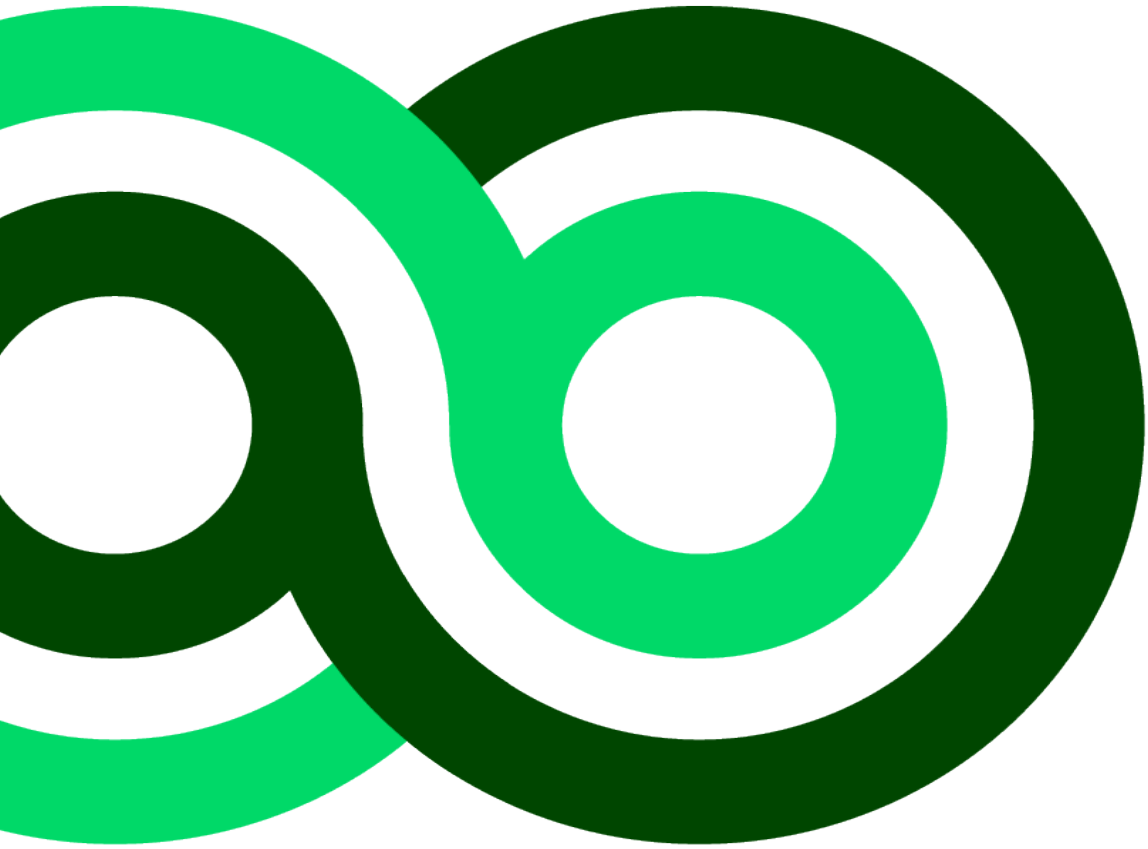
TEST PROCEDURE

Overall Test Procedure

Version 2.0.0 February 2021



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Green NCAP test procedure

WP1: Specifications test vehicle

vehicle selection: current model year, homologation Euro 6c, Euro 6d-Temp, Euro 6d-Temp-EVAP or Euro 6d (Euro 6 with characters AD, AG, BG or AJ), according to GNT_Green_NCAP_VSSTR_v1.0.0.docx

for definitions, acronyms and symbols please see GNT_Definitions_Accronyms_Symbols_WG_v1.0.1.xlsx

vehicle data collection according to GNT_Parameter_Input_List_Template_WG_v1.1.8.xlsx

wheel alignment with wheel alignment protocol;
This can be either performed by the laboratory or a specialized workshop. It has to be ensured, that the correct values and tolerances are applicable. A protocol (usually handed out by the workshop or given by the measurement device) has to prove the correctness of the wheel alignment adjustments.

driving resistance from vehicle´s CoC documents according to GNT_Driving_Resistance_WG_v1.0.1.docx

weighing on laboratory scale according to GNT_Overall_GNCAP_Test_Procedure_WG_v1.0.7.xlsx

Calculation of test masses: The calculation of test masses will automatically be conducted in GNT_Parameter_Input_List_Template_WG_v1.1.8.xlsx by following these formulas:

Laboratory tests:

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is less than ± 3%

$TM = TM\ from\ CoC\ (point\ 47.1.1)$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is more than ± 3%

$TM = UM + OM + 100kg + 0{,}15\ (LM - (UM + OM))$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

UM + OM = *actual mass – 75 kg*

LM = *gross vehicle weight: point 16.1 of vehicle´s CoC*

PEMS+ regular cold:

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is less than ± 3%

$TM_{regular\_cold} = UM + OM + 0{,}7\ (LM - (UM + OM + 75\ kg))$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

UM + OM = *actual mass – 75 kg*

LM = *gross vehicle weight: point 16.1 of vehicle´s CoC*

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is more than ± 3%

$TM_{regular\_cold} = mass\ on\ laboratory\ scale + 0{,}7\ (LM - (mass\ on\ laboratory\ scale + 75\ kg))$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

UM + OM = *actual mass – 75 kg*

LM = *gross vehicle weight: point 16.1 of vehicle´s CoC*

PEMS+ heavy warm:

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is less than ± 3%

$TM_{heavy\_warm} = UM + OM + 0{,}9\ (LM - (UM + OM + 75\ kg))$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

UM + OM = *actual mass – 75 kg*

LM = *gross vehicle weight: point 16.1 of vehicle´s CoC*

If deviation between (**mass on laboratory scale**) and **(actual mass – 75 Kg)** is more than ± 3%

$TM_{heavy\_warm} = mass\ on\ laboratory\ scale + 0{,}9\ (LM - (mass\ on\ laboratory\ scale + 75\ kg))$

Where:

mass on laboratory scale = *mass on laboratory scale, 100 % fuel, without driver*

actual mass = *point 13.2 of vehicle´s CoC*

UM + OM = *actual mass – 75 kg*

LM = *gross vehicle weight: point 16.1 of vehicle´s CoC*

PEMS+ light warm:

$TM_{light\_warm} = minimum\ test\ mass\ possible$

tyres summer,or if otherwise defined in the CoC according to CoC, min. 50% pattern depth, pressure according to GNT_WLTC+_WG_v1.0.5.docx

AdBlue quality check according to GNT_AdBlue_Quality_Check_v1.0.0.docx

maintenance check according to GNT_WLTC+_WG_v1.0.5.docx, GNT_Parameter_Input_List_Template_WG_v1.1.8.xlsx, check service history, vehicle memory readout

mileage from 3.000km up to 30.000km; PEVs shall be tested with at least 300km

onboard fuel/energy consumption monitoring data readout

installation of accelerator pedal position acquisition device

vehicle OBD memory readout and check

check vehicle according to GNT_Anti_manipulation_template_v1.0.0.xlsx

documentation test vehicle according to GNT_Parameter_Input_List_Template_WG_v1.1.8.xlsx, GNT_Footage_procedure_v1.0.4.docx

vehicle preparation for emissions testing according to GNT_WLTC+_WG_v1.0.5.docx, GNT_PEMS+_WG_v1.0.7.docx

Warmup for warm start tests:

For a warm up of the engine, the vehicle shall be driven at a speed of 100 km/h until the engine oil temperature has reached 90 °C or for a maximum of 5 minutes, whatever comes first. Therefore, a thermocouple has to be installed to the oil sump. The engine oil temperature at the start of the cycle must be at 90 °C +/- 5 °C. If the installation of a thermocouple isn´t possible, it shall be ensured (e.g. by the vehicle´s gauges), that the vehicle has reached it´s standard operation temperature.

Instructions for tests with Diesel Particulate Filter regeneration occurrence:

If a regeneration is detected during testing, the test should be continued and conducted as normal, not be interrupted, and shall be completed! This rule is valid for any test, both on chassis dyno and on-road. Generally, the results of the test, in which regeneration was detected, will not be included in the rating. The objective of completing tests that retroactively were declared invalid owing to regeneration is to be able to quantify the impact of regeneration on the individual test results as well as on the clean air index scores.

According to "GNT_Overall_GNCAP_Test_Procedure_WG", two valid PEMS+ cold tests are to be conducted: "PEMS+ cold" AND "PEMS+ cold rep". A test with regeneration occurring is generally not considered valid. If one of the PEMS+ cold tests is a test with regeneration occurring and therefore invalid, a third PEMS+ cold test shall be conducted. If at the third PEMS+ cold test regeneration is also occurring, the results of the first PEMS+ with regeneration shall be included in the rating – this means that the rating will include the results of one test without regeneration and one test with

Vehicle cabin temperature during chassis dynamometer tests:

For cabin temperature measurement, a temperature measuring tip has to be installed at the front-seat passenger´s headrest. All measurements shall be recorded.
The **automatic air condition** is operated with A/C switch on, temperature set at 23 °C and fan speed on automatic regulation with airflow on automatic regulation. No readjustments shall be done. Settings shall be proved by photographs.
The **manual air condition** is operated with A/C switch on, temperature ½ (middle position) and fan speed on 1/3 to ¼ with airflow on floor and windscreen. If necessary, the settings for temperature have to be readjusted until 23 °C ± 3 °C are met. This shall only be done during stop phases. All readjustments have to be recorded and proved, e.g. by photographs.

Propulsion unit setup

CE, GFV, HEV, PHEV

reference fuel according to GNT_WLTC+_WG_v1.0.5.docx

Diesel and Petrol	**GFV**		**HEV** in addition to the provisions made in GNT_WLTC+_WG_v1.0.5.docx, the requirements in GNT_Requirements_Hybrid_v2.docx have to be fulfilled	**PHEV** **CD capitals: charge depleting** **CS capitals: charge sustaining** in addition to the provisions made in GNT_WLTC+_WG_v1.0.5.docx, the requirements in GNT_Requirements_Hybrid_v2.docx have to be fulfilled	**PEV** **At no test shall the battery SoC be depleted to a level below 10 % or where power restriction strategies are activated!** **The battery capacity test shall be conducted according to GNT_GVI_DrivingRangeTest_v0.0.6.docx; PEMS+ tests can be used for determination of the available battery capacity, the final fill battery dischatge has to be conducted on the dyno.**
	monovalent	bivalent (fuel tank > 20l)			
note down BC (board computer) values for fuel consumption of every cycle	**note down BC (board computer) values for fuel consumption of every cycle**	**note down BC (board computer) values for fuel consumption of every cycle**	**note down BC (board computer) values for fuel consumption of every cycle**	**note down BC values for fuel/energy consumption of every cycle**	**note down BC (board computer) values for energy consumption of every cycle**
			3Free urban trip until ICE starts, plus free urban trip for additional 20km	**3PHEV Free urban trip** until ICE starts, plus free urban trip for additional 20km	HVB charging to SOC 100 %
test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C (coolant or oil temperature)	test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C (coolant or oil temperature)	test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C (coolant or oil temperature)	test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C (coolant or oil temperature)	test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C (coolant or oil temperature)	test cell at 14 °C ± 3 °C, vehicle at 23 °C ± 5°C
4WLTC_warm_cd according to GNT_WLTC+_WG_v1.0.5.docx	**4WLTC_warm_cd** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**4WLTC_warm_cd** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**4WLTC_warm_cd** according to GNT_WLTC+_WG_v1.0.5.docx	**4WLTC_warm_cd** according to GNT_WLTC+_WG_v1.0.5.docx	**4WLTC_warm_cd** according to GNT_WLTC+_WG_v1.0.5.docx
maximum 120 s inbetween	maximum 120 s inbetween	maximum 120 s inbetween	maximum 120 s inbetween	maximum 120 s inbetween	maximum 120 s inbetween
4cd for 14°C tests according to GNT_WLTC+_WG_v1.0.5.docx	**4cd for 14°C tests** according to GNT_WLTC+_WG_v1.0.5.docx	**4cd for 14 °C tests** according to GNT_WLTC+_WG_v1.0.5.docx	**4cd for 14 °C tests** according to GNT_WLTC+_WG_v1.0.5.docx	**4cd for 14°C tests** according to GNT_WLTC+_WG_v1.0.5.docx	**4cd for 14°C tests, 4WD mode** acc. to GNT_WLTC+_WG_v1.0.5.docx
Option 1: if both 14 °C tests and -7 °C tests will be performed at the same chassis dynamometer					
38cd for WLTC cold def CAT according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx
5WLTC_warm_def according to GNT_WLTC+_WG_v1.0.5.docx	**5WLTC_warm_def** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**5WLTC_warm_def** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**5WLTC_warm_def** according to GNT_WLTC+_WG_v1.0.5.docx	**5WLTC_warm_def** according to GNT_WLTC+_WG_v1.0.5.docx, **note SOC value**	**5WLTC_warm_def** according to GNT_WLTC+_WG_v1.0.5.docx
41Soaktime 9-36 h, 14 °C ± 3 °C	41Soaktime 9-36 h, 14 °C ± 3 °C	41Soaktime 9-36 h, 14 °C ± 3 °C	OBD SoC readout, 41Soaktime 9-36 h, 14 °C ± 3 °C	HVB SOC 100 %	41Soaktime 9-36 h, 14 °C ± 3 °C
				after HVB charging: 41Soaktime 9-36 h, 14 °C ± 3 °C	
6WLTC_cold_def according to GNT_WLTC+_WG_v1.0.5.docx	**6WLTC_cold_def** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**6WLTC_cold_def** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**6WLTC_cold_def** according to GNT_WLTC+_WG_v1.0.5.docx	**7WLTC_cold_def_CD** according to GNT_WLTC+_WG_v1.0.5.docx	**6WLTC_cold_def** according to GNT_WLTC+_WG_v1.0.5.docx
4 road load verification	4 road load verification	4 road load verification	4 road load verification	4 road load verification	4 road load verification
warm up	warm up	warm up	warm up, SoC adjustment, 14 °C ± 3 °C	warm up	warm up
11BAB_warm_def according to GNT_BAB_Motorway_WG_v1.0.1.docx	**11BAB_warm_def** according to GNT_BAB_Motorway_WG_v1.0.1.docx gfv	**11BAB_warm_def** according to GNT_BAB_Motorway_WG_v1.0.1.docx gfv	**11BAB_warm_def** according to GNT_BAB_Motorway_WG_v1.0.1.docx	n-times **8WLTC_warm_def CD** until **CS** acc. to GNT_WLTC+_WG_v1.0.5.docx	**11BAB_warm_def** according to GNT_BAB_Motorway_WG_v1.0.1.docx
warm up	warm up	warm up	warm up, SoC adjustment, 14 °C ± 3 °C	⋮	warm up

ns and efficiency testing (laboratory)

WP2: Emissio	**WLTC_warm_precon** according to GNT_WLTC+_WG_v1.0.5.docx		**WLTC_warm_precon** according to GNT_WLTC+_WG_v1.0.5.docx	gfv	**WLTC_warm_precon** according to GNT_WLTC+_WG_v1.0.5.docx	gfv	**WLTC_warm_precon** according to GNT_WLTC+_WG_v1.0.5.docx		41Soaktime 9-36 h, 14 °C ± 3 °C		**WLTC_warm_precon** according to GNT_WLTC+_WG_v1.0.5.docx	
									9WLTC_cold_def_CS according to GNT_WLTC+_WG_v1.0.5.docx			
									4 road load verification, afterwards SOC adjustment			
	PEMS installation, 41Soaktime 9-36 h, 14 °C ± 3 °C		PEMS installation, 41Soaktime 9-36 h, 14 °C ± 3 °C		PEMS installation, 41Soaktime 9-36 h, 14 °C ± 3 °C		SoC adjustment, PEMS installation, 41Soaktime 9-36 h, 14 °C ± 3 °C		**12BAB_warm_def_CS** according to GNT_BAB_Motorway_WG_v1.0.1.docx		41Soaktime 9-36 h, 14 °C ± 3 °C	
	13WLTC_cold_def_rep_PEMS_corr. acc. to GNT_WLTC+_WG_v1.0.5.docx		**13WLTC_cold_def_rep_PEMS_corr.** acc. to GNT_WLTC+_WG_v1.0.5.docx	gfv	**13WLTC_cold_def_rep_PEMS_corr.** acc. to GNT_WLTC+_WG_v1.0.5.docx	gfv	**13WLTC_cold_def_rep_PEMS_corr.** acc. to GNT_WLTC+_WG_v1.0.5.docx		SoC adjustment		**16WLTC_cold_def_rep** according to GNT_WLTC+_WG_v1.0.5.docx	
	4 road load verification		4 road load verification		4 road load verification		4 road load verification		**10WLTC_warm_def_rep_CS** according to GNT_WLTC+_WG_v1.0.5.docx		4 road load verification	
					41Soaktime9-36 h, 14 °C ± 3 °C				Ensure CS mode (break-off criterion shall be fulfiled)		**18Battery capacity test** according to GNT_GVI_DrivingRangeTest_v0.0.6.docx **(can also be performed inbetween the tests)**	
					14WLTC_cold_def according to GNT_WLTC+_WG_v1.0.5.docx	petrol	**12BAB_warm_def_CS** according to GNT_BAB_Motorway_WG_v1.0.1.docx		41Soaktime 9-36 h, 14 °C ± 3 °C			
					4 road load verification				**17WLTC_cold_def_rep_PEMS_corr._CS** acc. to GNT_WLTC+_WG_v1.0.5.docx			
					15BAB_warm_def according to GNT_BAB_Motorway_WG_v1.0.1.docx	petrol			4 road load verification			
WP3: PEMS testing and robustness testing	for MAW method use CO2 values in vehicle´s CoC document											
	PEMS preparation and pictures		PEMS preparation and pictures		PEMS preparation and pictures		PEMS preparation and pictures		PEMS preparation and pictures		PEMS preparation and pictures	
	20Preconditioning 20min at 118 km/h		20Preconditioning ~20min at motorway speeds	gfv	20Preconditioning ~20min at motorway speeds	gfv	20Preconditioning ~20min at motorway speeds, SOC adjustment		SoC adjustment		20Preconditioning ~20min at motorway speeds	
	41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56h at 23 °C ± 3 °C		41Soaktime 9-56h at 23 °C ± 3 °C	
	21PEMS+ cold according to GNT_PEMS+_WG_v1.0.7.docx		**21PEMS+ cold** according to GNT_PEMS+_WG_v1.0.7.docx	gfv	**21PEMS+ cold** according to GNT_PEMS+_WG_v1.0.7.docx	gfv	**21PEMS+ cold** according to GNT_PEMS+_WG_v1.0.7.docx		**22PEMS+ cold CS** according to GNT_PEMS+_WG_v1.0.7.docx		**21PEMS+ cold** according to GNT_PEMS+_WG_v1.0.7.docx	
	23Warm up (5 min free urban trip and 80 °C coolant temperature)		23Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	23Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	23Warm up (5 min free trip and 80 °C coolant temperature), SoC ad.		36Warm up (5 min free urban trip and 80 °C coolant temperature), SOC adjustment			
	27Idling 15 min		27Idling 15 min	gfv	27Idling 15 min	gfv	27Idling 15 min		**29Congestion Simulation CS** according to GNT_Emission_Robustness_v1.0.5.docx		23Warm up (5min free urban trip)	
	24PEMS_heavy_warm according to GNT_Emission_Robustness_v1.0.5.docx		**24PEMS_heavy_warm** according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**24PEMS_heavy_warm** according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**24PEMS_heavy_warm** according to GNT_Emission_Robustness_v1.0.5.docx		41Soaktime 9-56h at 23 °C ± 3 °C		**24PEMS_heavy_warm** according to GNT_Emission_Robustness_v1.0.5.docx (no idling before test needed)	
	20Preconditioning 20min at 118 km/h		20Preconditioning ~20min at motorway speeds	gfv	20Preconditioning ~20min at motorway speeds	gfv	20Preconditioning ~20min at motorway speeds		**26PEMS+ cold CS** according to GNT_PEMS+_WG_v1.0.7.docx		20Preconditioning ~20min at motorway speeds	
	41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		41Soaktime 9-56 h at 23 °C ± 3 °C		36Warm up (5 min free urban trip and 80 °C coolant temperature), SOC adjustment		41Soaktime 9-56h at 23 °C ± 3 °C	
	26PEMS+ cold rep according to GNT_PEMS+_WG_v1.0.7.docx		**26PEMS+ cold rep** according to GNT_PEMS+_WG_v1.0.7.docx	gfv	**26PEMS+ cold rep** according to GNT_PEMS+_WG_v1.0.7.docx	gfv	**26PEMS+ cold rep** according to GNT_PEMS+_WG_v1.0.7.docx		**31PEMS_eco_warm CS** according to GNT_Emission_Robustness_v1.0.5.docx		**26PEMS+ cold rep** according to GNT_PEMS+_WG_v1.0.7.docx	
	36Warm up (5 min free urban trip and 80 °C coolant temperature)		36Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	36Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	36Warm up (5 min free trip and 80 °C coolant temperature), SoC adjustment		36Warm up (5 min free urban trip and 80 °C coolant temperature), SOC adjustment		36Warm up (5 min free urban trip)	
	28Congestion Simulation according to GNT_Emission_Robustness_v1.0.5.docx		**28Congestion Simulation** with idling according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**28Congestion Simulation** with idling according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**28Congestion Simulation** with idling according to GNT_Emission_Robustness_v1.0.5.docx		**25PEMS_heavy_warm CS** according to GNT_Emission_Robustness_v1.0.5.docx		**28Congestion Simulation** with idling, accrd. to GNT_Emission_Robustness_v1.0.5.docx	
	36Warm up (5 min free urban trip and 80 °C coolant temperature)		36Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	36Warm up (5 min free urban trip and 80 °C coolant temperature)	gfv	36Warm up (5 min free urban trip and 80 °C coolant temperature)		41Soaktime 9-56h at 23 °C ± 3 °C, HVB SOC 100		36Warm up (5 min free urban trip)	
	30PEMS_eco_warm according to GNT_Emission_Robustness_v1.0.5.docx		**30PEMS_eco_warm** according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**30PEMS_eco_warm** according to GNT_Emission_Robustness_v1.0.5.docx	gfv	**30PEMS_eco_warm** according to GNT_Emission_Robustness_v1.0.5.docx		**32PEMS+ cold CD** according to GNT_PEMS+_WG_v1.0.7.docx		**30PEMS_eco_warm** with idling, according to GNT_Emission_Robustness_v1.0.5.docx	
					20Preconditioning ~20min at motorway speeds	petrol			41Soak at 23 °C ± 3 °C, until HVB SOC 100			
					41Soaktime 9-56 h at 23 °C ± 3 °C				**33PEMS_eco_cold CD** according to GNT_Emission_Robustness_v1.0.5.docx			
					34PEMS+ cold according to GNT_PEMS+_WG_v1.0.7.docx	petrol			41Soak at 23 °C ± 3 °C, until HVB SOC 100			
									35PEMS_heavy_cold CD according to GNT_Emission_Robustness_v1.0.5.docx			
WP4: Maximum Engine Load Curve Mapping	Warm up (5 min free urban trip and 80 °C coolant temperature)		Warm up (5 min free urban trip and 80 °C coolant temperature)		Warm up (5 min free urban trip and 80 °C coolant temperature)		Warm up (5 min free urban trip and 80 °C coolant temperature)		Warm up (5 min free urban trip and 80 °C coolant temperature)		Warm up 5 min free urban trip	
	37engine_load_curve_mapping according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx		**37engine_load_curve_mapping** according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx	gfv	**37engine_load_curve_mapping** according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx	gfv	**37engine_load_curve_mapping** according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx		**37engine_load_curve_mapping_CS** according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx		**37engine_load_curve_mapping** according to GNT_propulsion_unit_performance_ max_engine_load_WG_v1.0.0.docx	
	PEMS disassembly		PEMS disassembly		PEMS disassembly		PEMS disassembly		PEMS disassembly		PEMS disassembly	

WP2: Low Temp (Laboratory)

Option 2: if 14 °C tests and -7 °C tests will be performed at different chassis dynamometers

38WLTC_warm_cd_CAT according to GNT_WLTC+_WG_v1.0.5.docx	**38WLTC_warm_cd_CAT** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**38WLTC_warm_cd_CAT** according to GNT_WLTC+_WG_v1.0.5.docx gfv	**38WLTC_warm_cd_CAT** according to GNT_WLTC+_WG_v1.0.5.docx	**38WLTC_warm_cd_CAT** according to GNT_WLTC+_WG_v1.0.5.docx	**38WLTC_warm_cd_CAT** according to GNT_WLTC+_WG_v1.0.5.docx
38cd for WLTC cold def CAT according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx gfv	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx gfv	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**38cd for WLTC cold def CAT** according to GNT_WLTC+_CAT_v0.0.6.docx
39WLTC_warm_def_rep precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx	**39WLTC_warm_def_rep** precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx gfv	**39WLTC_warm_def_rep** precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx gfv	**39WLTC_warm_def_rep** precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx	**39WLTC_warm_def_rep** precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx	**39WLTC_warm_def_rep** precon at 23°C ±3°C acc. to GNT_WLTC+_WG_v1.0.5.docx
optional REESS charging	optional REESS charging	optional REESS charging		Ensure CS mode (break-off criterion shall be fulfiled)	
41Soaktime minimum 12h, -7 °C ± 3 °C	41Soaktime minimum 12h, -7 °C ± 3 °C	41Soaktime minimum 12h, -7 °C ± 3 °C	41Soaktime minimum 12h, -7 °C ± 3 °C	41Soaktime minimum 12h, -7 °C ± 3 °C	41Soaktime minimum 12h, -7 °C ± 3 °C
40WLTC_cold_def_CAT according to GNT_WLTC+_CAT_v0.0.6.docx	**40WLTC_cold_def_CAT** according to GNT_WLTC+_CAT_v0.0.6.docx gfv	**40WLTC_cold_def_CAT** according to GNT_WLTC+_CAT_v0.0.6.docx gfv	**40WLTC_cold_def_CAT** according to GNT_WLTC+_CAT_v0.0.6.docx	**40WLTC_cold_def_CAT_CS** according to GNT_WLTC+_CAT_v0.0.6.docx	**40WLTC_cold_def_CAT** according to GNT_WLTC+_CAT_v0.0.6.docx
38 road load verification	38 road load verification	38 road load verification	38 road load verification	38 road load verification	38 road load verification

WP5: Test Analysis, Rating

vehicle OBD memory readout and check

Test analysis according to GNT_Test_performance_limits_v2.xlsx

Results template GNT_Template_Test_Results_WG_v1.0.4.xlsx

Report table GNT_Template_Test_Results_WG_v1.0.3.xlsx

Rating GNT_Rating_Sheet_Master_2020_2.0.6.xlsm and GNT_Rating_Sheet_PHEV_v2.2.xlsm

Report GNT_Laboratory_Report_Template_v1.0.1.docx

Upload Output test data on Sharepoint

Procedure for AdBlue Quality Check

In order to avoid implausible measurement results due to poor quality or manipulated AdBlue, a quality check of the AdBlue (AUS 32, according to ISO 22241) in the vehicle should be carried out as part of the GNCAP procedure. This document proposes a corresponding procedure and defines the corrective measures to be taken if the quality criteria are not met. This procedure could be integrated in the vehicle maintenance check or during the documentation of the test vehicle.

1. General AdBlue check procedure

1.1 Prepare a sample of the vehicles AdBlue according to point 2 of this document

1.2 Quick check the AdBlue according to point 3.1 of this document

- If the urea content is within the specified limits, proceed with the WLTC+ precon and WLTC+ cold test
- If the urea content is out of limits, rinse and refill the AdBlue tank according to point 4 of this document and send the AdBlue sample for analysis according to point 3.2 of this document.

1.3 Check the emission levels after the the WLTC+ precon and WLTC+ cold test

- If the values for NOx, NH3 and N2O are within reasonable limits, proceed with the tests according to the standard test procedure
- If the values for NOx, NH3 and N2O are above reasonable limits:
    - **Option 1:** proceed with the tests according to the standard test procedure, analyse the sample according to point 2.2 of this document, and add the results to the vehicle data sheet.
    - **Option 2:** rinse and refill the AdBlue tank according to point 4 of this document and send the AdBlue sample for analysis according to point 3.2 of this document. Repeat the WLTC+ precon and WLTC+ cold test and proceed with the standard measurement protocol

2. AdBlue sampling

2.1 Sampling bottles

The used sampling bottles must fulfil the specifications of ISO 22241-2

- Wide neck bottles shall be used. Suited materials for these bottles are high-density polyethylene (HPDE), high-density polypropylene (HDPP) polyvinylidene fluoride (PVDF) and perfluoroalkoxy alkane (PFA).
- Prior to the first use with AdBlue, the bottles shall be cleaned and finally rinsed with deionized water

2.2 AdBlue sample

- Fill the sampling bottle to 1/3 with AdBlue from the vehicles AdBlue tank to rinse the container. To avoid contamination, do not fill the AdBlue back to the tank. The liquid used for rinsing must then be disposed in accordance with the disposal regulations.
- Fill the sampling bottle completely (500ml) with AdBlue from the vehicles AdBlue tank.
- During the filling of the sample, maximum care shall be taken that neither dust nor liquid pollutants get into the bottle.
- Label the bottle accordingly (vehicle ID, VIN, time and date)

2.3 AdBlue sample storage

- The sample shall be stored until two months after the publication of the measurement data/rating of the vehicle.
- According to 22241-2, it is recommended to conduct the analysis within three weeks in order to take into account possible changes in the ammonia content.

3. AdBlue quality check

3.1 Quick check with refractometer

- AdBlue has to be at lab ambient temperature (15-25°C)
- Urea content must be between 30 and 35%
- The value read with the refractometer must be recorded

3.2 AdBlue lab analysis

- AdBlue lab analysis shall be performed according to 22241-2
- According to 22241-2, it is recommended to conduct the analysis within three weeks in order to take into account possible changes in the ammonia content.

4. Rinsing/refilling of the vehicle AdBlue tank

4.1 Rinsing

- If not already done, prepare a sample of the vehicles AdBlue according to 1.2 of this document
- Empty the vehicles AdBlue tank as much as possible (by removing and emptying or pumping it empty)
- Fill up one litre of new AdBlue from the lab storage to dilute residuals and empty the tank again
- Quick check new AdBlue from the lab storage according to point 3.1 of this document
- Fill the vehicles AdBlue tank completely with new AdBlue from the lab storage

4.2 AdBlue from lab

- If possible, the AdBlue should already be analysed
- If the AdBlue is not analysed, take a sample according to point 1.2 of this document
- The date of the first opening of the AdBlue container must be protocolled
- AdBlue should be stored at temperatures between -5 °C and + 25 °C
- AdBlue should not be older than 36 months