded that the rate of matching VINs between the Dutch dataset and the data held by the OEMs was very high (99,998%).

4.4 Comparison TVV and reference database

The 2010 and the 2011 dataset should have been compared against the information given in the reference database available at the EEA. The EEA informed the Ökopol (EEA pers. comm. 2012) that the OEM feedback was insufficient. As a consequence this comparison was omitted.

4.5 Inter-comparison VIN-based systems

The main interest for this comparison task was to identify:

1. how many of the unidentifiable vehicles in the Member State data set can actually be identified by using the OEM information and matching the VINs,
2. whether really 17 characters are necessary to identify the individual vehicles or if also a lower number is sufficient and if so which,
3. the effect of one typo within the VIN with regard to the identification rate of the unidentifiable vehicles.

1) Unfortunately the information on CO_2 and mass values was not available for the Dutch data set, so that this comparison could not be performed. But it is clear that for all matching VINs the OEM CO_2 and mass values could have been used.

2) In order to analyse if all 17 characters of the VIN are necessary to identify an individual vehicle, each of the place of the VIN has been analysed with regard to its CO_2 value. For example if a VIN started with “WF05...”, the first place would be the “W”. The CO_2 values of all vehicles having a “W” as the first letter of the VIN were then screened and the registration weighted average minimum and maximum CO_2 value was calculated in order to reflect the spread of CO_2 values. The succeeding step was to add the second number/letter of the VIN to the analysis. In this example the spread of CO_2 values which appear for all vehicles which VIN starts with a “WF”. This was continued until the last place of the VIN was reached. Results of this analysis are presented in following figure for M1 & N1 vehicles, 1 OEM and 2011 data.

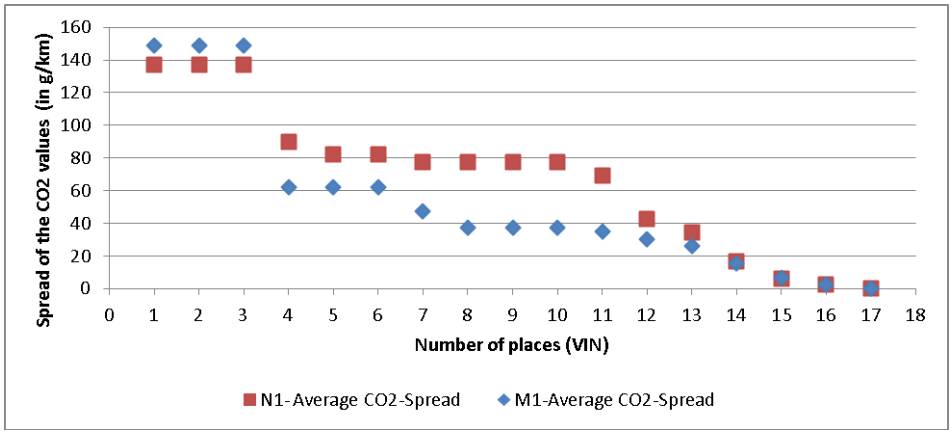


Figure 5: CO_2 spread if only a fraction of the VIN is used for vehicle identification

The spread of the CO_2 value decreases with every additional digit until zero when all VIN digits (17) are taken into account. In conclusion this means that all VIN digits are needed in order to get the maximum precision.

3) In order to simulate a typo within a VIN, two approaches were identified. The first approach would be to simulate for all VIN and for every place of each VIN an alternative letter or number.

The second approach was to regard a typo as a place of the VIN which is not recognizable and is therefore ignored.

Since the first approach would require a multitude of computer operation time and performance requirements which is not reasonable in view of cost-benefit considerations, the second approach was followed.

The following table shows how many VINs are identical if one place of the VIN is ignored.

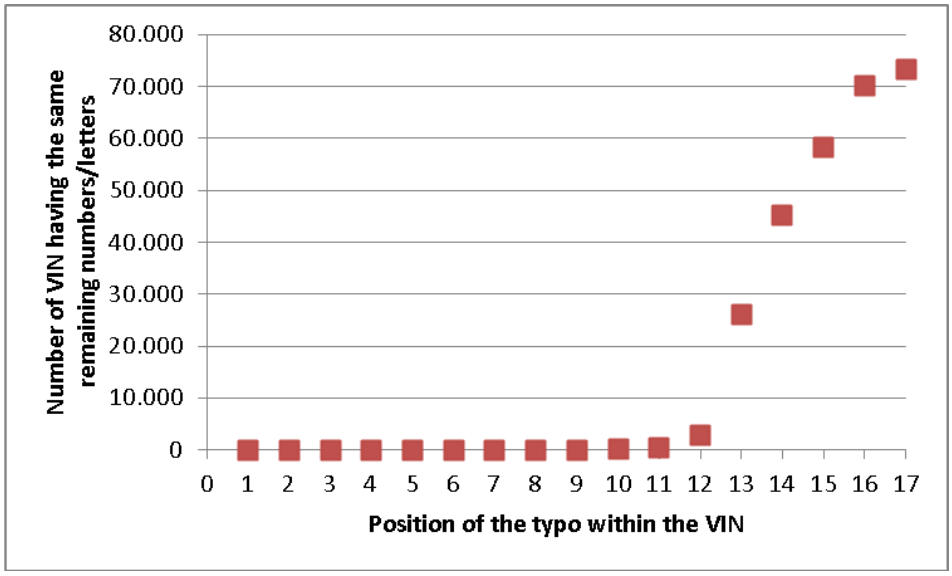


Figure 6: Effect of a typo within a VIN

For illustrative purposes above figure is explained in more detail by some questions:

How many VINs are identical if there is a typo in place 16 of the VIN?

or in other words:

How many VINs are identical if the first 15. and 17. places of the VIN are identical?

In this example which is based on the Dutch VIN submission for the year 2011, the answer would be:

70.000 VINs are identical if there is a typo in place 16 of the VIN.

Figure 6 also shows that a typo within the first 11 places of the VIN does not really have an effect. Almost no identical VINs are observed when those places contain a typo. This changes significantly from the 12. place onwards.

This means that a typo within the last six digits of the VIN could result in a large number of vehicles which are represented by this VIN. It is therefore crucial that the last digits of the VIN are flawless.

4.6 Summary VIN analysis

The VIN comparison performed for this contract showed that the Member State dataset was accurate and included the registrations that were relevant for the monitoring year in question. The VIN analysis disclosed that the Dutch and OEM data were matchable by 99,998% and that the initial OEM submission was more incorrect than the Dutch submission. It was moreover clearly demonstrated that the additional registrations referred to by the OEMs were correctly excluded from the Member State dataset since they related to registrations made in a different monitoring year.

Nevertheless, the analysis of Aston Martin which was also based on the VIN showed that in other MS or with another manufacturers the situation might be different and that the VINs can help here to ameliorate also the MS registration systems.

Therefore two ways forward regarding the use of the VIN are thinkable.

1) Changing Annex II A of Regulation (EC) No 443/2009 so that all information is being submitted based on the VIN instead of (or in addition to) the type, variant and version. An advantage would be that all vehicles which have been sold and registered in EU 27 are traceable on an individual basis. The administrative burden will most likely increase for the EEA, the MS authorities and the OEM, at least in the short term perspective. Whether this burden is high or only marginal depends on how the respective MS and OEM database system are designed in detail. In case of the MS the system have to be adjusted so that their VIN database feeds into the (then) adapted xml-schema as required. Also the OEM might have to adapt their systems in order to identify those vehicles which have not only been sold in EU 27 in a given year but also been registered in the necessary reporting year. The analysis performed in this study showed this clearly since one OEM had to add the warranty database to the sales database in order to trace the vehicles which were registered in the Netherlands in the respective year, but were not considered to be sold in that year.

Generally the VIN will not help regarding vehicles which were sold in EU 27, but never registered in that territory.

2) Using the VIN as a means to decide which of the data sources is right or contains better data than the other. This is the procedure currently implemented as seen with the Aston Martin example. Advantage of this procedure is that only specific analysis will be performed in case that evidence suggests that a problem has occurred. But depending on the number of issues occurring per year these analysis can also be very time consuming. The positive offsets of a compulsory VIN submission as mentioned under 1) like the increasing trust of the manufacturers and the successive decline of discussion with the OEM will most likely not develop to the same extend by these annual spot analyses.

In conclusion this means that if the highest level of data certainty is desired by the Commission the data submission according to Article 8 (1) and Annex II part A of Regulation (EU) No 443/2009 should be based upon the VIN. By taking this path the initial effort for establishing the system will be high in the beginning and provide also relevant results in the short term, after that it can be expected that the main differences or even flaws between the databases of the MS and the OEM are cleared and that only small differences are being observed in mid- and longterm.

If the second highest level of data certainty is desired by the Commission the data submission based on the TVV and its type approval number (TAN) including its extension number should be implemented. Currently this is being done based on Regulation (EU) No 443/2009 and the manufacturers guidelines[81]. In case of major discrepancies between the two data sets, an analysis of the VIN can still be performed for the specific issues. By taking this path the effort is mainly driven by those manufacturers actively requesting a more detailed analysis. In the long run also here the differences will get smaller although, absolute certainty for the OEM about the data will most likely not be achieved as the data is still aggregated.

[81] Guidelines to manufacturers for the notification of errors in the provisional data on CO_2–Emissions from cars.

5 TASK 4:ASSESSMENT OF DIFFERENT METHODS TO ESTIMATE THE ERROR MARGIN

5.1 Background

According to Article 8 (1) of Regulation (EC) No 443/2009 *MS "shall record information for each new passenger car registered in its territory in accordance with Part A of Annex II.* They shall furthermore *"ensure the maintenance, collection, control, verification and transmission of the […] monitoring data"* (Article 4 Regulation (EU) 1014/2010).

The Member State data is checked by the Commission (i.e. the EEA) when it is submitted. If the dataset is incomplete or manifestly incorrect, the MS is requested to re-submit the data or to agree to corrections. The Commission keeps the data reported by Member States in a central register, shall provisionally calculate inter alia the average CO2 value for each manufacturer (Article 8 (4) Regulation (EC) No 443/2009) and inform manufacturers thereof. Manufacturers may notify to the Commission if there are errors in the provisional data and calculations.

Based on the "Guidelines to manufacturers for the notification of errors in the provisional data on CO_2 emissions from cars" of the European Commission, version 2012, the notification of errors reported by the manufacturers must contain error codes, namely A, B or C. These error codes represent different possible modifications of the dataset with different implications, which are explained below.

*"**Error Code A** shall be used when an entry is changed for a vehicle that can be identified by the manufacturer. Following verification by the Commission, the corrected record will be considered for the calculation of the average mass and CO_2 emissions of the manufacturer. This concerns corrections of records where the manufacturer has enough elements to make the necessary changes of numerical values (e.g. the value for mass or CO_2), or of text (e.g. the TVV-codes) as well as the completion of the records in case of missing data.*

For a specific vehicle version a series of different values may apply for CO_2 or mass. Where the record includes a CO_2 or mass value within that series, it should, in principle, be considered correct, i.e. a correction is only appropriate if the values that fall outside the series. In the latter case, the Error code A should be given together with the correct precise value, or if that is not possible (in particular where TAN is not available), the applicable series (i.e. minimum and maximum values). In the latter case the average emissions and the target will be calculated on the basis of the minimum applicable CO_2 value and the

maximum applicable mass value. Should the record include the Error Code A but not have been corrected, i.e. the entries concerned are left blank or unchanged, the Commission will not consider this as a valid correction and the original record will be used for the final calculation.

***Error Code B** shall be used when a record contains entries for CO_2 and mass but the vehicle referred to in the record cannot be identified (e.g. the TVV-code or TAN is missing or incorrect) and the manufacturer cannot otherwise identify the vehicle. When records are marked with an Error Code B, no entries in the record should be modified.*

Records with the Error Code B will be taken into account for the final calculations, but an error margin will be applied to take account of the fact that the values cannot be verified by the manufacturer.

Note that the record could be considered correct, if the TVV-code is only partially missing or incorrect and the CO_2 emissions and/or mass fall within a series or range that is applicable for the given combination of type, variant or version.

***Error Code C** shall be indicated in column "MC" if the record refers to a vehicle that is either*

- *out of the scope of Regulation (EC) No 443/2009;*

  or

- *individually approved or approved as national small series;*

  or

- *unknown.*

Records with Error Code C will not be taken into account for the final calculation of the specific emissions target and the average specific emissions."

The aim of this project focuses on error code B as the Commission guidelines require that a margin of error will be applied upon this error type.

Service Request (SR) 5 already discussed three methods to incorporate the associated uncertainty of entries having error code B (= having missing or incomplete type, variant or version). This report shall now assess which of the three can be recommended from a mathematical point of view by checking whether their basic assumption can be validated. Therefore each method is again briefly described and their underlying assumption is presented in chapter 5.2. Chapter 4 analyses each assumption as far as possible. The results of this analysis are presented in chapter 5. Further developments of the methods are shown in chapter 6 and chapter 7 discusses the results.

All shown analyses refer to two manufacturers - one from 2010 and one from 2011.

5.2 Description of methods

5.2.1 Method 1

5.2.1.1 Description

This method was used upon the 2010 data and is briefly explained in Commission Implementing Decision 2011/878/EC. During the work under this contract it was realised that the initial understanding of the description in Commission Implementing Decision 2011/878/EC used in SR 5 was not complete and that the different error codes were taken into account in a defined way.

The method is based on two queries and the condition that data rows which were missing either a CO_2 or a mass value had to be excluded as well as error code C. In the first query the average mass and CO_2 value are calculated by excluding the error code B. In the second query error code B is included. The difference of the CO_2 value in both runs defines the correction factor to be applied upon the manufacturer. The distance to target is always corrected in favour of the manufacturer.

5.2.1.2 Underlying assumptions

Data which is missing either the CO_2 value or the mass value is assumed to be incorrect. Therefore the data is excluded from all further calculations.

5.2.2 Method 2

5.2.2.1 Description

Method 2 applies the same correction of the vehicles having a known TVV upon the vehicles having an unknown TVV onto mass and the CO_2 values separately. Whether the distance to target is closer or further away depends on the individual manufacturer. A detailed explanation of the method can be found in SR5.

5.2.2.2 Underlying assumption

Correction is needed to prevent a systematic error in the estimated mean by estimating values for the TVV unknown and TVV known.

5.2.3 Method 3

5.2.3.1 Description

This method uses the confidence interval which is generally used to estimate the true mean of a population. In this approach the number of unidentifiable vehicles determines the confidence interval which will be applied upon the manufacturer data.

5.2.3.2 Underlying assumption

The dataset is a random sample from all registered vehicles.

5.3 Analysis

All assumptions of the three methods are being tested in following chapters in order to check whether their assumptions can be verified.

5.3.1 Method 1

Method 1 ignores all data sets which are missing TVV and are not complete after OEM correction. This implies that those values can not be trusted and that they need to be suppressed. In order to prove this assumption the data of 2011 has been analysed in more detail.

Data sets which remain incomplete regarding CO_2 or mass value after the notification of the manufacturer must have an incomplete or missing TVV and therefore should be marked by error code B. But error code B only marks the fact that the entry can not be verified by the manufacturer, it does not state that the CO_2 value or mass value available for this entry is incorrect. It could be correct or incorrect. The manufacturers are not obliged to comment on the values itself, so whether the product portfolio of the respective manufacturer does in fact comprise vehicles having this specific CO_2 or mass value. Error code B only refers to the quality of the TVV.

Nevertheless it is possible to compare the data sets which comprise both values (mass & CO_2) and those which are missing one of them, in order to investigate whether one group has different characteristics than the other. This has been done based on the preliminary 2011 notification of one manufacturer.

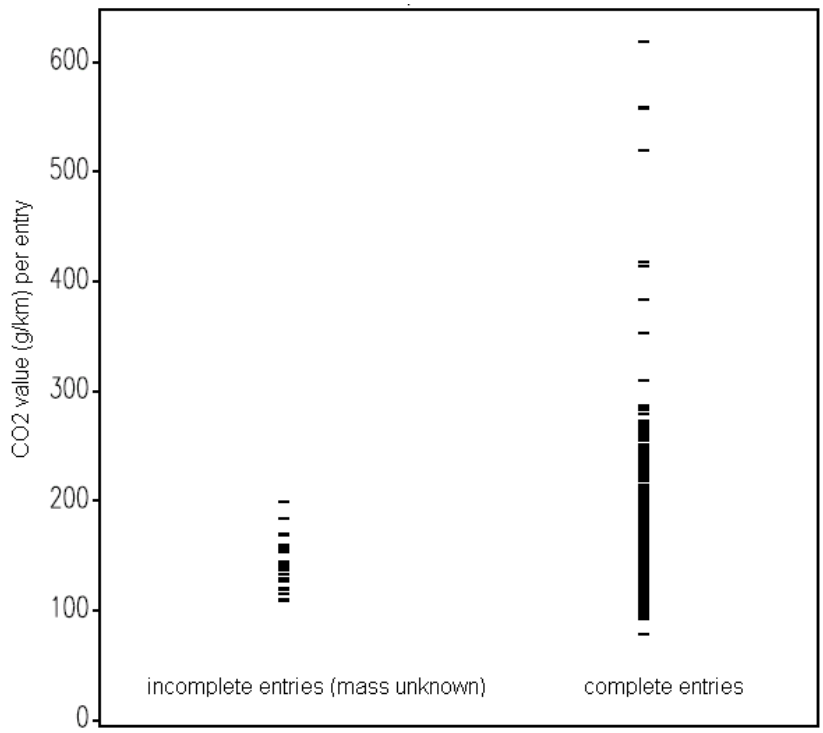


Figure 7: Distribution of CO2 values for complete and incomplete entries

Above figure shows that the distribution of the CO_2 values of the incomplete entries is within the area where most entries of the complete entries are. They

can therefore be considered plausible resp. they are not implausible. Furthermore it can be observed that the CO_2 values of the incomplete entries tending to the lower end of the range. By suppressing them, the average CO_2 value would therefore increase.

The same analysis can be done with the mass values.

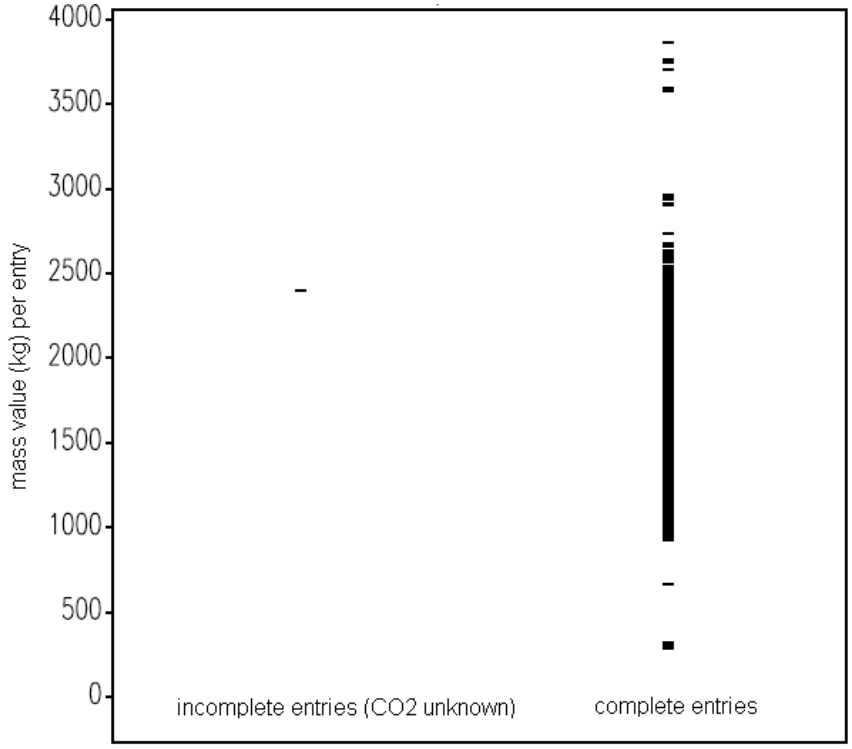


Figure 8: Distribution of mass values for complete and incomplete entries

Above figure shows, despite the little number of entries being incomplete, that the distribution of the mass values of the incomplete entries is within the area were most entries of the complete entries are. They can again be considered plausible resp. they are not implausible. Furthermore it can be observed that the mass values of the incomplete entry tends to the higher end of the range. By suppressing it the overall mass value would decrease.

From this analysis it cannot safely be derived that incomplete entries contain false data.

The second part of the application of method 1 compares the data of two different queries. The first one includes all verified data (blank cells and cells with error code A). The second one includes all verified and all unverified data (blank cells and cells with error code A & B). The difference in the average mass and CO_2 values of both datasets determines the distance to target per manufacturer.

The distribution of the two data sets is shown in following graphs.

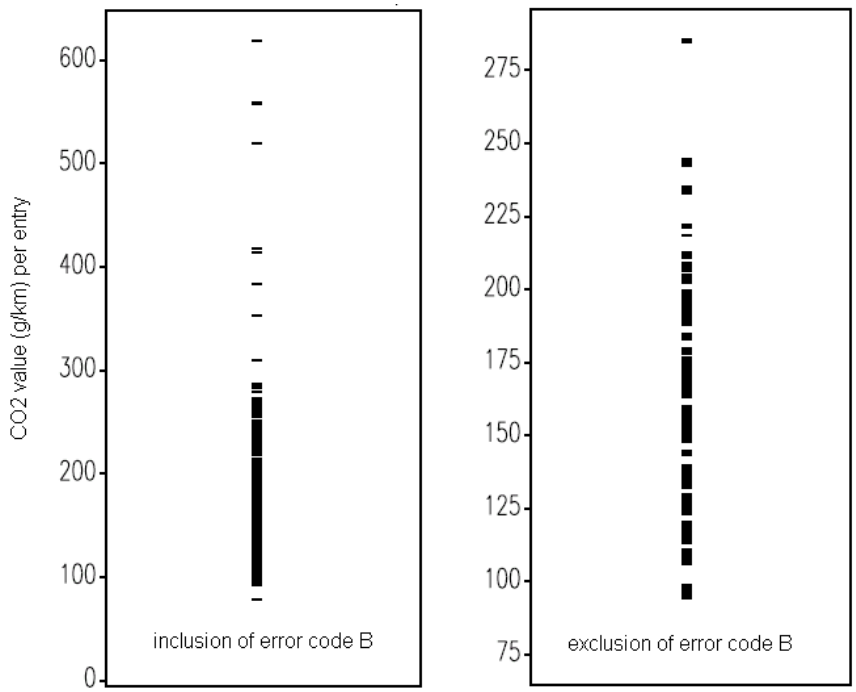


Figure 9: Distribution of CO2 values when in- or excluding error code B

It can be observed that the difference between in- or excluding error code B mainly limits the range of the CO_2 values as all CO_2 values above ~280 g/km vanish when error code B is excluded.

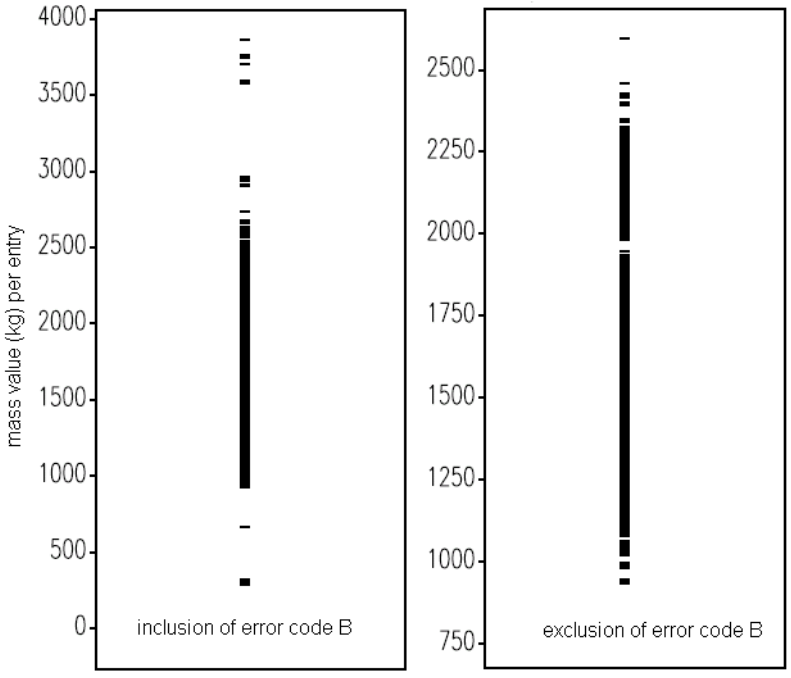


Figure 10: Distribution of mass values when in- or excluding error code B

It can be observed that the difference between in- or excluding error code B mainly effects the high and low mass values for this one manufacturer as all values above ~2700kg and below ~800 kg disappear.

A difference between both data sets is plausible if one considers that incomplete TVV can not be verified and have therefore a higher probability to contain incorrect values. Nevertheless it cannot be safely said that all entries having error code B are incorrect as following graph shows.

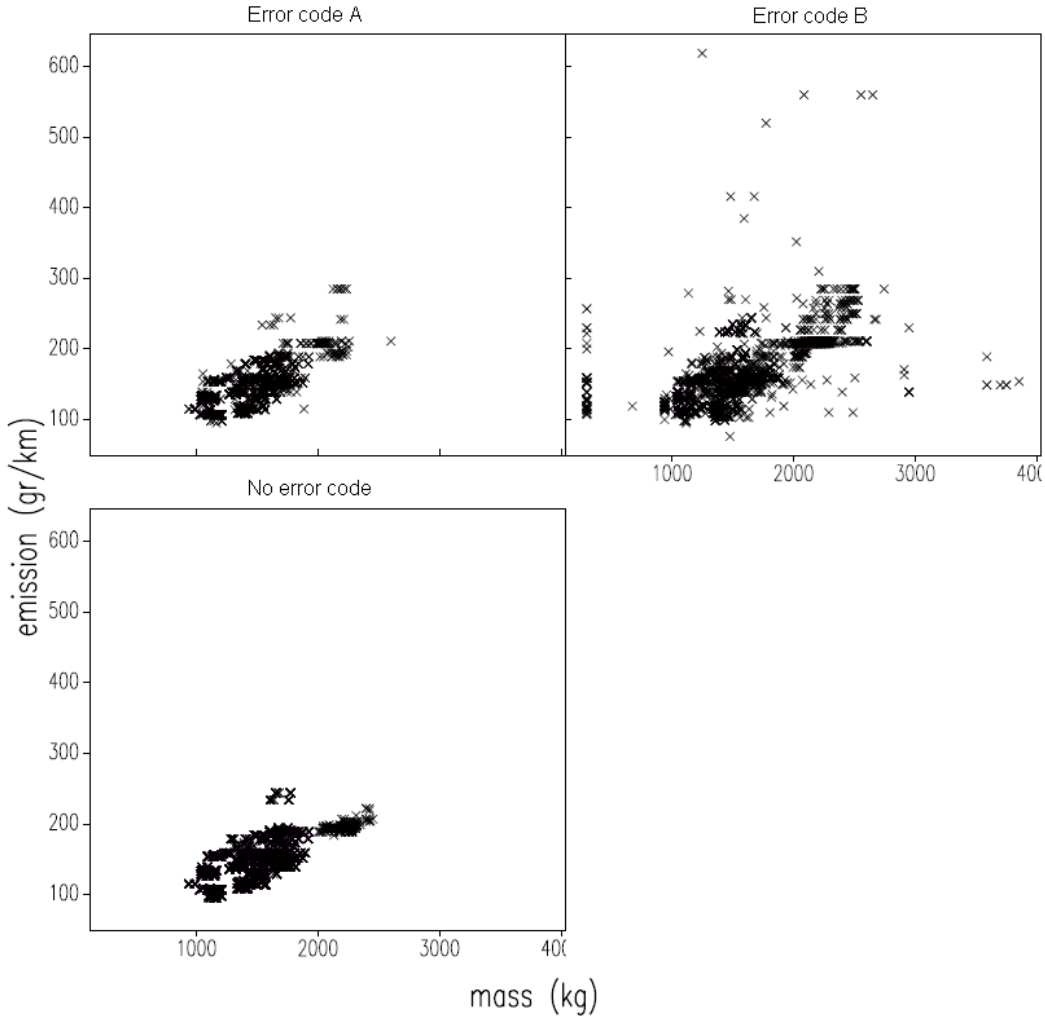


Figure 11: Distribution of the data depending on the their classification

The distribution of the entries having no error code (= values agreed and unchanged by the OEM) is between 1000-2500kg and 100-250 g/km. The distribution of entries having error code A is very similar to the “no error code”-distribution, showing a slightly larger range for mass and CO2 values. The distribution of entries having error code B show per emission/mass value a larger range than error code A. This could be an indication that some of the entries having error code B are erroneous, but since the majority of their entries is similar to the “no error code” entries, some of these values will also be correct.

The fact that the entries having error code B are most likely a mixture of correct and incorrect data has been reflected by the Commission by always correcting the distance to target to the favour of the manufacturers.

5.3.2 Method 2

Method 2 assumes that the average of the data, including the corrected data with TVV is an unbiased estimator for the mean. In order prove that the average of the data, including the corrected data with TVV is an unbiased estimator for the mean this was analysed based on one manufacturer.

The data for this manufacturer was distinguished into three categories:

1) no TVV available.

2) TVV available and corrected.

3) TVV data available and correct.

The first analyses shows those three categories and their distribution of CO_2 values (y-axis) before correction. It is clear that the distribution for TVV known (especially that part that need to be corrected) is different from the one where TVV is unknown.

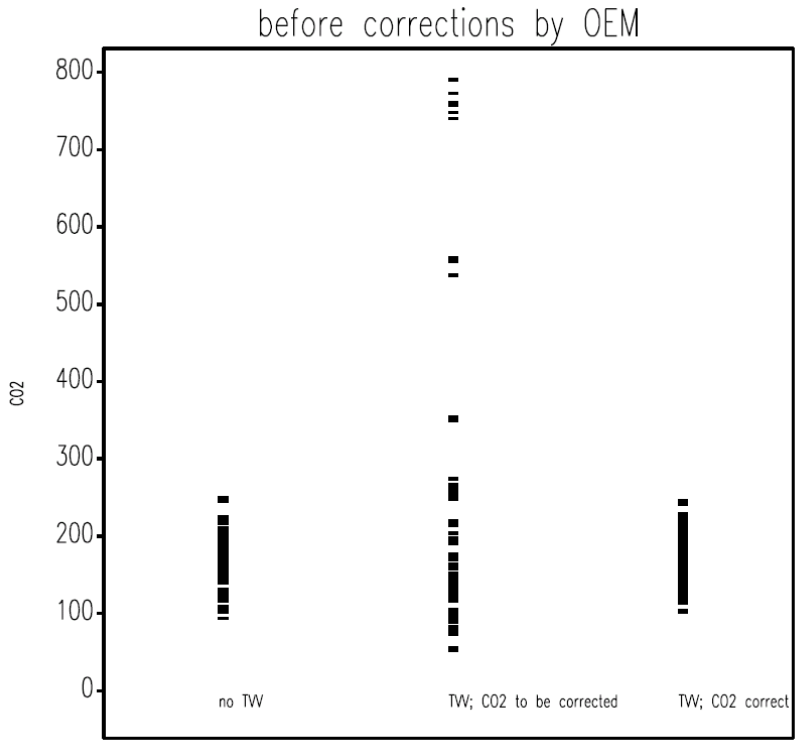


Figure 12: Distribution of CO2 values (y-axis) before correction

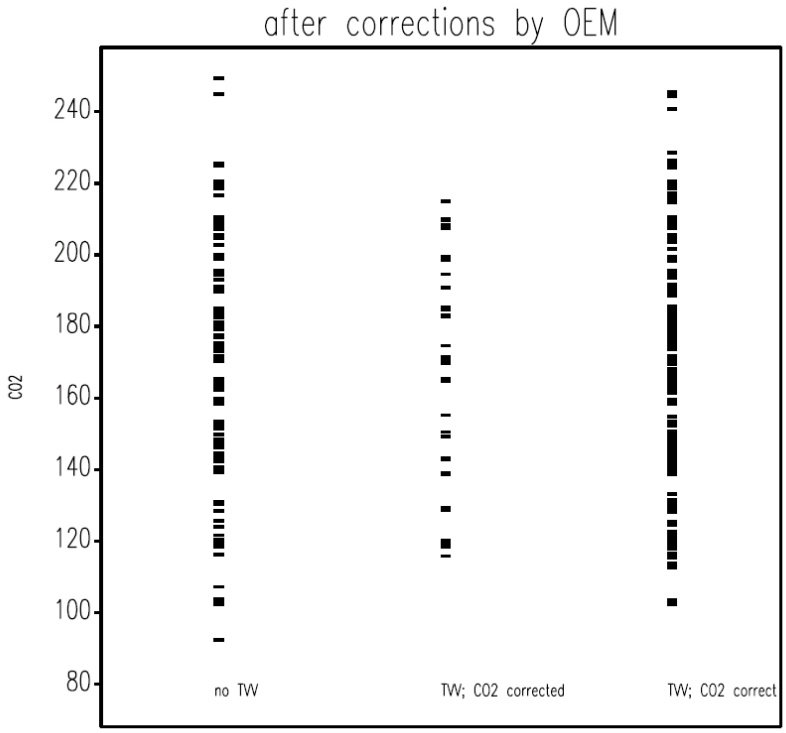


Figure 13: Distribution of CO2 values (y-axis) after correction

The effect of correcting the data is clearly visible. The extreme values disappear.

Following graph evaluates the correction made and give answer to the questions related to corrections. This is being done by elaborating the ratio of the CO_2 value before and after correction.

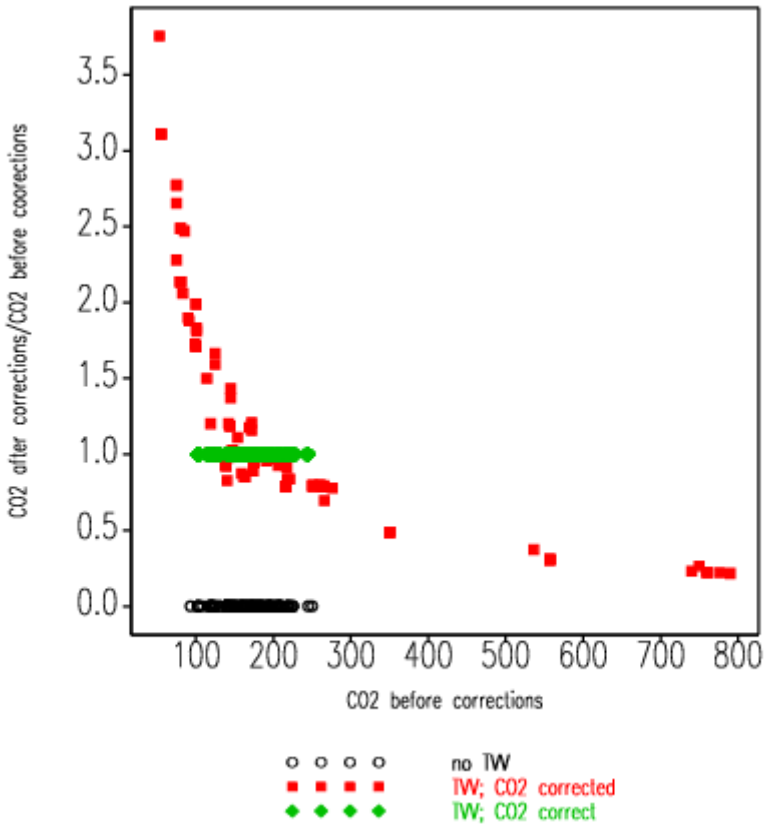


Figure 14: Ratio of CO2 values before and after correction

The black circles show the values which can not be corrected by the manufacturer because TVV is unknown. The green symbols show the records where TVV is known but no corrections where necessary, the red ones show the corrections applied (TVV known). There seems to be a clear relation between the correction needed and the published CO_2 value.

The records with TVV unknown are in the range [100;250]. In this range it was not necessary to correct original values (green symbols) and when a correction was needed, it was limited [0.7;1.7].

From this it can be concluded:

- the correction factor is not constant,
- an average correction factor is based on extreme values that are not in the group TVV unknown,
- the groups TVV known and TVV unknown are different.

Or in other words: it is not correct to use the same constant correction term for both groups.

If the assumption would be true for this manufacturer that the average of the data, including the corrected data with TVV, is an unbiased estimator for the mean - the distribution of TVV known would have been the same or similar than for TVV unknown.

5.3.3 Method 3

Method 3 corrects the confidence interval and due to that quantifies the uncertainty based on the incompleteness in the database. An important assumption is that the dataset is a random sample from all registered vehicles. Mostly it is assumed that the sample represent < 5% from all data. If this is not the case the uncertainty has to be multiplied with a factor [0,1] corresponding with the fraction not in the sample. If this fraction = 0 (all vehicles are in the dataset) this uncertainty becomes 0. In this situation the average is exactly known.

In statistical practice uncertainty measures like the standard error will not be used when the dataset is almost of the whole population (e.g. ≥ 90%).

Therefore it is crucial whether one considers the number of registrations of the corrected database as the whole population or only a random sample of less than 90% of the registered vehicles. Since the aim of Regulation (EC) 443/2009 is to gather all registration data of new M1 one can not consider the collected data as a sample.

5.4 Summary

Method 1 implies that all data missing either CO_2 or mass values are incorrect. This assumption can neither verified nor falsified. Most likely incomplete data contains a mix of correct and incorrect data just like all entries which are marked by error code B. Whether incomplete error code B data does indeed have a higher probability to be incorrect than complete error code B data can not be proven without changing the error notification procedure.

Method 2 has been elaborated based on the common assumption that the average of the data, including the corrected data with TVV, is an unbiased estimator for the mean. It was proven that this is not always the case and that the method has to be amended.

Method 3 is only applicable for sample data as defined above. OEM mentioned that there are vehicles missing from the data gathered by the European Commission according to Regulation (EC) No 443/2009. If this proves to be true, the missing vehicles can not be integrated by the OEM and their number exceed 10% of the total registrations, this method would the most appropriate to be applied upon the data set.

5.5 Further developments

5.5.1 General

In general, the error notification could be further developed in order to assess error code B in more depth (see example below). This would enable:

1) to verify whether incomplete datasets should really be ignored (underlying assumption of method one) and

2) which of the entries having error code B are implausible based on their CO_2 and/or mass values.

Table 6: Possible amendment of the error notification

ID	MS	MH	Man	MMS	Other para-meters	R	M	E	Remain-ing para-meters	Error code	Extended error code
34	AA	OEM	OEM	OEM	lack of informati on needed for identificat ion	2	1627		lack of information needed for identificati on	B	Value possible
35	BB	OEM	OEM	OEM		1	1555			B	Value possible
36	BB	OEM	OEM	OEM		2		208		B	Value possible
37	BB	OEM	OEM	OEM		3	1800			B	Value not possible
38	BB	OEM	OEM	OEM		1		250		B	Value not possible

5.5.2 Method 2

Method 2 can be changed in order to take into account that the correction is not constant but depends on the CO_2 emission and that the unit is not a record number but the emission e. In other words: in order to correct the records of the TVV missing (black symbols, see Figure 14) one would need to have a respective correction (red symbols, see Figure 14). The assumption is that the fraction of incorrect emissions is for 'TVV known' the same as for 'TVV unknown'.

Table 7: Definitions for amended method 2

Symbol	**Explanation**
e	Emission
$e11, e21$	all emission values in the groups *e11* and *e21*
$e2$	All emission values when TVV unknown[82]
$f11\|e$	correction given a certain emission *e* (only possible if TVV known and CO_2 changed)
$rij\|e$	number of vehicles given the emission *e*
$E11, E21$	Sum of emissions values when TVV known
$\widehat{E12}, \widehat{E22}$	Sum of estimated emissions values when TVV unknown

	TVV known	**TVV unknown**	**Total**
CO_2 changed	$E11$	$\widehat{E12}$	$E11 + \widehat{E12}$
CO_2 unchanged	$E21$	$\widehat{E22}$	$E21 + \widehat{E22}$
total	$E11 + E21$	$\widehat{E12} + \widehat{E22}$	$E11 + \widehat{E12} + E21 + \widehat{E22}$

With

$$E11 = \sum_{e \in e11} \left((r11|e * f11|e) * e \right)$$

$$E21 = \sum_{e \in e21} \left((r21|e) * e \right)$$

$$\widehat{E12} + \widehat{E22} = \sum_{e \in e2} \left((r11|e * f11|e + r21|e) \left(\frac{r12|e + r22|e}{r11|e + r21|e} \right) * e \right)$$

[82] For analytical reasons the assessment has been based on the completeness of the TVV and not on those entries having error code B. Usually they coincide but it is possible that missing TVV entries can be verified by manufacturers and therefore do not contain error code B. If this method is being implemented error code B should rather be taken as a criterion than incomplete TVV.

5.6 Conclusions

Method 1 takes into account that most likely erroneous data is part of error code B by correcting the distance to target in favour of the manufacturer. But this method also adjusts the data set from incomplete data without being able to proof that this data is most likely erroneous and should not be used for calculating the averages. By adapting the error notification this assumption could be assessed in the future.

The amended method 2 is copying the correction applied for error code A data to the data having error code B per emission/mass value leading to a correction of a part of error code B data. For those error code B entries for which no corresponding error code A correction is available, no correction is pursued. Generally the overall correction per manufacturer depends on the distribution of the data and the executed corrections. Whether the correction of the distance to the target will be to the advantage or disadvantage of the manufacturer depends on the individual manufacturer. In addition with method 2 the correction will be smaller than with method 1 since 1) the whole data set is used and 2) the correction is based on its perceptual distribution per emission category instead of 1) taking only complete data sets and 2) calculating the difference between the in- and exclusion of error code B.

Which method should be chosen for correcting the Member States data depends i.a. on the effects the Commission would like to see upon the data. Method 1 corrects the MS data to a larger extent than method 2 and corrects in a way that the distance to target is always corrected in favour of the manufacturer. Method 2 corrects the MS data to a smaller extent and the distance to target can be reduced or enlarged, depending on the detailed distribution of error code A and B.

6 TASK 5: EEA SUPPORT

Ad-hoc support was given to the EEA regarding the notification from Aston Martin and the missing registrations. The development and application of a verification method was by request of the Commission converted in order to work further on the implementation of a correction method, which has been performed.

7 ANNEX

7.1 Information and request to Member States about the potential use of the Vehicle identification numbers as a basis for CO2 monitoring

Background

The lack of Vehicle Identification Numbers (VINs) as a monitoring parameter has been cited by several manufacturers as a reason for not being able to completely verify or correct the 2010/2011 CO_2 monitoring data. The correctness of the CO_2 emissions data is essential for the proper functioning of the CO_2 car and van legislation. Manufacturers and Member States have a joint responsibility for the data and they need efficient tools for ensuring that it is of high quality. Specific emissions targets can only be appropriately enforced if the data used for the calculation of those targets is reliable and correct.

In order to better understand whether the introduction of the VINs as basis for monitoring has significant advantages in comparison to the current system, the Commission is seeking 3 to 4 Member States with a high number of registered vehicles **or** 2 Member States with a high number of registrations and 2-3 Member States with a low number of registrations which are willing to participate in a comparison exercise between Member States and OEM data. The same request has been submitted to ACEA and JAMA and feedback from individual OEMs is expected in the near future.

Personal data protection

As it is known that personal data protection might be an issue in some Member States for sharing this type of data, the EEA and Ökopol are ready to find appropriate solutions with the Member States concerned. The following different approaches are proposed:

1. The Member States sends the data to Ökopol and the latter will formally agree with the MS ensuring that the data will be treated according to the privacy rules apply in that Member State,
2. The Member States sends the data to the EEA and Ökopol assists the EEA in the data processing without direct data access,
3. If a Member State is willing to participate in the inter-comparison exercise but cannot share VINs with any entity for privacy issues, Ökopol offers assistance to the Member State concerned for the data processing.

Technical details

Data format:

The data format to be used for submitting the data will be based upon the xml-format currently used for reporting data under Regulation (EC) No 443/2009 and on Regulation (EU) No 510/2011. It will be enhanced by at least an additional field for the VIN.

Scope of the data:

2010 and 2011 data for M1 and N1 vehicles.

Submission of the data:

From November 2012 to February 2013, depending on the capabilities of the MS.

Comparative work:

Between December 2012 and April 2013 the data comparison will be carried out. The comparison work will either be carried out by Ökopol, the EEA or your authority. This depends on your data protection preferences (see heading 0 above).

Request

Based on above information, we would therefore like to ask you if you are interested in participating in this exercise. Please answer with yes or no and add comments, if you desire so.

If you are interested in this exercise, we would note your commitment and re-contact you between October/November 2012 for the detailed planning.

Thank you very much for your consideration.

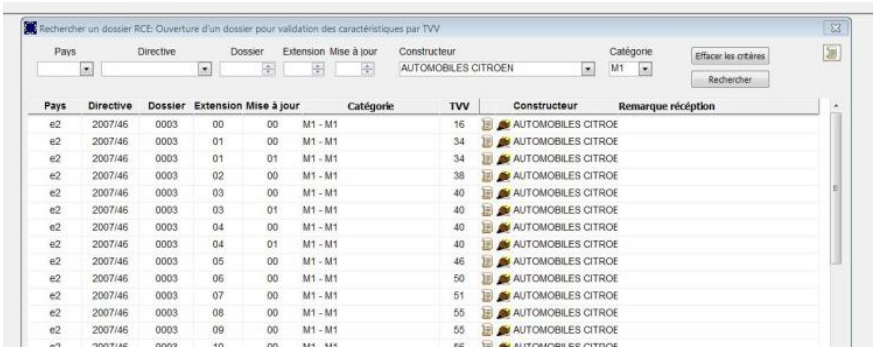
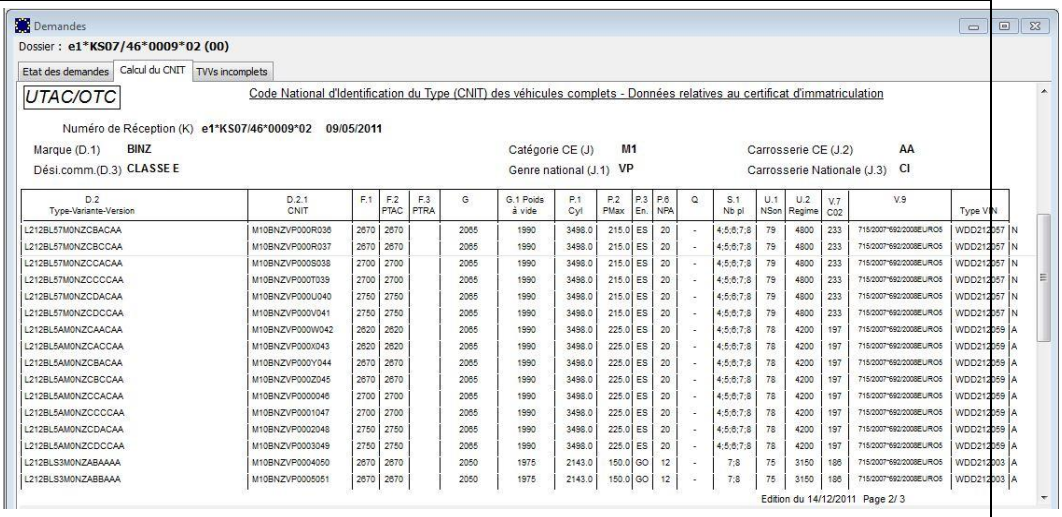
7.2 Data request to OEM about the potential use of the Vehicle identification numbers as a basis for CO2 monitoring

Task 3 - Data comparison activities

- **Scope of the data:**
  - 2010 and 2011data for M1 and N1 vehicles.
- **Data delivery format:**
  - xml (based on the xml requirement of Regulation (EC) No 443/2009 and Regulation (EU) No 510/2011) **OR**
  - Format used by the EEA for the error notification
- **Related questions:**
  - Which manufacturer has interest to participate?
  - Any preferences regarding format?
  - Timeline

ID	YEAR	sales date/month	Manufacturer name	VIN	TAN	Type	Variant	Version	Make	Commercial name	Category of the vehicle	CO2-Emissions (g/km)	Mass in running order (kg)	Only for multi stage vehicles: mass of the base vehicle (kg)
unique ID-Number for each record	2010 or 2011	Month or date when the vehicles was considered to be sold.		Vehicle Identification Number	Type approval number including its extension number						M1 or N1			

7.3 France : Processus général

Les dossiers de Réception communautaire communiqués par les autorités européennes sont récupérés quotidiennement (dossiers de base, extensions, corrections)		
Les données issues des dossiers de réception sont gérées dans une base de caractéristiques techniques des véhicules		
Un code national (CNIT) est attribué à chaque Type/Variante/Version et le caractérise		
Alimentation du Système d'immatriculation des véhicules		Les informations utiles à l'immatriculation sont transmises électroniquement et quotidiennement au Système d'immatriculation des véhicules (SIV). Elles sont également envoyées aux constructeurs/ importateurs. La disponibilité des données dans le système est un préalable nécessaire à l'immatriculation. Le numéro de réception (avec le numéro d'extension), le Type Variante Version, la marque et le CNIT sont utilisés comme clef d'entrée pour charger les données techniques d'immatriculation associées. Pour les véhicules neufs M1 VP, une grande partie des opérations est réalisée par télétransmission de données ce qui limite les sources d'erreurs et le délai de traitement des dossiers Les opérations de saisie manuelle réalisées en préfecture sont limitées.

7.4 Detailed MS answers (see chapter 3.7.1 ff)

a. Which information is available for the mass/CO2 values of the base vehicle and the complete(d) vehicles for TYPE APPROVAL AUTHORITHIES?

Entity	Parameter	Is the information on CO2 value and mass for the type approval authorities for vehicles being type approved via ... available? Please indicate YES or NO											
		national type-approval		individual approval		multi-stage type-approval (WVTA)1		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	LV, NL, EL, FI, BE, FR	SE, SK, LT, DK, ES, PT	LV, LT, IT, FI, BE,	SE, DE, SK, DK, ES, PT, FR	LV, DE**, NL, LT, EL, IT, FI, DK, BE	SE, SK, ES, PT	LV, DE**, LT, EL, IT, FI, DK, FR	SE, SK, ES, PT	Not applicable		LV, DE**, LT, IT, FI, DK, FR	SE, SK, EL, ES, PT
	mass value	NL, LT, EL, FI, BE, FR*	SE, LV, SK, DK, ES, PT	LT, IT, FI, BE, FR****	SE, LV, DE, SK, DK, ES, PT	DE*, NL, LT, EL, IT, FI, DK, BE	SE, LV, SK, ES, PT	DE*, LT, EL, IT, FI, DK, FR*	SE, LV, SK, ES, PT			DE*, LT, IT, FI, DK, FR*	SE, LV, SK, EL, ES, PT
Completed vehicle	CO2 value	SE, LV, DE, NL, EL, FI, DK, PT, FR	SK, LT, ES, BE	SE, LV, LT, EL, IT, FI, PT	DE, SK, DK, ES, BE, FR	SE, LV, DE, NL, LT, EL, IT***, FI, DK, PT	SK, ES, BE	LV, DE, LT, EL, IT, FI, DK, PT, FR	SE, SK, ES			LV, DE**, LT, IT, FI, DK, PT, FR	SE, SK, EL, ES
	mass value	SE, LV, DE*, NL, LT, EL, FI, DK, PT, BE, FR*	SK, ES,	SE, LV, LT, EL, IT, FI, DK, PT, BE, FR****	DE*, SK, ES	SE, LV, DE**, NL, LT, EL, IT, FI, DK, PT, BE	SK, ES	LV, DE*, LT, EL, IT, FI, DK, PT, FR*	SE, SK, ES,			LV, DE*, LT, IT, FI, DK, PT, FR*	SE, SK, EL, ES
Complete vehicle	CO2 value	LV, NL, SK, EL, FI, DK, ES, PT, BE, FR	SE, LT,	LV, SK, LT, EL, IT, FI, ES, PT, BE	SE, DE, DK, FR	Not applicable		LV, DE, SK, LT, EL, IT, FI, DK, ES, PT, FR*	SE	LV, DE, SK, LT, EL, IT, FI, DK, PT, BE, FR	SE, ES	LV, DE, SK, LT, IT, FI, DK, ES, PT, FR	SE, EL
	mass value	LV, NL, SK, LT, EL, FI, DK, ES, PT, BE, FR*	SE,	LV, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR****	SE, DE			LV, DE*, SK, LT, EL, IT, FI, DK, ES, PT, FR*	SE	LV, DE*, SK, LT, EL, IT, FI, DK, PT, BE, FR*	SE, ES	LV, DE*, SK, LT, IT, FI, DK, ES, PT, FR*	SE, EL

b. Which information is available for the mass/CO_2 values of the base vehicle and the complete(d) vehicles for **REGISTRATION AUTHORITHIES?**

Entity	Parameter	Is the information on CO2 value and mass for the registration authorithies for vehicles being type approved via .... available? Please indicate YES or NO											
		national type-approval		individual approval		multi-stage type-approval (WVTA)		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	LV, NL, EL, IT, BE, FR	SE, SK, LT, FI, DK, ES, PT	LV, EL, IT, BE	SE, LT*, SK, FI, DK, ES, PT, FR	LV, DE***, NL, EL, IT, BE, BG	SE, SK, LT*, FI, DK, ES, PT	LV, DE**, EL, IT, BE, FR, BG	SE, SK, LT*, FI, DK, ES, PT	Not applicable		LV, DE***, EL, IT, FR, BG	SE, SK, LT*, FI, DK, ES, PT
	mass value	NL, EL, IT, BE, FR*	SE, LV, SK, LT*, FI, DK, ES, PT	EL, IT, BE, FR*****	SE, LV, LT*, SK, FI, DK, ES, PT	DE*, NL, EL, IT, BE, BG	SE, LV, SK, LT*, FI, DK, ES, PT	DE**, EL, IT, BE, FR*, BG	SE, LV, SK, LT*, FI, DK, ES, PT			DE**, EL, IT, FR*, BG	SE, LV, SK, LT*, FI, DK, ES, PT
Completed vehicle	CO2 value	SE, LV, DE, NL, IT, FI, DK, PT, FR, BG	SK, LT, EL, ES, BE	SE, LV, LT, IT****, FI, PT, BG	SK, EL, DK, ES, BE, FR	SE, LV, DE***, NL, LT, IT, FI, DK, PT, BG	SK, EL, ES, BE	LV, DE***, LT, IT, FI, DK, PT, FR, BG	SE, SK, EL, ES, BE			LV, DE***, LT, IT, FI, DK, PT, FR, BG	SE, SK, EL, ES
	mass value	SE, LV, DE, LT, NL, IT, FI, DK, PT, BE, FR*, BG	SK, NL, EL, ES	SE, LV, LT, IT, FI, DK, PT, BE, FR*****, BG	SK, EL, ES	SE, LV, DE**, NL, LT, IT, FI, DK, PT, BE, BG	SK, EL, ES	LV, DE**, LT, IT, FI, DK, PT, BE, FR*, BG	SE, SK, EL, ES			LV, DE**, LT, IT, FI, DK, PT, FR*, BG	SE, SK, EL, ES
Complete vehicle	CO2 value	LV, NL, SK, EL, IT, FI, DK, ES, PT, BE, FR, BG	SE, LT	LV, SK, LT, EL, IT, FI, ES, PT, BE, BG	SE, DK, FR	Not applicable		LV, DE***, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR, BG	SE	LV, DE***, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR, BG	SE	LV, DE, SK, LT, EL, IT, FI, DK, ES, PT, FR, BG	SE
	mass value	LV, NL, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR*, BG	SE	LV, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR*****, BG	SE			LV, DE*, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR*, BG	SE	LV, DE*, SK, LT, EL, IT, FI, DK, ES, PT, BE, FR*, BG	SE	LV, DE**, SK, LT, EL, IT, FI, DK, ES, PT, FR*, BG	SE

* In some cases yes

** mass in running order, min-max values

*** only if the base vehicle already contains an engine

**** of the base vehicle

***** actual mass as stated in item 13 of the CoC

DE: individual approval is not type approved

Table a - c: Germany stated "not applicable" for base vehicle and complete vehicles

Table a & b: The Netherlands stated "not relevant" for individual, step by step type approval, single step approval, mixed type approval for all vehicle types.

c) Which information **will be available for reporting year 2012 and 2013** to be submitted to the European Commission based on Regulation (EU) No 510/2011?

Entity	**Parameter**	**Is the information on CO2 value and mass for the regsitration authorities for vehicles being type approved via .... available? Please indicate YES or NO**											
		national type-approval		individual approval		multi-stage type-approval (WVTA)		step-by-step type approval (WVTA)		single-step type-approval (WVTA)		mixed type-approval	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Base vehicle	CO2 value	LV, NL, EL, IT, BE	SE, SK, LT, FI, DK, ES, PT	LV, EL, IT, BE	SE, LT*, SK, FI, DK, ES, PT	LV, DE***, NL, EL, IT, BE	SE, SK, LT*, FI, DK, ES, PT	LV, DE**, EL, IT, BE	SE, SK, LT*, FI, DK, ES, PT	Not applicable		LV, DE***, EL, IT	SE, SK, LT*, FI, DK, ES, PT
	mass value	NL, EL, IT, BE	SE, LV, SK, LT*, FI, DK, ES, PT	EL, IT, BE	SE, LV, LT*, SK, FI, DK, ES, PT	DE*, NL, EL, IT, BE	SE, LV, SK, LT*, FI, DK, ES, PT	DE**, EL, IT, BE	SE, LV, SK, LT*, FI, DK, ES, PT			DE**, EL, IT	SE, LV, SK, LT*, FI, DK, ES, PT
Completed vehicle	CO2 value	SE, LV, DE, NL, IT, FI, DK, PT, BG	SK, LT, EL, ES, BE	SE, LV, LT, IT****, FI, PT, BG	SK, EL, DK, ES, BE	SE, LV, DE***, NL, LT, IT****, FI, DK, PT, BG	SK, EL, ES, BE	LV, DE***, LT, IT, FI, DK, PT, BG	SE, SK, EL, ES, BE			LV, DE***, LT, IT, FI, DK, PT	SE, SK, EL, ES
	mass value	SE, LV, DE, LT, NL, IT, FI, DK, PT, BE, BG	SK, NL, EL, ES	SE, LV, LT, IT, FI, DK, PT, BE, BG	SK, EL, ES	SE, LV, DE**, NL, LT, IT, FI, DK, PT, BE, BG	SK, EL, ES	LV, DE**, LT, IT, FI, DK, PT, BE, BG	SE, SK, EL, ES			LV, DE**, LT, IT, FI, DK, PT	SE, SK, EL, ES
Complete vehicle	CO2 value	LV, NL, SK, EL, IT, FI, DK, ES, PT, BE, BG	SE, LT	LV, SK, LT, EL, IT, FI, ES, PT, BE, BG	SE, DK	Not applicable		LV, DE***, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE	LV, DE***, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE	LV, DE, SK, LT, EL, IT, FI, DK, ES, PT	SE
	mass value	LV, NL, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE	LV, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE			LV, DE*, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE	LV, DE*, SK, LT, EL, IT, FI, DK, ES, PT, BE, BG	SE	LV, DE**, SK, LT, EL, IT, FI, DK, ES, PT	SE

FR: no data base

* In some cases yes
** mass in running order, min-max values
*** only if the base vehicle already contains an engine
**** of the base vehicle