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Assessment of the results of national reports in light of the Commission Guidelines on evaluating AES and Defeat Devices

On Thursday 26 January 2017, the Commission released its long awaited Guidelines on the evaluation of the presence of defeat devices. These will hopefully bring some clarity to the debate concerning exactly how wide-spread defeat device use is among diesel cars in Europe.

Indeed, following the initial revelations concerning Volkswagen in September 2015, at the Commission's request, several Member States[1] set up inquiries into the possible presence of vehicles fitted with defeat devices on their territories. The reports produced found various engine strategies leading to higher emissions on the road, but often concluded that these were necessary for engine protection[2], and therefore legal, or simply refrained from taking position, pointing to an alleged lack of clarity in the defeat device ban or the exemptions.

Moreover, the test methodologies and assessment criteria employed varied from one report to another, making it difficult to reach any kind of consensus on this matter. A striking example of this is the accusation by the KBA that Fiat vehicles contain a defeat device which reduces emission control performance 22 minutes after starting the car (the regulatory test only lasting 20 minutes), which Italy's transport minister vigorously denies, stating "*we have nothing to hide*", and "*you don't give orders to a sovereign country like Italy*". A mediation process to resolve the matter is currently underway between the German and Italian authorities.

The Commission Guidelines, though not legally binding, suggest common testing methods and assessment criteria to determine whether particular vehicle behaviours constitute a defeat device. This therefore provides a common standard against which to compare the test results obtained by the national inquiries, and hopefully should lead to further action on the part of the Member States if the criteria for suspecting a defeat device are met or, failing that, additional infringement procedures from the Commission.

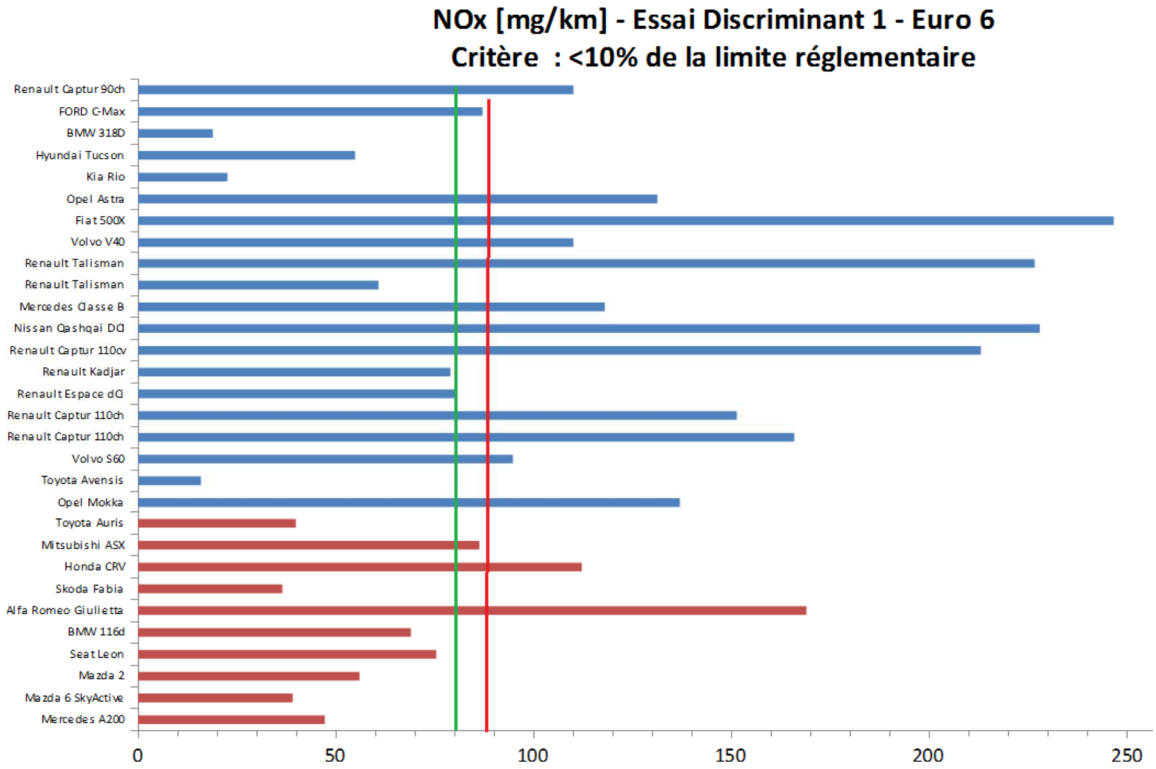
❖ Proof of "prohibited defeat devices"

In this regard, an almost direct comparison can be made between one of the testing methodologies used in the test report produced by the French "Commission Royal" and one of the procedures suggested by the Commission. Indeed, the "Category 1" test consists of running the regulatory test cycle with slight variations which do not affect engine load, such as opening a door or a window, which is almost exactly the approach taken by the "D1" test in the French report[3]. Since this kind

[1] France, Germany, United Kingdom, Belgium, Italy.
[2] Article 5(2)(a) of Regulation 715/2007
[3] Description of the « D1 » test in the Commission Royal report: "the test consists of reproducing on a dyno the cycle used for vehicle type-approval, i.e. the NEDC cycle, but modifying certain parameters, such as the position

of modification to the test conditions should lead to no significant change in the physical response of the engine system, the Guidelines state that any increase in emissions above the threshold of 10% in these circumstances show the vehicle is detecting the test cycle, and **should be considered proof of a prohibited defeat device** (i.e. one not covered by any of the exceptions)[4].

However, as for example shown in the graph below taken from the report, a significant number of Euro 5 and 6 vehicles failed this test, sometimes emitting up to four times what they did in the regulatory cycle[5]. While Renault, Volkswagen and Fiat are currently under investigation by the Paris prosecutor, no legal action against the other car manufacturers concerned is currently underway by the Member States responsible for type-approving these vehicles.



Vehicles in blue are equipped with EGR+LNT technology, while vehicles in red only have EGR. None are equipped with SCR.

❖ When is "engine protection" necessary?

The Guidelines also provide clarification on what is to be considered acceptable use of the exceptions to the ban on defeat devices. In particular, it is stressed that it is up to the car manufacturer to prove that any engine strategy they employ that affects vehicle emissions is strictly necessary.

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of the engine hood, making the non-motor wheels turn by running the test on a 4x4 dyno, by going into reverse gear during the test, after the first threshold of 15 km/h, by modifying the preconditioning cycle, and by not charging the battery."

[4] Commission Notice of 26.1.2014, *Guidance on the evaluation of Auxiliary Emissions Strategies and the presence of Defeat Devices with regard to the application of Regulation (EC) No 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6)*, p. 11

[5] See Annex II for details

Thus, car manufacturers will for example have to show that:

- The increase in emissions due to the emissions strategy is kept at the lowest possible level
- The best technology or design available on the market was used to the largest extent technically possible regarding emission control or engine safety
- There is a high likelihood of catastrophic damage to the engine in the absence of the particular emissions strategy employed

The Guidelines also highlight emissions strategies that should receive particular attention:

- Strategies that lead to higher emissions when starting the engine in hot start than cold start
- "Thermal windows" where emissions increase below or above certain ambient temperature ranges
- Parameters such as a timer or the vehicle's speed that are used to modulate emission control systems

As mentioned above, all of the national inquiries uncovered at least one, and sometimes all, of these behaviours in the vehicles tested, but for the most part accepted the manufacturer's contention that they were covered by the exception on engine protection. However, in light of the assessment criteria given by the Guidelines, there is reason to doubt whether this is the case.

– **Hot start**

Higher NO_x emissions at hot start than at cold start are counterintuitive, given that the aftertreatment systems in diesel vehicles, such as EGR or SCR, need to heat up to be effective, and should therefore perform better with a warm engine. Such results would therefore point to the operation of an emissions strategy, which is suspicious given that the regulatory test cycle is performed with a cold start only.

This behaviour was observed in several vehicles throughout all of the reports published by the national inquiries. Justifications offered by the manufacturers varied: for some vehicles, manufacturers attributed these results to measurement errors[6] or deemed them not comprehensible[7], while for others it was argued that EGR modulation was necessary for engine protection[8]. In some cases, no justification was offered. An explanation was also suggested by the report by the UK Department for Transport, according to which: "*NOx emissions are generated by high peak temperatures and pressures during the engine's combustion process. A fully warm engine might therefore be expected to generate higher NOx emissions during an NEDC test than an engine which*

[6] Bundministerium für Verkehr und digitale Infrastructur, *Bericht der Untersuchungskommission „Volkswagen"-Untersuchungen und verwaltungsrechtliche Maßnahmen zu Volkswagen, Ergebnisse der Felduntersuchung des Kraftfahrt-Bundesamtes zu unzulässigen Abschalteinrichtungen bei Dieselfahrzeugen und Schlussfolgerungen* (April 2016), pp. 28, 30

[7] *Ibid.*, pp. 42, 44

[8] *Ibid.*, p. 46; Ministère de l'Environnement, de l'Energie et de la Mer, *Rapport final de la commission indépendante mise en place par la Ministre Ségolène Royal après la révélation de l'affaire Volkswagen - Contrôle des émissions de polluants atmosphériques et de CO_2 mené sur 82 véhicules*, pp. 42, 44, 53

has started from 25°C"[9]. There is however reason to doubt the validity of this explanation, for the reasons outlined above[10].

However, the significant degree of variation between the results of different vehicles for hot start tests, even among those produced by the same manufacturer, would tend to put into question the necessity of emissions strategies for engine protection in these circumstances. Indeed, if some vehicles do not employ emission strategies leading to higher emissions at hot start, and if there is significant variation in the increase for those that do, this would tend to show that there were technologies or designs available on the market which, if used to the fullest extent possible, would lead to lower emissions or could better protect the engine.

– "**Thermal window"**

The effect of ambient temperatures on NO_x emissions was noted in several of the national inquiries, but the report published by the KBA goes into the most detail about the phenomenon of "thermal windows".

Indeed, the report notes that the rate of exhaust gas recirculation (EGR) is lowered below 10°C for Daimler diesel passenger cars, 17°C for Audi[11], Nissan[12], Renault, Porsche[13] and Opel[14], and 20°C for Hyundai[15], Fiat[16], Alfa Romeo[17] and Jeep[18]. For Opel, it would seem that selective catalytic reduction (SCR) is also affected[19]. In all cases, the exception relating to engine protection was invoked by the car manufacturers to explain these parameters.

There are several reasons to doubt that these thermal windows can be covered by the exception. Indeed, diesel cars sold by these manufacturers on the U.S. market, where more stringent NO_x standards apply, are subjected to temperatures down to -7°C as part of the regulatory test cycles, which shows that the technology to extend the thermal window is available. Moreover, even without looking to the U.S. market, the various thresholds used for the thermal windows, and the fact that other car manufacturers active on the European diesel market manage to maintain EGR rates down to far lower temperatures[20], show that the "best technology or design available on the market" criteria is not met.

[9] Department for Transport, *Vehicle Emissions Testing Programme* (April 2016), p. 24
[10] See also : http://www.theicct.org/blogs/staff/emissions-test-defeat-device-problem-europe-not-about-vw
[11] *Op.cit.* (note 5), p. 74
[12] *ibid.*, p. 98
[13] *ibid.*, p. 104
[14] *ibid.*, p. 100 & 102
[15] *ibid.*, p. 86
[16] *ibid.*, p. 92
[17] *ibid.*, p. 72
[18] *ibid.*, p. 92
[19] *ibid.*, p. 100 & 102
[20] 0°C (Toyota), -10°C (Peugeot), or -12°C (Mitsubishi)

Further confirmation of this can be found in the fact that several car manufacturers, such as Renault[21], Audi[22] and Opel[23], have agreed to broaden the range of their thermal windows in subsequent model years, and to provide a software update to this effect for the current fleet. It would seem obvious that, if a simple calibration can broaden the thermal window without adverse consequences for the engine, then the technology or design used for the vehicle was not being used to the largest extent technically possible.

- **Temporal modulation of vehicle emissions**

As mentioned above, the KBA has reported discovering a defeat device in certain Fiat vehicles which reduces EGR rates 22 minutes after engine start, and deactivates the NO_x trap after a certain number of regeneration cycles. While they acknowledge that EGR modulation occurs after 22 minutes, the FCA group and the Italian transport authorities deny that this constitutes a defeat device, arguing that this behaviour is necessary for engine protection.

This line of argument is particularly easy to dispose of, given that this behaviour is unique to Fiat, and therefore definitely cannot be considered to demonstrate full use of the best technologies or designs available on the market.

[21] Ministère de l'Environnement, de l'Energie et de la Mer, *op.cit.*, p. 49
[22] Bundministerium für Verkehr und digitale Infrastructur, *op.cit.*, pp. 98, 100, 102
[23] Renault, *Groupe Renault reduces its nitrogen oxide emissions on its Diesel EURO 6b vehicles in customer driving conditions* (5 April 2016), http://media.renault.com/global/en-gb/renaultgroup/Media/PressRelease.aspx?mediaid=76775

Annex I – Evaluation criteria suggested in the Guidelines and corresponding tests in national inquiries

Cat.	Test Description	Emissions threshold	Suggested consequences
1	Testing is conducted in a laboratory under a controlled environment with only limited changes when compared to the legislative cycle and the modified parameters can be controlled. The modification of the testing conditions **should not lead to a significant change in the physical response of the engine system**. Examples of such modifications include testing vehicles with an open door or rolled down windows	**1.1 (10% above NEDC)**	**Prohibited defeat device is present**
2	Testing is conducted in a laboratory or on the road with conditions different than the legislative cycle and the value of the modified parameters can be controlled (e.g. driving a legislative cycle on a test track). The modification of the testing conditions may in some cases lead only to a **limited change in the physical response of the engine system**. Examples of such modifications include variations in the **test temperature**, the execution of **hot-start** tests, and the **repetition of selected phases of the test cycle**	**1.5 (50% above NEDC)**	**Suspicion of defeat device, further investigations and explanations from manufacturer required**
3	Testing is conducted on the road and the values of the modified parameters are – to a large extent – uncontrolled (e.g. the vehicle speed due to the traffic, the temperature, etc, …). The modification of the testing conditions **may lead to a significant change in the physical response of the engine system(s)**. The magnitude in the change of the emissions may depend on the severity of the testing conditions. Examples of such modifications include testing at various test routes characterised by a distinct altitude profile, such as the RDE compliant testing. Multiple RDE testing would also allow to detect possible presence of defeat devices.	**2 to 5 (200 to 500% above NEDC)**	**Suspicion of defeat device, further investigations and explanations from manufacturer required**
4	"Surprise testing", to cover testing that does not fall in any of the above categories, but may still be needed in order to detect a possible defeat device, for example in the case of evaporative emissions testing.	**?**	**?**

	Cat. 1	Cat. 2	Cat. 3
France	- D1	- D2 - D3	
UK		- NEDC Hot - Hot double NEDC - Hot reverse NEDC - NEDC PEMS hot - NEDC +10%	- RDE
Italy		- NEDC Hot - Artemis Urban - Constant speed - NEDC reverse cold - NEDC 70 hot - NEDC 70 cold	
Germany		- NEDC Hot - NEDC 10°C - NEDC on road - NEDC reverse hot - NEDC +10%/-10% - NEDC -10%	- RDE
JRC	- NEDC 4x4	- NEDC Hot - NEDC 10°C Cold - NEDC 30°C Cold - NEDC +10%/-10% - NEDC 4x4 Hot - WLTP LRL4x4 Cold - WLTP LRL 4x4 Hot - WLTP LRL 4x4 10°C Cold - WLTP LRL 4x4 30°C Cold	- RDE

- **D1**: NEDC with modified parameters, such as the position of the engine hood, making the non-motor wheels turn by running the test on a 4x4 dyno, by going into reverse gear during the test, after the first threshold of 15 km/h, modifying the preconditioning cycle, and not charging the battery.
- **D2:** straight after D1, hot NEDC ran with modified UDC but identical EUDC
- **D3**: NEDC with PEMS
- **NEDC Hot**: NEDC with engine at operating temperature
- **NEDC 10°C**: NEDC at 10°C with engine at operating temperature
- **NEDC on the road**: NEDC on flat road with engine at operating temperature, measurement with PEMS
- **NEDC reverse (DE+UK)**: NEDC on a flat road with engine at operating temperature, EUDC then UDC, measurements with PEMS
- **NEDC reverse (IT)**: cold-start NEDC, EUDC then UDC[24]
- **Hot Double NEDC**: two consecutive NEDC tests run back-to-back
- **NEDC +10%/-10%**: NEDC on flat road with speed increased/decreased by 10% and engine at operating temperature, measurements with PEMS

[24] In a few cases, the test was conducted with a hot start.

- **NEDC 70**: NEDC on road, measurements with PEMS, top speed capped at 70 km/h instead of 120 km/h and test duration 1030 seconds instead of 1180 seconds.
- **Artemis Urban**: Urban part of the Common Artemis Driving Cycle (CADC)
- **Constant speed:** NEDC test in the lab and on the road, from 10 to 130 km/h in increments of 10 km/h
- **NEDC 4x4**: NEDC on a 4x4 dyno
- **NEDC 4x4 Hot**: NEDC on a 4x4 dyno with engine at operating temperature

Annex II – Vehicles failing “Category 1” test

- **FR report**

The FR inquiry is the only national inquiry to include a “category 1” test.

Brand	Model	Standard	Displacement	Emissions treatment	Declared NOx (mg/km)	NOx with “Category 1” test (mg/km	% increase
Alfa Romeo	Giulietta	Euro6	2L	EGR	34.4	169	**391.27**
Audi	Q3	Euro5	2L	EGR	112.9	141	24.88
Audi	A1	Euro5	1.6L	EGR	135	164.9	22.14
Citroën	C4 Picasso	Euro5	2.0L	EGR	135.5	169.2	24.87
Dacia	Duster	Euro5	1.5L	EGR	150.5	176.5	17.27
Fiat	500X	Euro6	2.0L	EGR+NOx Trap	68.2	246.7	**261.73**
Fiat	500L	Euro5	1.3L	EGR	171.9	224.5	30.59
Ford	C-MAX	Euro6	1.5L	EGR+NOx Trap	43	87.1	**102.55**
Ford	Mondeo	Euro6	2.0L	EGR+NOx Trap+SCR	43	87.6	**103.72**
Ford	Transit	Euro6	1.6L	EGR	180	235.7	30.94
Ford	Kuga	Euro6	2.0L	EGR+NOx Trap+SCR	57.1	207.5	**263.39**
Ford	Focus	Euro5	1.6L	EGR	165.3	185.1	11.97
Ford	Transit	Euro5	1.6L	EGR	180	220.6	22.55
Honda	CRV	Euro6	1.6L	EGR	69.3	112.2	61.90
Mercedes	S350	Euro6	3.0L	EGR+SCR	73.3	118.6	61.80
Mercedes	Class B	Euro6	1.5L	EGR+NOx Trap	63.6	118	85.53
Mitsubishi	ASX	Euro6	1.6L	EGR	74	86.3	16.62
Nissan	Qashqai DCI	Euro6	1.6L	EGR+NOx Trap	41.1	228	**454.74**
Nissan	Navara	Euro5 VU	2.5L	EGR	188	469.1	**149.52**
Opel	Mokka	Euro6	1.6L	EGR	48	137	**185.41**
Opel	Astra	Euro6	1.6L	EGR+NOx Trap	44.4	131.3	**195.72**
Peugeot	208	Euro5	1.6L	EGR	108.5	159	46.54
Porsche	Cayenne	Euro5	3.0L	EGR	145.5	167.1	14.84
Renault	Espace	Euro 5 BS	2.0L	EGR	194	316,8	63.29
Renault	Captur 90ch	Euro 6	1.5L	EGR+NOx Trap	31,8	110,1	**246.22**
Renault	Captur 110ch	Euro 6	1.5L	EGR+NOx Trap	37,2	165,9	**345.96**
Renault	Espace dCi	Euro 6	1.6L	EGR+NOx Trap	50,6	80,24	58.57
Renault	Kadjar	Euro 6	1.5L	EGR+NOx Trap	53,6	78,99	47.36
Renault	Scenic 3	Euro 5	1.6L	EGR	113,3	196,1	73.08
Renault	Kangoo	Euro 5	1.5L	EGR	135,8	157,7	16.12
Renault	Laguna	Euro 5	2.0L	EGR	135,8	224,5	65.31
Renault	Clio IV	Euro 5	1.5L	EGR	151,7	240,1	58.27
Renault	Scénic	Euro 5	1.5L	EGR	130,6	168,3	28.86
Renault	Talisman	Euro 6	1.6L	EGR+NOx Trap	54,8	226,7	**313.68**

Volvo	S60	Euro 6	2.0L	EGR+NOx Trap	35,4	94,8	**167.79**
Volvo	V40	Euro 6	2.0L	EGR+NOx Trap	57,4	110,1	**91.81**
VW	Tiguan	Euro 5	2.0L	EGR	119,8	171	42.73
VW	Sharan	Euro 5	2.0L	EGR	134,4	156,8	16.6

- **JRC tests**

Tests were conducted on four vehicles in 2016 by the JRC as part of its Administrative Arrangement with DG GROW: a Citroen Cactus (Euro 6), a Skoda Yeti (Euro 5), an Audi A3 (Euro 6) and a gasoline Ford Fiesta. Two of the diesel vehicles were tested with a procedure conforming to a "category 1 test", i.e. NEDC on a 4x4 dyno.

Brand	Model	Standard	Displacement	Emissions treatment	NEDC NO_x	NEDC 4x4	% increase
Audi	A3	Euro 6	2.0	EGR+SCR	73.01	115.7	58.47
Skoda	Yeti	Euro 5	?	EGR	127.7	312.2	144.47

Annex III – Vehicles failing "Category 2" test

- **<u>UK report</u>**

Assessment of the results in the UK report is made more difficult by the fact that the data is only presented in graph form, without the actual test figures.

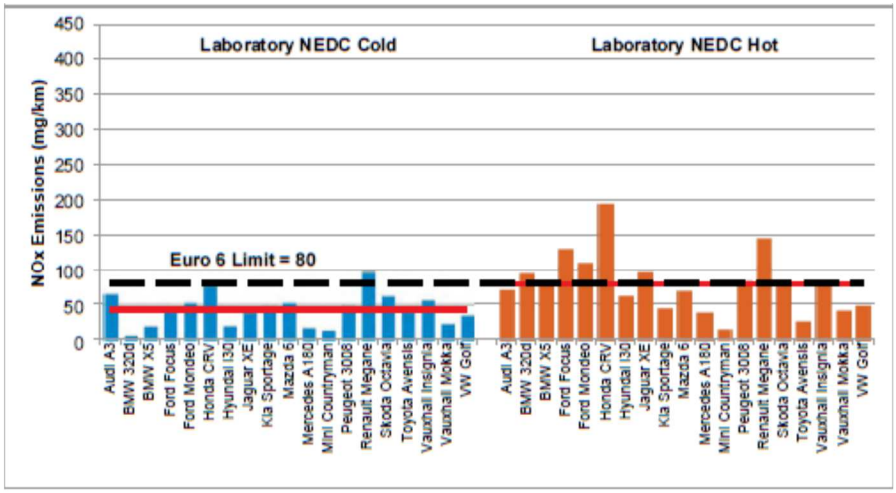


Figure D-2 Laboratory - NEDC cold versus NEDC hot - Euro 6 vehicles

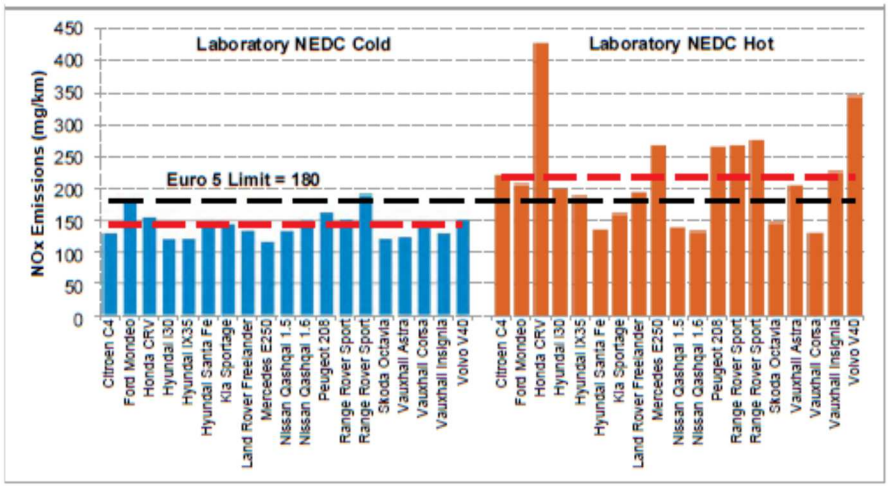


Figure D-1 Laboratory - NEDC cold versus NEDC hot - Euro 5 vehicles

- **FR report**

i. Hot start (D2)

The D2 test only compares the hot and cold extra-urban part of the NEDC, and the figures for the urban part of the hot test are not provided. However, given that the EUDC represents the largest portion of NO_x emissions in the NEDC cycle, vehicles that exceed the 1.5 threshold for this part can be considered to also exceed it for the whole NEDC.

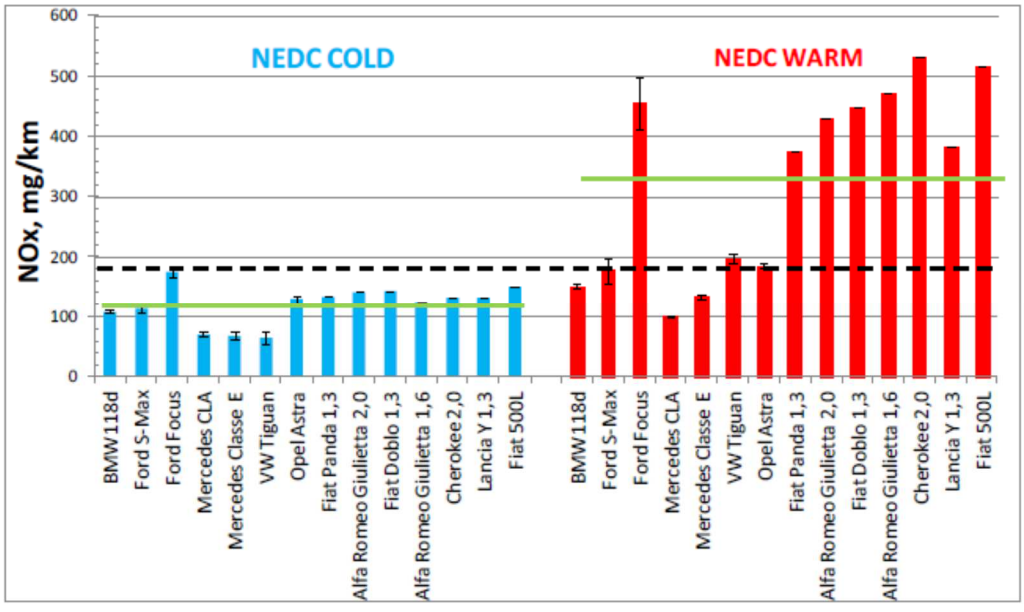
Brand	Model	Standard	Displacement	Emissions treatment	NO_x EUD-C	NOx Hot EUDC	% increase
Audi	Q3	Euro 5	2.0L	EGR	104	330	**217.30**
Audi	A1	Euro 5	1.6L	EGR	140.3	503	**258.51**
Audi	Q7	Euro 6	3.0L	EGR+SCR	15.8	24.2	53.16
BMW	318D	Euro 6	2.0L	EGR+NOx Trap	17	26	52.94
BMW	116d	Euro 6	1.5L	EGR	93.8	158.4	68.86
Citroën	C3	Euro 5	1.4L	EGR	100,3	267,4	**166.6**
Citroën	C5	Euro 5	1.6L	EGR	101,5	210,4	**107.29**
Citroën	C4 Picasso	Euro 5	1.6L	EGR	121,9	244,3	**100.4**
Citroën	C5	Euro 5	2.0L	EGR	114,3	183,4	60.4
Fiat	Doblo	Euro 5 N1C2	1.3L	EGR	172,5	368,79	**113.79**
Fiat	500X	Euro 6	2.0L	EGR + NoxTrap	287	528,5	84.1
Fiat	500L	Euro 5	1.3L	EGR	216,2	387,5	79.2
Jeep	Cherokee	Euro 5	2.0L	EGR	126,2	1392,4	**1003.3**
Mazda	SkyActive	Euro 6	2.2L	EGR	29,1	46,9	61.1
Mercedes	S350	Euro 6	3.0L	EGR+SCR	60	115	91.6
Mercedes	A180	Euro 5	2.0L	EGR	73,2	148,4	**102.7**
Mitsubishi	ASX	Euro 6	1.6L	EGR	84,9	204	**140.28**
Peugeot	208	Euro 5	1.4L	EGR	122.2	216.86	77.46
Peugeot	5008	Euro 5	1.6L	EGR	100,6	201,5	**100.29**
Renault	Captur 110ch	Euro 6	1.5L	EGR + NoxTrap	169	303	79.28
Renault	Clio IV	Euro 5	1.5L	EGR	163,3	524,68	**221.29**
VW	Tiguan	Euro 5	2.0L	EGR	130	436	**235.38**
VW	Polo	Euro 5	1.2L	EGR	95	187,1	96.94

- **IT report**

i. Hot start

The report by the Italian Transport Ministry provides this table expressing the relationship between the results of the standard NEDC test, the hot NEDC and the reverse NEDC for the vehicles tested. All of the vehicles tested are Euro 5.

Rapporto delle emissioni di NOx		
	NEDC warm/NEDC cold	NEDC reverse/NEDC cold
BMW118d	1.4	1.0
Ford S-Max	1.6	1.4
Ford Focus	2.6	1.5
Mercedes CLA	1.4	1.2
Mercedes Classe E	2.0	1.3
VW Tiguan	3.1	2.5
Opel Astra	1.4	1.3
Fiat Panda 1,3	2.8	1.8
Alfa Romeo Giulietta 2,0	3.0	2.4
Fiat Doblo 1,3	3.1	1.8
Alfa Romeo Giulietta 1,6	3.8	
Cherokee 2,0	4.1	
Lancia Y 1,3	2.9	
Fiat 500L	3.4	1.9



- **DE report**

i. Hot start

Brand	Model	Standard	Displacement	Emissions Treatment	NOx NEDC	NOx hot NEDC	% increase
Audi	A3	Euro 6	2.0L	EGR+LNT	29.50	44.80	51.8†
BMW	320	Euro 5	2.0L	EGR	109.00	216.00	98.16
BMW	216	Euro 6	1.6L	EGR+LNT	25.00	209.00	**736***
BMW	530	Euro 6	3.0L	EGR+LNT+SCR	53.00	244.00	**360.37****
Fiat	Panda	Euro 5	1.3L	EGR	143.00	386.00	169.93
Honda	HR-V	Euro 6	1.6L	EGR+LNT	54.00	100.00	85.18
Mercedes	C220 Bluetec	Euro 6	2.0L	EGR+SCR	43.00	144.00	**234.88**
Mercedes	S350 Bluetec	Euro 6	3.0L	EGR+SCR	55.58	230.48	**314.68**
Mercedes	Sprinter	Euro 5	2.1L	EGR	174.81	872.44	**399.07**
Peugeot	308 SW	Euro 6	1.6L	EGR+SCR	44.00	203.00	**361.36**
Smart	fortwo	Euro 5	0.8L	EGR	195.09	338.78	73.65
Toyota	Auris	Euro 5	2.0L	EGR	139.70	228.35	63.45
VW	Sportsvan	Euro 6	2.0L	EGR+LNT	15.02	31.08	**106.92**†
VW	Touareg V6	Euro 6	3.0L		30.77	89.31	**190.25**
Alfa Romeo	Giulietta	Euro 5	2.0L	EGR	130.96	430.77	**228.93**
Chevrolet	Cruze	Euro 5	2.0L	EGR	109.00	664.00	**509.17**
Dacia	Sandero	Euro 6	1.5L	EGR+LNT	46.03	298.65	**548.81**
Fiat	Ducato	Euro 5	3.0L	EGR	236	1171	**396.18**
Ford	C-Max	Euro 6	1.5L	EGR+LNT	43.00	85.00	97.67
Jeep	Cherokee	Euro 5	2.0L	EGR	144.00	1127.00	**682.63*****
Mercedes	V250 Bluetec	Euro 6	2.1L	EGR	39.79	228.66	**474.66**
Nissan	Navara	Euro 5	2.5L	EGR	170.83	337.04	97.29
Opel	Insignia	Euro 6	2.0L	EGR+SCR	45,00	68,00	51.1†
Opel	Zafira	Euro 6	1.6L	EGR+SCR	73.52	124.25	69.00
Porsche	Macan	Euro 6	3.0L	EGR+SCR	57.95	174.84	**201.70**
Renault	Kadjar	Euro 6	1.6L	EGR+LNT	23.90	132.56	**454.64**
Renault	Kadjar	Euro 6	1.5L	EGR+LNT	21.20	109.46	**416.32**
Suzuki	Vitara	Euro 6	1.6L	EGR+LNT	30.00	68.00	**126.66**†
VW	Amarok	Euro 5 N1	2.0L	EGR	197.24	486.83	**146.82**!
VW	Beetle	Euro 5	2.0L	EGR	116.21	374.67	**222.40**!

* According to the report, this value is due to a measurement error and a low result was obtained after re-running the hot NEDC test. The value for the second test is not provided. The results for the NEDC 10°C are 56 mg/km

** According to the report, this value for the hot NEDC is not plausible, and is inflated by a particulate filter regeneration. The result for the NEDC at 10°C is 48 mg/km

*** Vehicle tested twice with same results

VW	Passat	Euro 5	2.0L TDI	EGR	103.00	372.00	**261.16**[!]
VW	Polo	Euro 5	1.2L TDI	EGR	136.00	302.00	**122.05**[!]

[†] The vehicle remains below the legal limit for the test concerned
[!] Vehicle with EA189 engine, confirmed defeat device