

TSV 2021-2281

In-Service Conformity (ISC)

ISC testing according to EU Regulation 2017/1151 as amended by EU Regulation 2018/1832

Final Report - ISC testing for 2020

Table 1. Revision management

Rev.	Date	Comments
00	2021-03-31	Interim report
01	2021-12-17	Final report, updated and addition of test results





TSV 2021-2281

Glossary

Table 2. Glossary of terms

ISC	In-Service Conformity
GTAA	Granting Type Approval Authority
STA	Swedish Transport Agency
RDE	Real Driving Emission
PEMS	Portable Emission Measurement System
VIN	Vehicle Identification Number
UND	Undecided
NTE	Not to exceed
COC	Certificate of Conformity
NTE	Not to Exceed
ECG	Emissions Characteristics Group
MIRO	Mass In Running Order
ICE	Internal Combustion Engine
WLTP	Worldwide Harmonised Light Vehicles Test Procedure
СО	Carbon Monoxide
HC	Hydro Carbons
NMHC	Non-Methane Hydro Carbons
THC	Total Hydro Carbons
NOx	Nitrogen Oxides
РМ	Particle Mass
PN	Particle Number





3 (26)

Table of contents

Α.	QUICK OVERVIEW AND MAIN CONCLUSIONS						
В.	ISC ACTIVITIES PERFORMED BY THE MANUFACTURER IN THE PREVIOUS YEAR:	5					
	 Information gathering by manufacturer ISC testing from manufacturer 2.1 Ford-Werke GmbH. 2.2 Hyundai Assan Otomotiv San ve Tic A.S 2.3 Hyundai Motor Manufacturing Czech s.r.o 2.4 Jaguar Land Rover Limited. 2.5 Kia Motor Corporation 2.6 Kia Motors Slovakia s.r.o 2.7 Volvo Cars. 2.8 Bayerische Motoren Werke AG 2.9 Rolls-Royce Motor Cars Ltd 	5 5 7 8 9 . 10 . 10 . 11 . 12					
C.	ISC ACTIVITIES PERFORMED BY ACCREDITED LABORATORIES OR TECHNICAL SERVICES IN THE PREVIOUS YEAR:	. 12					
	2. Information gathering an risk assessment	. 12					
	3. ISC testing from accredited laboratories or technical services	. 12					
D.	ISC ACTIVITIES PERFORMED BY THE GRANTING TYPE APPROVAL AUTHORITY IN TH PREVIOUS YEAR (ISC2020, TEST PERFORMED UP TO-DATE):	IE . 13					
	 Information gathering and risk assessment	. 13 .)15 . 16 . 18 . 19 . 20 . 21 . 23 . 24 . 25 . 26 . 26					
E.	ASSESSMENT OF THE YEARLY EXPECTED EMISSIONS DECREASE DUE TO ANY ISC REMEDIAL MEASURES	. 26					
F.	LESSONS LEARNED (INCLUDING FOR PERFORMANCE OF INSTRUMENTS USED)	. 26					
G.	. REPORT OF OTHER INVALID TESTS						
AN	NEXES:	. 26					





A. Quick overview and main conclusions

As of 01 January 2020, Granting Type Approval Authorities (GTAAs) are required to perform ISC testing. These new requirements are contained within Annex II, Part B, of Regulation (EU) 2017/1151, as amended by 2018/1832. The regulation also opens up the possibility for accredited laboratories and technical services to conduct ISC testing, in the following referred to as third party testing. This final report summaries the testing of ISC-2020 that conducted by manufacturers, third parties and the Swedish Transport Agency (STA). STA is the GTAA in Sweden.

STA has issued emission type approvals (e5*715/2007*2018/1832*....) for nine manufacturers:

- Ford-Werke GmbH
- Hyundai Assan Otomotiv Sanayi Ve Ticaret A.S.
- Hyundai Motor Manufacturing Czech s.r.o.
- Jaguar Land Rover Limited
- Kia Motors Corporation Seoul Korea
- Kia Motors Slovakia s.r.o
- Volvo Cars
- Bayerische Motoren Werke AG
- Rolls-Royce Motor Cars Ltd. (BMW AG is the approval holder)

The results reported broadly in Section B2, C4 and D6 below. A more detailed description of the results per manufacturer in Annexes I – VIII.

As can be read from table 3, results are missing on nine planned test objects. This is due to the single biggest problem area within the ISC programme i.e. finding test objects within the selected ISC-families. Due to difficulties in vehicle sourcing in selected ISC-families, STA has in a few cases chosen to test objects with an odometer reading lower than the minimum mileage stipulated in the regulation of 15000km, see table 25 for a presentation of in which ISC families vehicles with deviating mileage have been tested.

Table 3. Summary of planned and performed tests and outcome from STA and third party testing.

ISC-2020	Planned vehicles	Tested vehicles	PASS	FAILED
STA	45	36	35	1
3 rd Parties	4	4	4	0

Per Johansson

Type Approval Compliance Officer

Swedish Transport Agency

Per Johansson

17 December 2021

Lars Rapp Type Approval Compliance Officer Swedish Transport Agency

Olof Lindell Type Approval Compliance Officer Swedish Transport Agency

PROVALAL TRANSPO ANNANDE



TSV 2021-2281

B. ISC activities performed by the manufacturer in the previous year:

1. Information gathering by manufacturer

This section is an overview of the testing performed per manufacturer. If sales numbers pass the mark of 5000 for the given year, a statistical folder to be opened for the ISC family in case.

All results reported to GTAA from manufacturer are described in tables 6-21.

2. ISC testing from manufacturer

Table 4. Summary of ISC-families valid for manufacturer testing and completed statistical folders.

	Overview Manufacturer testing	Number of families for ISC-2020	Number of families for ISC-2021	Completed
2.1	Ford-Werke GmbH	12	13	7
2.2	Hyundai Assan Otomotiv Sanayi Ve Ticaret A.S.	4	5	1
2.3	Hyundai Motor Manufacturing Czech s.r.o.	8	3	3
2.4	Jaguar Land Rover Limited	1	0	1
2.5	Kia Motors Corporation Seoul Korea	3	5	0
2.6	Kia Motors Slovakia s.r.o	4	4	1
2.7	Volvo Cars	8	8	4
2.8	Bayerische Motoren Werke AG	0	0	0
	Not qualified for ISC-test, sales<5000			
2.9	Rolls-Royce Motor Cars Ltd	0	0	0
	Not qualified for ISC-test, sales<5000			





TSV 2021-2281

2.1 Ford-Werke GmbH

Table 5. ISC-families for manufacturer testing from Ford-Werke GmbH.

	ISC-2020	ISC-2021
Total amount of ISC families	24	29
ISC families with > 5000 vehicles sold in previous year	12(10)*	13

*Request from Ford to merge some ISC-families with identical specifications.

Table 6. ISC-families to test (Type 1) by Ford-Werke GmbH.

	ISC bas sales p year	year, ed on previous >5000	ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-12-10)	Status
1	2020	2021	11-WF0-D10	3	7	PASS
2	2020	2021	5-WF0-D25 11-WF0-D6	3	5 (1 FAILED)	PASS
3	2020	2021	5-WF0-P28 11-WF0-P9	3	4	PASS
4	-	2021	11-WF0-P16	3	2	
5	2020	2021	11-WF0-D8	3	4	PASS
6	2020	2021	5-WF0-D13	6	5	UND
7	2020	2021	5-WF0-D14	3	2	UND
8	-	2021	5-WF0-P27	3	3	
9	2020	-	11-WF0-P7	3	2	UND
10	2020	-	11-WF0-P8	3	4	PASS
11	2020	-	11-WF0-P20 11-WF0-P22	3	5	PASS
12	2020	-	11-WF0-D16	3	1	

Swedish Transport Agency Road and Rail Department P.O. Box 267 SE-781 23 Borlänge Sweden





7 (26)

17 December 2021

13	-	2021	5-WF0-P34	3	Not Started
14	-	2021	5-WF0-D41	3	Not Started
15	-	2021	5-WF0-D42	3	Not Started
16	-	2021	5-WF0-D40	3	Not Started
17	-	2021	5-WF0-D36	3	Not Started

2.2 Hyundai Assan Otomotiv San ve Tic A.S

Table 7. ISC-families for manufacturer testing from Hyundai Assan Otomotiv Sanayi Ve Ticaret A.S.

	ISC-2020	ISC-2021
Total amount of ISC families	6	7
ISC families with>5000 vehicles sold in previous year	4	5

Table 8. ISC-families to test (Type 1) by Hyundai Assan Otomotiv Sanayi Ve Ticaret A.S.

Test	ISC year, based on sales previous year		ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-10-06)	Status
1	2020	2021	11-HAO-1	3	2	UND
2	2020		11-HAO-2	3		Not started
3	2020	2021	11-HAO-3	3	1	UND
4	2020	2021	11-HAO-4	3	3	PASS
5		2021	5-HAO-17	3		Not started
6		2021	5-HAO-18	3		Not started

Table 9. Additional RDE-test by Hyundai Assan Otomotiv Sanayi Ve Ticaret A.S.

Test	ISC-Family	Tested vehicles (until 2021-10-06)	Status
1	11-HAO-4	1	Approved





TSV 2021-2281

2.3 Hyundai Motor Manufacturing Czech s.r.o

Table 20. ISC-families for manufacturer testing from Hyundai Motor Manufacturing Czech s.r.o.

	ISC-2020	ISC-2021
Total amount of ISC families	11	17
ISC families with > 5000 vehicles sold in previous year	8	3

Table 11. ISC-families to test (Type 1) by Hyundai Motor Manufacturing Czech s.r.o.

Test	ISC yea sales pr	r, based on evious year	ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-10-06)	Status
1	2020	2021	11-HMM-5	3	3	PASS
2	2020		11-HMM-6	3	3	PASS
3	2020	2021	11-HMM-8	3	3	PASS
4	2020		11-HMM-10	3		Not started
5	2020		11-HMM-11	3		Not started
6	2020		11-HMM-12	3		Not started
7	2020		11-HMM-14	3		Not started
8	2020	2021	11-HMM-15	3		Not started

Table 12. Additional RDE-test by Hyundai Motor Manufacturing Czech s.r.o.

Test	ISC-Family	Tested vehicles (until 2021-10-06)	Result
1	11-HMM-5	1	Approved
2	11-HMM-6	1	Approved
3	11-HMM-8	1	Approved





2.4 Jaguar Land Rover Limited

Table 13. ISC-families for manufacturer testing from Jaguar Land Rover Limited.

	ISC-2020	ISC-2021
Total amount of ISC families	10	16
ISC families with > 5000 vehicles sold in previous year	1	0

Table 14. ISC-families to test (Type I) by Jaguar Land Rover Limited.

Test	ISC yea sales pr	r, based on evious year	ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-05-25)	Status
1	2020		11-SAJ-001	3	3	PASS

2.5 Kia Motor Corporation

Table 15. ISC-families for manufacturer testing from Kia Motor Corporation.

	ISC-2020	ISC-2021
Total amount of ISC families	4	18
ISC families with > 5000 vehicles sold in previous year	3	5

Table 16. ISC-families to test (Type I) by Kia Motor Corporation.

Test	ISC yea sales pr	r, based on evious year	ISC-Family	Number of Vehicles for Test	Tested vehicles $(\rightarrow 2021-09-29)$	Status
1	2020	2021	11-KMC-7	3		Not started
2	2020	2021	11-KMC-8	3		Not started
3	2020		11-KMC-9	3		Not started
4		2021	5-KMC-14	3		Not started
5		2021	11-KMC-4	3		Not started
6		2021	11-KMC-5	3		Not started

Swedish Transport Agency Road and Rail Department P.O. Box 267 SE-781 23 Borlänge Sweden





2.6 Kia Motors Slovakia s.r.o

Table 17. ISC-families for manufacturer testing from Kia Motors Slovakia s.r.o.

	ISC-2020	ISC-2021
Total amount of ISC families	6	11
ISC families with > 5000 vehicles sold in previous year	4	4

Table 18. ISC-families to test (Type 1) by Kia Motors Slovakia s.r.o.

Test	ISC year, sales prev	based on ⁄ious year	ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-07-14)	Status
1	2020	2021	11-HMM-5	3	0	Not started
2	2020	2021	11-HMM-6	3	0	Not started
3	2020	2021	11-HMM-8	3	0	Not started
4	2020	2021	11-HMM-15	3	0	Not started

Table 19. Additional RDE-test by Kia Motors Slovakia s.r.o.

Test	ISC-Family	Tested vehicles (→2021-07-14)	Status
1	5-KMC-1	1	PASS
2	5-KMC-2	1	PASS

2.7 Volvo Cars

Table 20. ISC-families for manufacturer testing from Volvo Cars.

	ISC-2020	ISC-2021
Total amount of ISC families	10	10
ISC families with > 5000 vehicles sold in previous year	8	8







TSV 2021-2281

Test	ISC year, sales prev	based on ⁄ious year	ISC-Family	Number of Vehicles for Test	Tested vehicles (→ 2021-11-02)	Status
1	2020	2021	5-YV1-012	3	3	PASS
2	2020	2021	5-YV1-016	3	3	PASS
3	2020	2021	5-YV1-020			Not Started
4	2020	2021	5-YV1-021	3	3	PASS
5	2020	2021	5-YV1-022			Not Started
6	2020	2021	5-YV1-023	3	3	PASS
7	2020	2021	5-YV1-026			Not Started
8	2020	2021	5-YV1-027	3	0	UND

Table 21. ISC-families to test (Type I) by Volvo Cars.

Additional tests on 5-YV1-012 and 5-YV1-016:

- Type II test (carbon monoxide emission test at idling speed and roadworthiness testing)
- Type III test (emission of crankcase gases)

2.8 Bayerische Motoren Werke AG

Table 22. ISC-families for manufacturer testing from Bayerische Motoren Werke AG.

	ISC-2020	ISC-2021
Total amount of ISC families	2	3
ISC families with > 5000 vehicles sold in previous year	0	0

For ISC-2020, no ISC families were qualified testing due to low sales, age and mileage.





2.9 Rolls-Royce Motor Cars Ltd

Table 23. ISC-families for manufacturer testing from Rolls-Royce Motor Cars Ltd.

	ISC-2020	ISC-2021
Total amount of ISC families	1	1
ISC families with > 5000 vehicles sold in previous year	0	0

For ISC 2020, no ISC families were qualified testing due to low sales, age and mileage.

C.ISC activities performed by accredited laboratories or technical services in the previous year:

2 Information gathering an risk assessment

No data available

3 ISC testing from accredited laboratories or technical services

Test	TSV-Ref	Manufacturer	ISC-Family	Technical service	Test type	Status
1	2021-870	Ford-Werke GmbH	5-WF0-D25	DTI	RDE	PASS
2	2021-871	Kia Motors Slovakia s.r.o	11-HMM-15	DTI	RDE	PASS
3	2021-872	Volvo Cars	5-YV1-016	Emisia	RDE	PASS
4	2021-873	Kia Motor Corporation	11-KMC-8	Emisia	RDE	PASS

Table 24. Third party ISC testing performed during 2020.

Please refer to Annex VIII – 3rd party testing, for results.





D. ISC activities performed by the granting type approval authority in the previous year (ISC2020, test performed up to-date):

5. Information gathering and risk assessment

A common risk assessment methodology was applied for all manufacturers applicable for ISC testing by the GTAA. Only Type 1 and RDE tests were conducted for this ISC programme.

As a first step, all e5*715/2007*2018/1832* emissions approvals that were applicable to GTAA ISC testing were identified for the manufacturer. Each approval was accompanied by the associated IP and ISC (PEMS) families, 2019 sales volumes, warranty claims and other administrative information to assist in the information gathering process (such as test reports and basic vehicle specification).

The risk assessment methodology was split into two parts:

Risk Rating 1 - Quantifying the emissions performance of 'similar' vehicles

In-market emissions test data for Euro 6d-* vehicles, available from a variety of independent sources, were collated into a database (194 tests in total). Each tested vehicle was assigned an 'Emissions Characteristics Group' (ECG) identifier, which is a concatenated string of the vehicles':

- *Mass class* ('Light': MIRO < 1500 kg; 'Medium': 1500 ≤ MIRO < 2250 kg; 'Heavy': MIRO ≥ 2250 kg)
- Powertrain architecture ('ICE / Mild NOVC-HEV'; 'Full NOVC-HEV'; 'OVC-HEV')
- Fuel ('Petrol'; 'Diesel')
- *Aspiration* ('Naturally aspirated'; 'Turbocharged (single)'; 'Turbocharged (multiple)'; 'Turbocharged and Supercharged'; 'Supercharged')
- Fuelling method ('Direct Injection'; 'Indirect Injection')
- *Engine volume* (< 1500 cm³; ≥ 1500 cm³)

For example: "Medium_ICE / Mild NOVC-HEV_Diesel_Turbocharged (single)_Direct Injection_Greater than or equal to 1500"

This allowed the grouping of 'similar' vehicles (those which had the same ECG identifier), and the emissions performance of each ECG could be expressed as a risk rating (in terms of the probability that a similar vehicle would exceed pollutant limits) as follows:

Risk Rating $1 = \frac{Number \ of \ exceedances \ within \ ECG}{Number \ of \ tests \ performed \ within \ ECG} \times 100\%$

where: 'exceedances' in this case actually refers to any exhaust pollutant being at least 70% of the applicable type-approval limit in a Type 1 or RDE test. It was decided to define exceedances in this





TSV 2021-2281

way, with a low exceedance threshold of 70% (i.e. not 100%), due to rates of vehicle compliance actually being very high on the 194 Euro-6d* in-market tests collected. It was found that if an exceedance was defined as exceeding the type-approval limit, this method would almost allocate no risk to any ECGs. Lowering the exceedance threshold still allows the 'riskiest' vehicles to be identified, even if those vehicles are still found to comply.

ECGs identifiers were then assigned to each ISC family for the manufacturer, with the corresponding Risk Rating 1 for that ECG.

Risk Rating 2 - Based on manufacturer/vehicle-specific data

This part of the risk rating draws upon the information available from the manufacturer during the initial information gathering step, as well as type-approval test data each ISC family. The rating is built of six parameters, which can each effectively be treated as a form of probability marker, a component of risk for each ISC family:

- 1. *Rate of emissions-related warranty claims or repairs* (%) The number of warranty claims or repairs divided by the number of sales in 2019.
- 2. Sales compared to average ISC family registrations in EU (%) This is analogous to the exposure of the ISC family to the market; high sales is a greater risk if emissions-related issue is present on affected vehicles. This was calculated by taking the 2019 sales volume of an ISC family, and dividing it by the 'expected' number of registrations for the ISC family.

The 'expected' number of registrations was based on 15,782,990 EU light-duty vehicle registrations in 2019 from 52 manufacturers ^{[1][2]}; giving an average of 303,519 registrations per manufacturer. This average was then divided by the number of ISC families that exist for a manufacturer; yielding an 'expected' number registrations per ISC family for this manufacturer.

3. In-market test history failure rate (%)

Of the 194 vehicle tests that were gathered for the purpose of generating Risk Rating 1, the failure rate of any vehicles that coincidentally happened to be from one of the ISC families was factored in (i.e. number of exceedances divided by the number of tests). In most cases, a vehicle from a particular ISC family had not been tested and where that was the case, this parameter was excluded from the Risk Rating 2 calculation.

4. Type-approval Type 1 performance (%) For each ISC family, the type-approval Type 1 test results for all IP families contained within it were collected. Any final pollutant result that was at least 70% of the limit (for VH. VL or

it were collected. Any final pollutant result that was at least 70% of the limit (for VH, VL or VM) was deemed an 'exceedance' (see Risk Rating 1 for explanation). The total number of exceedances within an ISC family were counted and then divided by the number of IP families in the ISC family.

5. Relative type-approval RDE performance (%)

For each ISC family, the ratio of the final pollutant result / NTE limit for all RDE tests performed at type-approval were collected and averaged across each pollutant (CO, NOx and PN). To quantify the relative RDE performance of an ISC family, the results were normalised to reveal families that were closer to exceeding the NTE limits. This method was used as vehicles generally were found to be well below the NTE limits at type-approval, and understanding families' *relative* performance gave more insight as to the families who were more likely to emit higher levels of pollutants.

6. ISC family complexity (%)





TSV 2021-2281

Calculated by taking the number of IP families in an ISC family and dividing by the total number of IP families across all ISC families. This metric is thought to provide an indication of ISC family complexity, since a greater number of IP families generally corresponds to a greater number of vehicle configurations being available. More configurations arguably adds complexity for a manufacturer in terms of ensuring robust powertrain design and calibration to support compliant emissions performance across a broad range of configurations, where characteristics such as rated engine power, vehicle mass, exhaust system layouts (and more) could differ considerably within the definition of a ISC (PEMS) family.

These six parameters were then averaged for each ISC family to generate Risk Rating 2 value (%).

Combined Risk Rating

A Combined Risk Rating is then calculated for each ISC family, by summing Risk Rating 1 and Risk Rating 2.

The two ISC families with the highest Combined Risk Rating were then selected to be tested for ISC (Type 1 and RDE). A check was performed to ensure that two ISC families were sufficient to meet the annual minimum test frequency requirements (to test a minimum of 5% or at least two ISC families per year), which showed that two families were sufficient for this manufacturer.

[1] https://www.acea.be/uploads/statistic_documents/Economic_and_Market_Report_full-year_2019.pdf

[2] https://www.acea.be/statistics/tag/category/by-manufacturer-registrations

6. ISC testing (including planning and selection of families tested, and final results of tests)

Table 25. GTAA ISC-2020 testing programme, for detailed test result, see chapter and annex for each manufacturer.

	Manufacturer Comment	ISC-Family	Planned Vehicles	Tested Vehicles	Result
6.1	Ford-Werke GmbH	5-WF0-D13	3	3	PASS
		11-WF0-P7	3	3	PASS
6.2	Hyundai Assan Otomotiv San ve Tic A.S	11-HAO-4	3	3	PASS
	1 vehicle mileage<15000km (11-HAO-1)	11-HAO-1	3	3	PASS
6.3	Hyundai Motor Manufacturing Czech s.r.o	11-HMM-15	3	3	PASS
	1 vehicle mileage<15000km (11-HMM-15)	11-HMM-14	3	3	PASS
6.4	Jaguar Land Rover Limited	11-SAJ-001	3	1	UND

Telephone +46 771 503503 Telefax +46 243 23 66 77 www.transportstyrelsen.se ISC@transportstyrelsen.se

TRANSP

MNANDE



Date 17 December 2021

TSV 2021-2281

	Difficulties in finding test objects	11-SAL-002	3	0	UND
6.5	Kia Motor Corporation	11-KMC-9	3	2	UND
	Difficult to find test objects (11-KMC-9)	11-KMC-7	3	3	PASS
	1 vehicle mileage<15000km (11-KMC-9)				
6.6	Kia Motors Slovakia s.r.o.	11-HMM-8	3	3	PASS
	2 vehicle mileage<15000km (11-HMM-8)	11-HMM-6	3	3	PASS
	1 vehicle mileage<15000km (11-HMM-6)				
6.7	Volvo Cars	5-YV1-021	3	3	PASS
	One FAILED test in 5-YV1-016, to reach a PASS result for the folder one extra vehicle tested with approved results.	5-YV1-016	3	4	PASS
6.8	Bayerische Motoren Werke AG	5-WBA-O21	0	0	-
	Not qualified for ISC-2020, age and low mileage	5-WBA-O35			
6.9	Rolls-Royce Motor Cars Ltd	5-SCA-032	3	0	UND
	Difficult to find test objects				

6.1 Ford-Werke GmbH

Table 26. Selected Ford-Werke GmbH ISC-families from Risk assessment.

ISC family 1	ISC family 2
5-WF0-D13	11-WF0-P7

Table 27. Ford-Werke GmbH IP families on tested vehicles in Type 1 and RDE tests.

		ISC family (5-WF0-D1	ISC family (11-WF0-F	7 2 97)					
No. of vehi (Type 1 and	cles tested d RDE)	3		3					
	Vehicle 1	IP-V362_2018_00012-WF0-1	Type 1: 20/01/21 RDE: 22/01/21	IP-11-WF0-2017-0031	Type 1: 13/01/21 RDE: 14/01/21				
IP families tested	Vehicle 2	IP-V362_2018_00005-WF0-1	Type 1: 13/04/21 RDE: 15/04/21	IP-11-WF0-2018-0020	Type 1: 24/03/21 RDE: 25/03/21				
	Vehicle 3	IP-V362_2018_00007-WF0-1	Type 1: 30/04/21 RDE: 04/05/21	IP-11-WF0-2017-0039	Type 1: 27/03/21 RDE: 29/03/21				



Final Report

Date 17 December 2021

TSV 2021-2281

Table 28. Statistical Folder Status and Test Results ISC family 1 (5-WF0-D13)

	IS	ISC family 1 (5-WF0-D13)												
		TEST 1					TI	EST 2			T	EST 3		SAMPLE DECISION
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until ST Dec 2019)
Type 1	CO	х				х				х				PASS
	THC													
	NMHC													
	NOX	х				x				х				PASS
	THC+NOX	х				х				х				PASS
	PM	х				х				х				PASS
	PN	х				x				х				PASS
RDE	NOX	х				х				х				PASS
	PN	x				x				х				PASS

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Table 29. Statistical Folder Status and Test Results ISC family 2 (11-WF0-P7)

		IS	ISC family 2 (11-WF0-P7)												
		TEST 1					TI	EST 2			TI	EST 3		SAMPLE DECISION	
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)	
Туре 1	CO	x				x				х				PASS	
	THC	х				x				х				PASS	
	NMHC	х				x				х				PASS	
	NOX	х				х				х				PASS	
	THC+NOX														
	PM	х				x				х				PASS	
	PN	х				x				х				PASS	
RDE	NOX	x				x				x				PASS	
	PN	х				х				х				PASS	

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex I – Ford-Werke GmbH for results.





6.2 Hyundai Assan Otomotiv San ve Tic A.S

Table 30. Selected Hyundai Assan Otomotiv San ve Tic A.S ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
11-HAO-4	11-HAO-1

Table 31. Hyundai Assan Otomotiv San ve Tic A.S IP families on tested vehicles in Type 1 and RDE tests.

		ISC far (11-H <i>I</i>	mily 1 AO-4)	ISC family 2 (11-HAO-1)				
No. of vehicle: (Type 1 and R	s tested RDE)	3		3				
	Vehicle 1	IP-11-NLH-2018-0008	Type 1: 26/03/2021	IP-11-NLH-2018-9401	Type 1: 14/04/2021			
			RDE: 30/03/2021		RDE: 15/04/2021			
IP families	Vehicle 2	IP-11-NLH-2018-0008	Type 1: 28/04/2021	IP-11-NLH-2018-9400	Type 1: 20/05/2021			
lesied			RDE: 29/04/2021		RDE: 21/05/2021			
	Vehicle 3	IP-11-NLH-2018-0008	Туре 1: 07/05/2021	IP-11-NLH-2018-9401	Type 1: 01/07/2021			
			RDE: 07/05/2021		RDE: 05/07/2021			

Table 32. Statistical Folder Status and Test Results ISC family 1 (11-HAO-4).

		IS	ISC family 1 (11-HAO-4)												
			Т	EST 1			Т	EST 2			T	EST 3		SAMPLE DECISION	
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)	
Type 1	СО	х				x				x				PASS	
	THC	х				х				x				PASS	
	NMHC	х				х				x				PASS	
	NOX	х				х				x				PASS	
	THC+NOX														
	PM														
	PN														
RDE	NOX	х				х				x				PASS	
	PN														

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier





Final Report

17 December 2021

TSV 2021-2281

Table 33. Statistical Folder Status and Test Results ISC family 2 (11-HAO-1)

	IS	ISC family 2 (11-HAO-1)												
		TEST 1					TI	EST 2			T	EST 3		SAMPLE DECISION
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 51 Dec 2019)
Type 1	CO	х				х				х				PASS
	THC	х				х				х				PASS
	NMHC	х				х				х				PASS
	NOX	х				х				х				PASS
	THC+NOX													
	PM													
	PN													
RDE	NOX	х				х				х				PASS
	PN													

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex II - Hyundai Assan Otomotiv San ve Tic A.S for results.

6.3 Hyundai Motor Manufacturing Czech s.r.o

Table 34. Selected Hyundai Motor Manufacturing Czech s.r.o ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
11-HMM-15	11-HMM-14

Tabell 35. Hyundai Motor Manufacturing Czech s.r.o IP families on tested vehicles in Type 1 and RDE tests.

		ISC family	ISC famil	y 2					
		(11-HMM-1	15)	(11-HMM-14)					
No. of vehicles (Type 1 and R	s tested RDE)	3		3					
	Vehicle 1	IP-11-TMA-2018-0039	Type 1: 28/01/21 RDE: 01/02/21	IP-11-TMA-2018-0031	Type 1: 02/03/21 RDE: 03/03/21				
IP families tested	Vehicle 2	IP-11-TMA-2018-0039	Type 1: 28/09/21 RDE: 08/10/21	IP-11-TMA-2018-0032	Type 1: 20/07/21 RDE: 16/07/2021				
Vehicle 3		IP-11-TMA-2018-0039	Type 1: 30/09/21 RDE: 04/10/21	IP-11-TMA-2018-0031	Type 1: 07/09/21 RDE: 07/09/2021				





	ly 1 ((11-	-HI	MM-	15)									
			Т	EST 1			T	EST 2			TI	EST 3		SAMPLE DECISION
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	
Type 1	СО	x				x				х				PASS
	THC													
	NMHC													
	NOX	x				x				х				PASS
	THC+NOX	х				х				х				PASS
	PM	x				x				х				PASS
	PN	x				x				х				PASS
RDE	NOX	х				х				х				PASS
	PN	х				х				х				PASS

Table 36. Statistical Folder Status and Test Results ISC family 1 (11-HMM-15).

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Table 37. Statistical Folder Status and Test Results ISC family 2 (11-HMM-14)

		IS	ISC family 2 (11-HMM-14)													
		TEST 1					T	EST 2			Т	EST 3		SAMPLE DECISION		
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)		
Туре 1	СО	x				x				х				PASS		
	THC	x				x				x				PASS		
	NMHC	х				х				х				PASS		
	NOX	x				x				х				PASS		
	THC+NOX															
	PM	х				х				х				PASS		
	PN	x				x				x				PASS		
RDE	NOX	х				х				х				PASS		
	PN	x				x				x				PASS		

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex III – Hyundai Motor Manufacturing Czech s.r.o for results.

6.4 Jaguar Land Rover Limited

Table 38. Selected Jaguar Land Rover Limited ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
11-SAJ-001	11-SAL-002

Table 39. Jaguar Land Rover Limited IP families on tested vehicles in Type 1 and RDE tests.







Final Report

Date 17 December 2021

TSV 2021-2281

		ISC far (11-SA	nily 1 J-001)	ISC family 2 (11-SAL-002)					
No. of vehicle (Type 1 and F	s tested RDE)	1		0					
	Vehicle 1	IP-11-SAD-2018-0009	Type 1: 04/02/21 RDE: 04/02/21	TBC	Type 1: RDE:				
IP families tested	Vehicle 2	ТВС	Type 1: RDE:	ТВС	Type 1: RDE:				
	Vehicle 3	TBC	Type 1: RDE:	ТВС	Type 1: RDE:				

Table 40. Statistical Folder Status and Test Results ISC family 1 (11-SAJ-001)

		IS	ISC family 1 (11-SAJ-001)														
		TEST 1					TI	EST 2			T	EST 3		SAMPLE DECISION			
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until ST Dec 2019)			
Туре 1	СО	х												UND			
	тнс																
	NMHC																
	NOX	х												UND			
	THC+NOX	х												UND			
	PM	х												UND			
	PN	х												UND			
RDE	NOX	х												UND			
	PN	х												UND			

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex IV – Jaguar and Land Rover Limited for results.

6.5 Kia Motor Corporation

Table 41. Selected Kia Motor Corporation ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
11-KMC-9	11-KMC-7





TSV 2021-2281

Table 42. Kia Motor Corporation IP families on tested vehicles in Type 1 and RDE tests.

		ISC fami (11-KMC	ly 1 :-9)	ISC family 2 (11-KMC-7)					
No. of vehicles tested (Type 1 and RDE)		2		3					
	Vehicle 1	IP-11-KNA-2018-0023	Type 1: 02/03/21 RDE: 03/02/21	IP-11-KNA-2018-0011	Type 1: 10/03/21 RDE: 11/02/21				
IP families tested	Vehicle 2	IP-11-KNA-2018-0024	Type 1: 01/09/21 RDE: 02/09/21	IP-11-KNA-2018-0014	Type 1: 20/04/21 RDE: 21/04/21				
Vehicle 3		N/A	Type 1: RDE:	IP-11-KNA-2018-0015	Type 1: 12/05/21 RDE: 12/05/21				

Table 43. Statistical Folder Status and Test Results ISC family 1 (11-KMC-9)

		IS	ISC family 1 (11-KMC-9)														
		TEST 1					TI	EST 2			TI	EST 3		SAMPLE DECISION			
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 51 Dec 2019)			
Туре 1	CO	х				х								UND			
	THC																
	NMHC																
	NOX	х				х								UND			
	THC+NOX	х				х								UND			
	PM	х				х								UND			
	PN	х				х								UND			
RDE	NOX	х				х								UND			
	PN	х				х								UND			

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Table 44. Statistical Folder Status and Test Results ISC family 2 (11-KMC-7)

		IS	ISC family 2 (11-KMC-7)													
		TEST 1					T	EST 2			T	EST 3		SAMPLE DECISION		
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)		
Туре 1	СО	х				x				х				PASS		
	THC	x				x				х				PASS		
	NMHC	х				х				х				PASS		
	NOX	х				x				х				PASS		
	THC+NOX															
	PM	х				х				х				PASS		
	PN	х				x				х				PASS		
RDE	NOX	х				х				х				PASS		
	PN	х				x				x				PASS		

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex V – Kia Motor Corporation for results.

Swedish Transport Agency Road and Rail Department P.O. Box 267 SE-781 23 Borlänge Sweden





6.6 Kia Motors Slovakia s.r.o

Table 45. Selected Kia Motors Slovakia s.r.o. ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
11-HMM-8	11-HMM-6

Table 46. Kia Motors Slovakia s.r.o. IP families on tested vehicles in Type 1 and RDE tests.

		ISC famil (11-HMM	y 1 -8)	ISC family 2 (11-HMM-6)						
No. of vehicle (Type 1 and F	es tested RDE)	3		3						
	Vehicle 1	IP-110012-TMA-1 (IP-11-TMA-2018-0012)	Type 1: 12/05/21 RDE: 11/05/21	IP-110005-TMA-1	Type 1: 27/04/21 RDE: 28/04/21					
IP families tested	Vehicle 2	IP-110011-TMA-1 (IP-11-TMA-2018-0011)	Type 1: 02/09/21 RDE: 01/09/21	IP-110005-TMA-1	Type 1: 16/09/21 RDE: 14/09/21					
Vehicle 3		IP-110012-TMA-1 (IP-11-TMA-2018-0012)	Type 1: 28/09/21 RDE: 30/09/21	IP-110005-TMA-1	Type 1: 23/09/21 RDE: 21/09/21					

Table 47. Statistical Folder Status and Test Results ISC family 1 (11-HMM-8)

			ISC family 1 (11-HMM-8)														
			Т	EST 1		TEST 2					Т	EST 3		SAMPLE DECISION			
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)			
Type 1	CO	х				х				х				PASS			
	THC																
	NMHC																
	NOX	x			х				х				PASS				
	THC+NOX	х				х				х				PASS			
	PM	х				х				х				PASS			
	PN	х				х				х				PASS			
RDE	NOX	х				х				х				PASS			
	PN	х				x				х				PASS			

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier







Final Report

Date 17 December 2021

TSV 2021-2281

Table 48. Statistical Folder Status and Test Results ISC family 2 (11-HMM-6)

			ISC family 2 (11-HMM-6)														
			Т	EST 1			T	EST 2			TI	EST 3		SAMPLE DECISION			
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)			
Type 1	CO	х				х				х				PASS			
	THC																
	NMHC																
	NOX	х				х				х				PASS			
	THC+NOX	х				х				х				PASS			
	PM	х				х				х				PASS			
	PN	х				х				х				PASS			
RDE	NOX	х				х				х				PASS			
	PN	х				х	x			х				PASS			

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Please refer to Annex VI - Kia Motors Slovakia s.r.o for results.

6.7 Volvo Cars

Table 49. Selected Volvo Cars ISC-families from Risk assessment.

ISC family 1:	ISC family 2:
5-YV1-021	5-YV1-016

Table 50. Volvo Cars IP families on tested vehicles in Type 1 and RDE tests.

		ISC fam 5-YV1-	ily 1 021	ISC family 2 5-YV1-016						
No. of vehicles t (Type 1 and RD	ested E)	3		4						
	Vehicle 1	IP-2019_246K5C-YV1-1	Type I: 04/03/21 RDE: 09/03/21	IP-2019_53615D-YV1-1	Type I: 09/03/21 RDE: 10/03/21					
IP families	Vehicle 2	IP-2019_246K5C-YV1-1	Type I: 02/03/21 RDE: 12/03/21	IP-2019_53615D-YV1-1	Type I: 09/03/21 RDE: 15/03/21					
tested	Vehicle 3	IP-2019_246K5C-YV1-1	Type I: 14/03/21 RDE: 22/03/21	IP-2019_53615D-YV1-1	Type I: 12/03/21 RDE: 19/03/21					
-	Vehicle 4			IP-2019_53615D-YV1-1	Type I: 02/06/21 RDE: 04/06/21					





Final Report

Date 17 December 2021

TSV 2021-2281

Table 51. Statistical Folder Status and Test Results ISC family 1 (5-YV1-021)

		IS	C f	amil	y 1 (5-Y	V1-	021)						
			T	EST 1			TI	EST 2			TI	EST 3		SAMPLE DECISION
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until ST Dec 2019)
Туре 1	CO	х				х				х				PASS
	THC													
	NMHC													
	NOX	х				х				х				PASS
	THC+NOX	х				х				х				PASS
	PM	х				х				х				PASS
	PN	х				х				х				PASS
RDE	NOX	х				х				х				PASS
	PN	х				х				х				PASS

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Table 52. Statistical Folder Status and Test Results ISC family 1 (5-YV1-016)

		ISC family 1 (5-YV1-016)																
			Т	EST 1			Т	EST 2			Т	EST 3			Т	EST 4		SAMPLE DECISION
		р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	р	f	i.o.	e.o.	(Types approved until 31 Dec 2019)
Туре 1	СО	х				x				x				x				PASS
	THC	х				х				х				х				PASS
	NMHC	х				x				х				x				PASS
	NOX	х				х				х				х				PASS
	THC+NOX																	
	PM	х					х			х				х				PASS
	PN	х				x				х				x				PASS
RDE	NOX	х				х				х				х				PASS
	PN	х				x				x				x				PASS

p=pass; f=fail; i.o.=intermediate outlier; e.o.=extreme outlier

Type 1 test show PM result above limit. The test was found valid and no indication of faults on the test object. Consequently, a fourth car was tested with approved results.

Please refer to Annex VII – Volvo Cars for results.

6.8 Bayerische Motoren Werke AG

No ISC families were qualified testing in ISC-2020 programme because all BMW ISC-families have to low age and mileage.





TSV 2021-2281

6.9 Rolls-Royce Motor Cars Ltd

Difficulties to find vehicles for testing, no tests performed for ISC-2020.

7. Detailed investigations Nothing to report.

8. Remedial measures Nothing to report.

E. Assessment of the yearly expected emissions decrease due to any ISC remedial measures

Not applicable.

F. Lessons Learned (including for performance of instruments used)

Difficulties to procure appropriate test objects.

G.Report of other invalid tests

Nothing to report.

ANNEXES:

Annex I: Ford-Weke GmbH Final Report ISC-2020

Annex II: Hyundai Assan Otomotiv San ve Tic A.S Final Report ISC-2020

Annex III: Hyundai Motor Manufacturing Czech s.r.o Final Report ISC-2020

Annex IV: Jaguar Land Rover Limited Final Report ISC-2020

Annex V: Kia Motor Corporation Final Report ISC-2020

Annex VI: Kia Motors Slovakia s.r.o Final Report ISC-2020

Annex VII: Volvo Cars Final Report ISC-2020

Annex VIII: 3rd party ISC testing Final Report 2020



Annex I – Ford Werke GmbH, Final Report ISC-2020

ISC year:	2020
Manufacturer:	Ford Werke GmbH
Report status:	Final
Report number:	ISC-2020-01
Issue date:	2021-12-17



Test Overview on Ford Werke GmbH

ISC Family	Manufacturer (Section B) 2020-01-01→2021-10- <u>30</u>	STA (Section D) 2020-01-01→2021-05- <u>04</u>	3 rd parties (Section C) Calender year 2020
5-WF0-D13	 4 vehicles tested, Type1 Tested by Ford Results on 3 tests 2 vehicles to be tested 	 3 vehicles tested, Type1+RDE 1 Tested by Dekra in Germany 2 Tested by AVL in Sweden Meets applicable regulation 	 No tests reported
11-WF0-P7	 2 vehicles tested, Type1 Tested by Ford No result presented Third vehicle to be sourced 	 3 vehicle tested, Type1+RDE 1 Tested by Dekra in Germany 2 Tested by AVL in Sweden Meets applicable regulations 	 No tests reported.
5-WF0-D25 11-WF0-D6	 5 vehicles tested Tested by Ford Results on 4 tests 1 Failed Meets applicable regulations Statistical folder - Closed 	 Not selected for 2020 testing 	 1 vehicle tested, RDE Tested by Danish Technological Institute in Denmark Meets applicable regulations.
11-WF0-D10	 7 vehicles tested, Type1 Tested by Ford Results on 6 tests One invalid test Meets applicable regulations Statistical folder - Closed 	 Not selected for 2020 testing 	No tests reported
5-WF0-P28 11-WF0-P9	 4 vehicles tested, Type1 Tested by Ford Meets applicable regulations Statistical folder – Closed 	 Not selected for 2020 testing 	 No tests reported
11-WF0-P16	 3 vehicles tested, Type1 Results on 2 vehicles Tested by Ford Meets applicable regulations 	Not selected for 2020 testing	No tests reported



Annex I – Ford Werke GmbH, Final Report ISC-2020

11-WF0-D8	 3 vehicles tested, Type1 Tested by Ford Statistical folder – Closed 	Not selected for 2020 testing	No tests reported
5-WF0-D14	 2 vehicles tested, Type1 Trying to identify third vehicle Tested by Ford Meets applicable regulations 	Not selected for 2020 testing	No tests reported
11-WF0-P8	 4 vehicles tested, Type1 Tested by Ford Meets applicable regulations Statistical folder – Closed 	Not selected for 2020 testing	No tests reported
11-WF0-P20 11-WF0-P22	 5 vehicles tested, Type1 Tested by Ford Meets applicable regulations Statistical folder – Closed 	Not selected for 2020 testing	No tests reported
11-WF0-D16	 1 vehicle tested, Type1 Tested by Ford Meets applicable regulations Trying to identify second/third 	Not selected for 2020 testing	No tests reported
5-WF0-P27	 3 vehicle tested, Type1 Tested by Ford Meets applicable regulations Statistical folder – Closed 	Not selected for 2020 testing	No tests reported
5-WF0-P34	 1 vehicle tested, Type1 2 vehicles identified for test 	Not selected for 2020 testing	No tests reported
5-WF0-D41	No testingVehicles for tests identified	Not selected for 2020 testing	No tests reported
5-WF0-D42	No testingVehicles for tests identified	Not selected for 2020 testing	No tests reported
5-WF0-D40	No testingVehicles for tests identified	Not selected for 2020 testing	No tests reported
5-WF0-D36	No testing2 Vehicles identified for testing	Not selected for 2020 testing	No tests reported



Detailed Type 1a (RDE) data from STA test (D)

ISC-family	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
5-WF0-D13	e5*715/2007*2018/1832DG*1650*00	N/A	168	9,00E+11	40	27	16%	3,13E+08	0%	113	59	35%	5,47E+08	0%
5-WF0-D13	e5*715/2007*2018/1832DG*1402*00	N/A	168	9,00E+11	22	97	58%	1,24E+10	1%	67	150	89%	4,42E+09	0%
5-WF0-D13	e5*715/2007*2018/1832DG*1400*00	N/A	168	9,00E+11	0	53	31%	4,19E+09	0%	0	109	65%	7,89E+09	1%
11-WF0-P7	e5*715/2007*2018/1832DG*1113*01	N/A	126	9,00E+11	347	12	9%	4,86E+10	5%	166	21	16%	9,09E+10	10%
11-WF0-P7	e5*715/2007*2018/1832DG*1099*01	N/A	126	9,00E+11	409	28	22%	1,12E+11	12%	286	57	45%	1,21E+11	13%
11-WF0-P7	e5*715/2007*2018/1832DG*1098*01	N/A	126	9,00E+11	413	13	10%	5,15E+11	57%	183	14	11%	4,73E+11	53%



Annex I – Ford Werke GmbH, Final Report ISC-2020

Detailed Type 1 (WLTP) data from STA test (D)

ISC-family	Vehicle	Emission Type Approval	CO (mg/km)	Limit CO (mg/km)	CO % of Limit	THC (mg/km)	Limit THC (mg/km)	THC % of Limit	NMHC (mg/km)	Limit NMHC (mg/km)	NMHC % of Limit	NOx (mg/km)	Limit NOx (mg/km)	NOx % of Limit	THC+NOx (mg/km)	Limit THC+NOx (mg/km)	THC+NOx % of Limit	PM (mg/km)	Limit PM (mg/km)	PM % of Limit	PN (#/km)	Limit PN (#/km)	PN % of Limit
5-WF0-D13	Vehicle 1	e5*715/2007*2018/1832DG*1650*00	40	500	8%							31	80	38%	37	170	22%	0,51	4,50	11%	2,02E+09	6,00E+11	0%
	Vahiela 2	-F*71F/2007*2010/1022DC*1402*00	22	500	70/							10		2.49/	22	170	1.29/	0.04	4.50	108/	F 495+09	C 005+11	09/
5-WF0-D13	venicie 2	e5*715/2007*2018/1832DG*1402*00	33	500	1%							19	80	24%	23	170	13%	0,84	4,50	19%	5,48E+08	6,00E+11	0%
5-WF0-D13	Vehicle 3	e5*715/2007*2018/1832DG*1400*00	79	500	16%							21	80	26%	44	170	26%	0,57	4,50	13%	1,20E+10	6,00E+11	2%
11 WEO D7	Vahisla 1	~E*71E/3007*3010/1023DC*1113*01	200	1000	0.0%	FO	100	E0%	42	60	639/	17	60	20%				0.45	4.50	1.0%	E 22E+11	6.00E+11	90%
11-00-0-0	Venicie 1	2010/185200 1115 01	077	1000	50%	30	100	30%	42	00	0270	17	00	2370				0,43	4,30	10%	3,520711	0,00E+11	03/0
11-WF0-P7	Vehicle 2	e5*715/2007*2018/1832DG*1099*01	445	1000	45%	36	100	36%	32	68	46%	26	60	44%				0,56	4,50	12%	4,39E+11	6,00E+11	73%
11 WEO D7	Vahisla 2	~E*71E/2007*2019/1922DC*1009*01	669	1000	679/	EQ	100	E 00/	52	c 0	770/	10	60	210/				0.50	4.50	110/	2 555 11	6.00E+11	E0%



Annex II – Hyundai Assan Otomotiv San ve Tic. A.Ş, Final Report ISC-2020

ISC year:	2020
Manufacturer:	Hyundai Assan Otomotiv San ve Tic. A.Ş.
Report status:	Final
Report number:	ISC-2020-02
Issue date:	2021-12-17



ISC Family	Manufacturer (Section B) 2020-01-01→2021-10-06	STA (Section D) 2020-01-01→2021-05-07	3 rd parties (Section C) Calender year 2020
11-HAO-1	 2 vehicles tested, Type 1 Tested by HAOS 1 vehicle left to test Meets applicable regulations 	 3 vehicles tested, Type1+RDE 1 vehicle at Dekra in Germany 2 vehicles at AVL in Sweden 1 vehicle mileage<15000km Meets the applicable regulations Statistical folder closed 	 1 vehicle tested, RDE EMISIA in Greece Meets applicable regulations
11-HAO-3	 1 vehicle tested, Type 1 Tested by HAOS 2 vehicle left to test Meets the applicable regulations 	 Not selected for 2020 testing 	 No tests reported
11-HAO-4	 2 vehicles tested, Type 1 1 vehicle tested, Type 1+RDE Tested by HAOS Meets the applicable regulations Statistical folder closed 	 3 vehicles tested, Type1+RDE 1 vehicle at Dekra in Germany 2 at AVL in Sweden Meets the applicable regulations Statistical folder closed 	 No tests reported

Test Overview on Hyundai Assan Otomotiv San ve Tic. A.Ş.



Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE
11-HAO-4	Vehicle 1	e5*715/2007*2018/1832DG*1331*00	N/A	126	69	8	6%	164	16	13%
11-HAO-4	Vehicle 2	e5*715/2007*2018/1832DG*1331*00	N/A	126	1009	14	11%	734	18	15%
11-HAO-4	Vehicle 3	e5*715/2007*2018/1832DG*1331*00	N/A	126	1424	22	17%	210	9	7%
11-HAO-1	Vehicle 1	e5*715/2007*2018/1832DG*1326*00	N/A	126	249	16	13%	169	13	10%
11-HAO-1	Vehicle 2	e5*715/2007*2018/1832DG*1325*00	N/A	126	1374	19	15%	261	27	21%
11-HAO-1	Vehicle 3	e5*715/2007*2018/1832DG*1326*00	N/A	126	1520	22	18%	232	21	17%



Annex II – Hyundai Assan Otomotiv San ve Tic. A.Ş, Final Report ISC-2020

Detailed Type 1 (WLTP) data from STA test (D)

ISC-family	Vehicle	Emission Type Approval	CO (mg/km)	Limit CO (mg/km)	CO % of Limit	THC (mg/km)	Limit THC (mg/km)	THC % of Limit	NMHC (mg/km)	Limit NMHC (mg/km)	NMHC % of Limit	NOx (mg/km)	Limit NOx (mg/km)	NOx % of Limit
11-HAO-4	Vehicle 1	e5*715/2007*2018/1832DG*1331*00	331	1000	33%	27	100	27%	24	68	36%	12	60	20%
11-HAO-4	Vehicle 2	e5*715/2007*2018/1832DG*1331*00	349	1000	35%	27	100	27%	24	68	36%	12	60	20%
11-HAO-4	Vehicle 3	e5*715/2007*2018/1832DG*1331*00	287	1000	29%	24	100	24%	22	68	33%	15	60	25%
11-HAO-1	Vehicle 1	e5*715/2007*2018/1832DG*1326*00	179	1000	18%	22	100	22%	21	68	30%	18	60	29%
11-HAO-1	Vehicle 2	e5*715/2007*2018/1832DG*1325*00	276	1000	28%	18	100	18%	16	68	24%	13	60	22%
11-HAO-1	Vehicle 3	e5*715/2007*2018/1832DG*1326*00	238	1000	24%	15	100	15%	15	68	21%	14	60	23%



Annex III – Hyundai Motor Manufacturing Czech s.r.o, Final Report ISC-2020

ISC year:	2020
	Hyundai Motor
Manufacturer:	Manufacturing Czech s.r.o
Report status:	Final
Report number:	ISC-2020-03
Issue date:	2021-12-17



Annex III – Hyundai Motor Manufacturing Czech s.r.o, Final Report ISC-2020

Test Overview on Hyundai Motor Manufacturing

ISC Family	Manufacturer (Section B) 2020-01-01→2021-05-30	STA (Section D) 2020-01-01→2021-10-06	3 rd parties (Section C) Calender year 2020
11-HMM-15	 Not selected for 2020 testing 	 3 vehicles tested, Type 1+RDE 1 vehicle tested by Dekra in Germany 2 vehicle tested by AVL in Sweden 1 vehicle mileage<15000km Meet applicable regulation Statistical folder closed 	No tests reported
11-HMM-14	Not selected for 2020 testing	 3 vehicles tested, Type 1+RDE 1 vehicle tested by Dekra in Germany 2 vehicles tested by AVL in Sweden Meet applicable regulations Statistical folder closed 	No tests reported
11-HMM-16	 Not selected for 2020 testing 	 Not selected for 2020 testing 	 No tests reported
11-HMM-5	 2 vehicles tested, Type 1 1 vehicle tested, Type 1 + RDE Tested by HMMC Meet the applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	No tests reported
11-HMM-6	 2 vehicles tested, Type 11 vehicle 1 tested, Type 1+RDE Tested by HMMC Meet the applicable regulations Statistical folder closed 	 Not selected for 2020 testing. 	 No tests reported.
11-HMM-8	 2 vehicles tested, Type 1 1 vehicle tested, Type 1+RDE Tested by HMMC Meet the applicable regulations Statistical folder closed 	 Not selected for 2020 ISC testing. 	 No tests reported.



Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
11-HMM-15	Vehicle 1	e5*715/2007*2018/1832DG*0202*03	N/A	168	9,00E+11	5	31	18%	3,30E+09	0%	9	62	37%	6,38E+09	1%
11-HMM-15	Vehicle 2	e5*715/2007*2018/1832DG*0202*02	N/A	168	9,00E+11	71	26	16%	9,85E+09	1%	99	60	36%	2,31E+10	3%
11-HMM-15	Vehicle 3	e5*715/2007*2018/1832DG*0202*03	N/A	168	9,00E+11	266	89	53%	2,03E+11	23%	314	159	95%	2,89E+11	32%
11_HMM_14	Vehicle 1	م5*715/2007*2018/1822DC*1220*00	N/A	126	9 00E±11	112	21	16%	1 27E±10	1%	100	22	18%	1 78E±10	2%
11-110101-14	Venicie 1	2018/18/2007 2018/18/2018 12:55 00	11/A	120	J,00L111	115	21	10/0	1,27110	170	100	22	10/0	1,700110	2.70
11-HMM-14	Vehicle 2	e5*715/2007*2018/1832DG*1258*00	N/A	126	9,00E+11	384	25	20%	6,08E+10	7%	311	23	18%	7,91E+10	9%
11-HMM-14	Vehicle 3	e5*715/2007*2018/1832DG*1239*00	N/A	126	9,00E+11	1070	52	42%	6,54E+10	7%	1010	41	33%	1,01E+11	11%



Detailed Type 1 (WLTP) data from STA test (D)

ISC-family	Vehicle	Emission Type Approval	CO (mg/km)	Limit CO (mg/km)	CO % of Limit	THC (mg/km)	Limit THC (mg/km)	THC % of Limit	NMHC (mg/km)	Limit NMHC (mg/km)	NMHC % of Limit	NOx (mg/km)	Limit NOx (mg/km)	NOx % of Limit	THC+NOx (mg/km)	Limit THC+NOx (mg/km)	THC+NOx % of Limit	PM (mg/km)	Limit PM (mg/km)	PM % of Limit	PN (#/km)	Limit PN (#/km)	PN % of Limit
11-HMM-15	Vehicle 1	e5*715/2007*2018/1832DG*0202*03	30	500	6%	32						36	80	45%	68	170	40%	0.12	4.50	3%	2 35F+09	6.00E+11	0%
11 11 11 11 11	Vehicle 2	c=*71E/2007*2019/1922DC*0202*03	22	500	79/	40						36	00	23%	66	170	20%	0,12	4,50	3%	1.055+00	6.00E+11	0%
11-HMM-15	Vehicle 3	e5*715/2007*2018/1832DG*0202*02	28	500	6%	22						41	80	51%	62	170	37%	0,13	4,50	3%	2 28E+10	6.00E+11	4%
11-HMM-14	Vehicle 1	e5*715/2007*2018/1832DG*1239*00	126	1000	13%	12	100	12%	9	68	14%	20	60	34%	32	110	5776	0.34	4,50	8%	2,26E+10	6.00E+11	4%
11-HMM-14	Vehicle 2	e5*715/2007*2018/1832DG*1258*00	212	1000	21%	14	100	14%	12	68	18%	16	60	27%	30			0,24	4,50	5%	6,15E+10	6,00E+11	10%
11-HMM-14	Vehicle 3	e5*715/2007*2018/1832DG*1239*00	220	1000	22%	16	100	16%	13	68	19%	23	60	38%	39			0,45	4,50	10%	5,37E+10	6,00E+11	9%



Annex IV – Jaguar Land Rover Limited, Final Report ISC-2020

ISC year:	2020
Manufacturer:	Jaguar Land Rover Limited
Report status:	Final
Report number:	ISC-2020-04
Issue date:	2021-12-17



Test overview on Jaguar Land Rover Limited

ISC Family	Manufacturer (Section B) 2020-01-01→ 2021-05-25	STA (Section D) 2020-01-01→2020-02-04	3 rd parties (Section C) Calender year 2020
11-SAJ-001	 4 vehicles tested Type 1 1 invalid test Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 1 vehicle tested, Type1+RDE Tested by Dekra in Germany Meet applicable regulations Procurement of remaining test objects on-going 	 No tests reported
11-SAL-002	 3 vehicles tested, Type 1 Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported
11-SAJ-004	 3 vehicles tested, Type 1 Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported
11-SAJ-016	 4 vehicles tested, Type 1 1 invalid test Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported
11-SAL-019	 4 vehicles tested, Type 1 1 invalid test Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported
11-SAL-020	 3 vehicles tested, Type 1 Tested by Jaguar Land Rover Meet applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported



Annex IV – Jaguar Land Rover Limited, Final Report ISC-2020

Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
11-SAJ-001-001	Vehicle 1	e5*715/2007*2018/1832DG*1202*00	N/A	168	9,00E+11	54	25	15%	3,76E+11	42%	50	37	22%	5,21E+11	58%

Detailed Type 1 (WLTP) data from STA test (D)

ISC-family	Vehicle	Emission Type Approval	CO (mg/km)	Limit CO (mg/km)	CO % of Limit	THC (mg/km)	NOx (mg/km)	Limit NOx (mg/km)	NOx % of Limit	THC+NOx (mg/km)	Limit THC+NOx (mg/km)	THC+NOx % of Limit	PM (mg/km)	Limit PM (mg/km)	PM % of Limit	PN (#/km)	Limit PN (#/km)	PN % of Limit
11-SAJ-001-001	Vehicle 1	e5*715/2007*2018/1832DG*1202*00	22	500	4%	4	23	80	29%	27	170	16%	0,28	4,50	6%	3,81E+10	6,00E+11	6%



ISC year:	2020
Manufacturer:	Kia Motor Corporation
Report status:	Final
Report number:	ISC-2020-05
Issue date:	2021-12-17



Test Overview on Kia Motor Corporation

ISC Family	Manufacturer (Section B) 2020-01-01→2021-09-29	STA (Section D) 2020-01-01→2021-09-02	3 rd parties (Section C) Calender year 2020
11-KMC-7	 No tests reported 	 3 vehicle tested, Type I+RDE 1 Tested by Dekra in Germany 2 Tested by AVL in Sweden Meet applicable regulations Statistical folder closed 	No tests reported
11-KMC-8	 No tests reported 	Not selected for 2020 testing	 1 vehicle tested RDE Tested by EMISIA in Greece Meet applicable regulations
11-KMC-9	 No tests reported 	 2 vehicle tested, Type 1+RDE 1 Tested by Dekra in Germany 1 Tested by AVL in Sweden 1 vehicle mileage<15000km 1 vehicle remaining Tests meet applicable regulations 	No tests reported
05-KMC-12	 1 vehicles tested, Type 1 Tested by KMS. Meet the applicable regulations 2 vehicles left to test 	Not selected for 2020 testing.	 No tests reported
05-KMC-13	 2 vehicles tested Type 1 Tested by KMS Meet the applicable regulations 1 vehicles left to test 	Not selected for 2020 testing	No tests reported
05-KMC-15	 2 vehicles tested, Type 1 Tested by KMS Meet the applicable regulations 1 vehicles left to test 	Not selected for 2020 testing	 No tests reported



05-KMC-16	 2 vehicles tested, Type 1 Tested by KMS Meet the applicable regulations 1 vehicles left to test 	 Not selected for 2020 testing. 	No tests reported
05-KMC-17	 1 vehicles tested, Type 1 Tested by KMS Meet the applicable regulations 2 vehicles left to test 	 Not selected for 2020 testing 	No tests reported

Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
11-KMC-9-0	Vehicle 1	e5*715/2007*2018/1832DG*1271*02	N/A	168	9,00E+11	76	29	17%	1,63E+09	0%	126	59	35%	2,24E+09	0%
11-KMC-9-0	Vehicle 2	e5*715/2007*2018/1832DG*1270*02	N/A	168	9,00E+11	81	35	21%	1,89E+09	0%	142	68	40%	2,73E+09	0%
11-KMC-9-0	Vehicle 3														
11-KMC-7-0	Vehicle 1	e5*715/2007*2018/1832DG*1259*01	N/A	126	9,00E+11	86	10	8%	8,70E+10	10%	104	14	11%	1,56E+11	17%
11-KMC-7-0	Vehicle 2	e5*715/2007*2018/1832DG*1354*01	N/A	126	9,00E+11	39	12	10%	8,33E+10	9%	83	20	16%	1,36E+11	15%
11-KMC-7-0	Vehicle 3	e5*715/2007*2018/1832DG*1261*01	N/A	126	9,00E+11	481	22	17%	1,44E+11	16%	13	28	22%	1,25E+11	14%



Detailed Type 1 (WLTP) data from STA test (D)

			со	Limit CO	CO % of	тнс	Limit THC	THC % of	ммнс	Limit NMHC	NMHC % of	NOx	Limit NOx	NOx % of	THC+NOx	Limit THC+NOx	THC+NOx % of	РМ	Limit PM	PM % of	PN	Limit PN	PN % of
ISC-family	Vehicle	Emission Type Approval	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(#/km)	(#/km)	Limit
11-KMC-9-0	Vehicle 1	e5*715/2007*2018/1832DG*1271*02	88	500	18%							50	80	62%	75	170	44%	0.25	4.50	6%	1.21E+09	6.00F+11	0%
11-KMC-9-0	Vehicle 2	e5*715/2007*2018/1832DG*1270*02	84	500	17%							33	80	41%	57	170	33%	0,16	4.50	4%	4.66E+08	6.00E+11	0%
11-KMC-9-0	Vehicle 3																	,	,				
11-KMC-7-0	Vehicle 1	e5*715/2007*2018/1832DG*1259*01	80	1000	8%	8	100	8%	6	68	9%	10	60	17%				0,34	4,50	8%	7,07E+10	6,00E+11	12%
11-KMC-7-0	Vehicle 2	e5*715/2007*2018/1832DG*1354*01	70	1000	7%	8	100	8%	7	68	10%	17	60	28%				0,70	4,50	16%	2,38E+11	6,00E+11	40%
11-KMC-7-0	Vehicle 3	e5*715/2007*2018/1832DG*1261*01	46	1000	5%	11	100	11%	10	68	14%	11	60	19%				0,68	4,50	15%	1,09E+11	6,00E+11	18%



ISC year:	2020
Manufacturer:	Kia Motors Slovakia s.r.o
Report status:	Final
Report number:	ISC-2020-06
Issue date:	2021-12-17



Test Overview on Kia Motors Slovakia s.r.o

ISC Family	Manufacturer (Section B) 2020-01-01→2021-07-14	STA (Section D) 2020-01-01→2021-09-30	3 rd parties (Section C) Calender year 2020
11-HMM-6	 No tests reported 	 3 vehicle tested, Type 1+RDE 1 Tested by Dekra in Germany 2 Tested by AVL in Sweden 1 vehicle mileage<15000km Meet applicable regulations Statistical folder closed 	 No tests reported
11-HMM-8	No tests reported	 3 vehicle tested, Type 1+RDE 1 Tested by Dekra in Germany 2 Tested by AVL in Sweden 2 vehicle mileage<15000km Meet applicable regulations Statistical folder closed 	 No tests reported
11-HMM-15	No tests reported	Not selected for 2020 testing	 1 vehicle tested RDE Tested by Danish Technical Institute in Denmark Meet applicable regulations
5-KMC-1	 1 vehicles tested, Type 1 1 vehicle tested RDE Tested by KaSK Meet the applicable regulations 2 vehicles left to test 	 Not selected for 2020 testing 	 No tests reported
5-KMC-2	 2 vehicles tested, Type 1 1 vehicle tested, Type1+RDE Tested by KaSK Meet the applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	No tests reported

TRANSPORT STYRELSEN

OKANNANDE

Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
11-HMM-8	Vehicle 1	e5*715/2007*2018/1832DG*1309*03	N/A	168	9,00E+11	20	40	24%	1,72E+09	0%	32	30	18%	1,94E+10	2%
11-HMM-8	Vehicle 2	e5*715/2007*2018/1832DG*1307*03	N/A	168	9,00E+11	80	38	23%	3,96E+10	4%	145	72	43%	8,20E+10	9%
11-HMM-8	Vehicle 3	e5*715/2007*2018/1832DG*1309*03	N/A	168	9.00E+11	57	57	34%	1.05E+09	0%	106	94	56%	9.85E+08	0%
11-HMM-6	Vehicle 1	e5*715/2007*2018/1832DG*1304*02	N/A	126	9,00E+11	256	13	10%	, 1,00E+11	11%	242	31	25%	9,41E+10	10%
11-HMM-6	Vehicle 2	e5*715/2007*2018/1832DG*1304*02	N/A	126	9,00E+11	382	19	15%	5,39E+10	6%	217	38	30%	8,62E+10	10%
11-HMM-6	Vehicle 3	e5*715/2007*2018/1832DG*1304*02	N/A	126	9,00E+11	688	22	17%	2,75E+10	3%	213	37	30%	3,44E+10	4%



Detailed Type 1 (WLTP) data from STA test (D)

ISC-family	Vehicle	Emission Type Approval	CO (mg/km)	Limit CO (mg/km)	CO % of Limit	THC (mg/km)	Limit THC (mg/km)	THC % of Limit	NMHC (mg/km)	Limit NMHC (mg/km)	NMHC % of Limit	NOx (mg/km)	Limit NOx (mg/km)	NOx % of Limit	THC+NOx (mg/km)	Limit THC+NOx (mg/km)	THC+NOx % of Limit	PM (mg/km)	Limit PM (mg/km)	PM % of Limit	PN (#/km)	Limit PN (#/km)	PN % of Limit
11-HMM-8	Vehicle 1	e5*715/2007*2018/1832DG*1309*03	108	500	22%							23	80	29%	52	170	31%	0.18	4 50	4%	8 65E+09	6.00E+11	1%
11-HMM-8	Vehicle 2	e5*715/2007*2018/1832DG*1307*03	83	500	17%							21	80	26%	39	170	23%	0,21	4.50	5%	9.58E+10	6.00E+11	16%
11-HMM-8	Vehicle 3	e5*715/2007*2018/1832DG*1309*03	122	500	24%							38	80	47%	67	170	39%	0,15	4,50	3%	9,82E+08	6,00E+11	0%
11-HMM-6	Vehicle 1	e5*715/2007*2018/1832DG*1304*02	251	1000	25%	19	100	19%	16	68	24%	28	60	47%				0,20	4,50	4%	6,90E+10	6,00E+11	12%
11-HMM-6	Vehicle 2	e5*715/2007*2018/1832DG*1304*02	401	1000	40%	14	100	14%	11	68	16%	10	60	17%				0.27	4.50	6%	1.14F+11	6.00F+11	19%
11-HMM-6	Vehicle 3	e5*715/2007*2018/1832DG*1304*02	517	1000	52%	16	100	16%	11	68	17%	8	60	13%				0,34	4,50	7%	5,33E+10	6,00E+11	9%



Annex VII – Volvo Cars, Final Report ISC-2020

ISC year:	2020
Manufacturer:	Volvo Cars
Report status:	Final
Report number:	ISC-2020-07
Issue date:	2021-12-17



Test Overview on Volvo Cars

ISC Family	Manufacturer (Section B) 2020-01-01→2021-11-02	STA (Section D) 2020-01-01→2021-06-04	3 rd parties (Section C) Calender year 2020
5-YV1-012	 3 (Type I, II, III) Tested by AVL in Sweden Meets the applicable regulations Statistical folder closed 	 Not selected for 2020 testing 	 No tests reported
5-YV1-016	 3 vehicles tested (Type I, II, III) Tested by TÜV Nord, Germany Meets the applicable regulations Statistical folder closed 	 4 vehicles tested, Type1+RDE 1 FAILED test, to high PM in Type1 Tested by AVL in Sweden Meets applicable regulations Statistical folder closed 	 1 vehicle tested, RDE Test by EMISIA Greece Meets applicable regulations
5-YV1-020	 No tests reported 	 Not selected for 2020 testing 	 No tests reported
5-YV1-021	 3 vehicles tested, Type1 Tested by TÜV Nord, Germany Meets the applicable regulations Statistical folder closed 	 3 vehicles tested, Type 1+RDE Tested by AVL Sweden Meets the applicable regulations Statistical folder closed 	 No tests reported
5-YV1-022	 No tests reported 	Not selected for testing 2020	 No tests reported
5-YV1-023	 3 vehicles tested, Type1 Tested by AVL in Sweden Meets the applicable regulations Statistical folder closed 	 Not selected for testing 2020 	 No tests reported
5-YV1-026	No tests reported	Not selected for 2020 testing	 No tests reported
5-YV1-027	 No tests reported 	 Not selected for 2020 testing 	 No tests reported



Annex VII – Volvo Cars, Final Report ISC-2020

Detailed Type 1a (RDE) data from STA test (D)

ISC-family	Vehicle	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
5-YV1-021	Vehicle 1	e5*715/2007*2018/1832DG*0236*00	N/A	168	9,00E+11	107	23	14%	1,34E+09	0%	143	41	24%	2,58E+09	0%
5-YV1-021	Vehicle 2	e5*715/2007*2018/1832DG*0236*00	N/A	168	9,00E+11	381	69	41%	2,82E+11	31%	262	91	54%	5,22E+11	58%
5-YV1-021	Vehicle 3	e5*715/2007*2018/1832DG*0236*00	N/A	168	9,00E+11	93	28	17%	4,49E+09	0%	114	51	30%	7,32E+09	1%
5-YV1-016	Vehicle 1	e5*715/2007*2018/1832DG*0240*00	N/A	126	9,00E+11	155	8	6%	5,79E+09	1%	186	18	14%	6,16E+09	1%
5-YV1-016	Vehicle 2	e5*715/2007*2018/1832DG*0240*00	N/A	126	9,00E+11	154	14	11%	4,48E+09	0%	218	27	22%	3,31E+09	0%
5-YV1-016	Vehicle 3	e5*715/2007*2018/1832DG*0240*00	N/A	126	9,00E+11	148	8	6%	1,50E+10	2%	197	16	13%	1,64E+10	2%
5-YV1-016	Vehicle 4	e5*715/2007*2018/1832DG*0240*00	N/A	126	9,00E+11	176	11	8%	2,51E+10	3%	206	21	16%	3,71E+10	4%



Annex VII – Volvo Cars, Final Report ISC-2020

Detailed Type 1 (WLTP) data from STA test (D)

			со	Limit CO	CO % of	тнс	Limit THC	THC % of	ммнс	Limit NMHC	NMHC % of	NOx	Limit NOx	NOx % of	THC+NOx	Limit THC+NOx	THC+NOx % of	РМ	Limit PM	PM % of	PN	Limit PN	PN % of
ISC-family	Vehicle	Emission Type Approval	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(mg/km)	(mg/km)	Limit	(#/km)	(#/km)	Limit
5-YV1-021	Vehicle 1	e5*715/2007*2018/1832DG*0236*00	187	500	37%							32	80	40%	56	170	33%	0,23	4,50	5%	2,92E+09	6,00E+11	0%
5-YV1-021	Vehicle 2	e5*715/2007*2018/1832DG*0236*00	184	500	37%							38	80	47%	77	170	45%	0,27	4,50	6%	6,43E+10	6,00E+11	11%
5-YV1-021	Vehicle 3	e5*715/2007*2018/1832DG*0236*00	126	500	25%							40	80	49%	68	170	40%	0,25	4,50	6%	2,37E+09	6,00E+11	0%
5 10/1 010	Velicie 4	. 5 # 7 15 /0007 #0010 /10000 0 #0010 #000	220	1000	2201	26	100	2.6%	22	60	229/	21	60	250/				0.20	4.50	604	0.005.00	0.005 - 11	10/
5-YV1-016	Vehicle 1	e5*/15/200/*2018/1832DG*0240*00	228	1000	23%	26	100	26%	22	68	32%	21	60	35%				0,28	4,50	6%	8,60E+09	6,00E+11	1%
5-YV1-016	Vehicle 2	e5*715/2007*2018/1832DG*0240*00	226	1000	23%	30	100	30%	24	68	36%	20	60	34%				4,82	4,50	107%	5,11E+11	6,00E+11	85%
5-YV1-016	Vehicle 3	e5*715/2007*2018/1832DG*0240*00	225	1000	22%	25	100	25%	21	68	30%	25	60	41%				2,66	4,50	59%	9,54E+09	6,00E+11	2%
5-W/1-016	Vehicle 4	a5*715/2007*2019/1922DC*0240*00	170	1000	17%	20	100	20%	17	69	25%	17	60	20%				2.49	4.50	55%	2 865+10	6.00E±11	5%



Annex VIII – Report 3rd party ISC testing 2020

ISC year:	2020
Manufacturer:	3rd party
Report status:	Final
Report number:	ISC-2020-08
Issue date:	2021-12-17



Annex VIII – Report 3rd party ISC testing 2020

Test Overview on 3rd party testing during 2020

Test	TSV-Ref	Manufacturer	ISC-Family	Technical service	Test type	Status
1	2021-870	Ford-Werke GmbH	5-WF0-D25	DTI	RDE	PASS
2	2021-871	Kia Motors Slovakia s.r.o	11-HMM-15	DTI	RDE	PASS
3	2021-872	Volvo	5-YV1-016	Emisia	RDE	PASS
4	2021-873	Kia Motor Corporation	11-KMC-8	Emisia	RDE	PASS

Detailed Type 1a (RDE) data from STA test (D)

ISC-family	EmissionTypeApproval	Limit CO NTE (mg/km)	Limit NOx NTE (mg/km)	Limit PN NTE (#/km)	CO Totaltrip (mg/km)	NOx Totaltrip (mg/km)	NOx Totaltrip % of NTE	PN Totaltrip (#/km)	PN Totaltrip % of NTE	CO Urban (mg/km)	NOx Urban (mg/km)	NOx Urban % of NTE	PN Urban (#/km)	PN Urban % of NTE
			1.00		100									
5-WF0-D25	e5*715/2007*2018/1832DG*0559*00	N/A	168	9,00E+11	122	50	29%	1,99E+09	0%	79	42	25%	1,69E+09	0%
11-HMM-15-0	e5*715/2007*2018/1832DG*0198*01	N/A	168	9,00E+11	20	50	30%	5,67E+09	1%	44	69	41%	4,55E+09	1%
5-YV1-016	e5*715/2007*2018/1832DG*0240*00	N/A	126	9,00E+11	160	23	18%	2,35E+09	0%	168	39	31%	2,80E+09	0%
11-KMC-8	e5*715/2007*2018/1832DG*1269*00	N/A	126	N/A	340	23	18%			190	20	16%		

