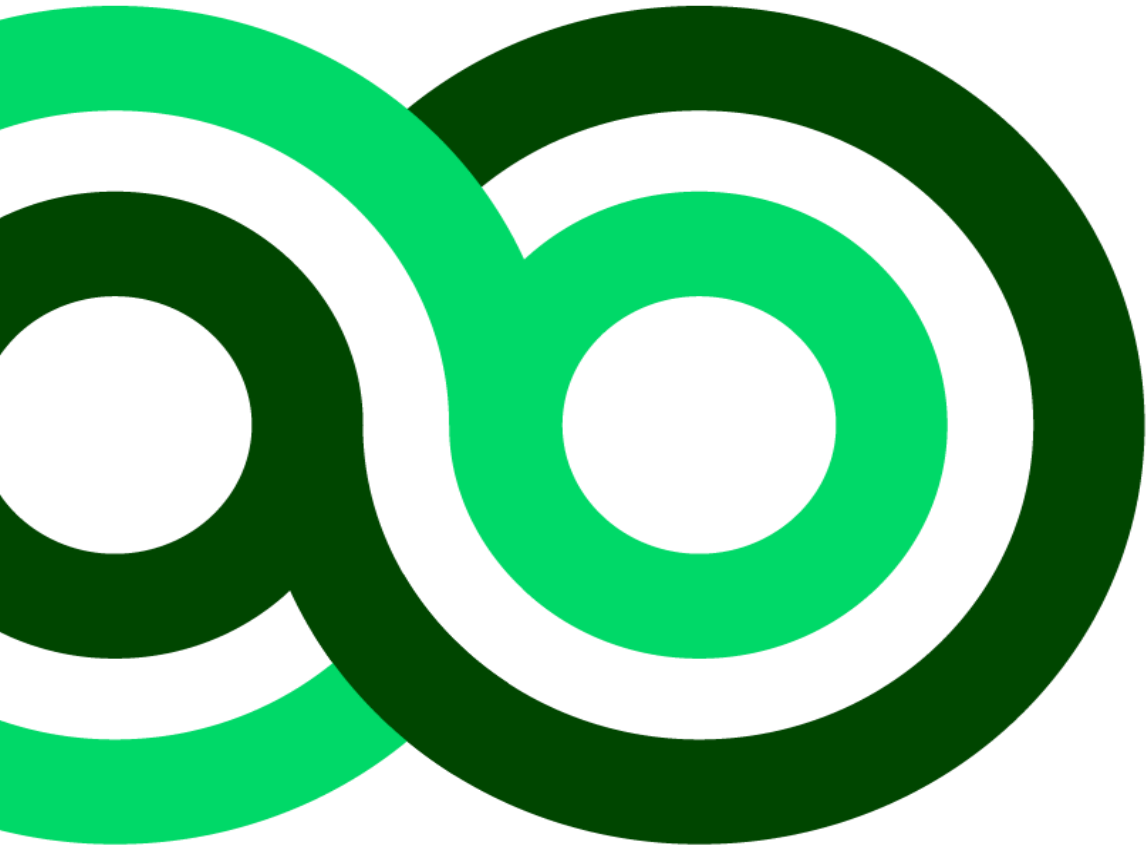
TEST PROCEDURE

BAB Motorway

Version 2.0.0 February 2022



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GNT BAB motorway cycle BAB130

Test procedure on the emissions test stand

General testing requirements

The test cycles include the emission test stand measurement of pollutants such as carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides (NOx), of particulate matter (PM) and particle number (PN), ammonia (NH_3), as well as of the greenhouse gases carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Fuel consumption is calculated on the basis of carbonaceous emissions. NH_3, CH_4 and N_2O shall be measured according to *GNT_WLTC+_Test_Procedure*.
The following requirements have been defined for the test procedure to replicate reality as closely as possible:

- All vehicles are driven under harsh acceleration in kick-down.
- Vehicles with a gear-shift indicator are measured shifting the gears as recommended.
- Reference fuel has to be used for tests. A corresponding certification document has to be provided with the measurement results.
- Target room temperature in the emissions laboratory is 23 °C +/- 3 °C during soak phases and at the start of the test. During the test the temperature set point is 23 °C +/- 5 °C.
- Daytime running lights (or, alternatively, low beam) are on.
- The air condition is operated with the following settings:

Manual air condition:

- A/C switch: on
- Temperature: Temperature ½ (middle position) recorded by measurement tip according to *GNT_Overall_Test_Procedure;* if necessary readjusted until 23 °C ± 3 °C are met
- Fan speed: 1/3 ... 1/4
- Air flow: floor/windscreen

Automatic air condition:

- A/C switch: on
- Temperature: 23°C +/- 3 °C recorded by measurement tip according to *GNT_Overall_Test_Procedure*
- Fan speed: AUTO
- Air flow: AUTO

- Measurements are performed with both vehicle axles on the test bench.
- There is no special test bench mode.
- As for vehicles with several operating modes to choose from, measurements are performed in the mode automatically activated after starting. Where a pre-set mode should be maintained, the most ecological mode should be selected.

Test procedure for gaseous vehicles (CNG, LPG)

The test procedure is similar to the requirements for petrol and diesel vehicles. Regardless of the type of gas used (CNG, LPG), the vehicles are measured and evaluated only in the gas-powered mode of operation, if technologically feasible.

BAB130 motorway cycle - speed profile

The Figure below shows the BAB motorway cycle. Ratings are based on the average of phase 1 and phase 2. This additional test developed by ADAC is designed to show whether the exhaust emission control system also performs well outside the legally prescribed test. The motorway cycle reflects the fact that in most European countries the motorway speed limit is 130 kph. In addition, it also includes full-load accelerations.

The cycle consists of a short preconditioning phase, which will not be included in the measurement, and of two identical test phases. The two phases make it possible to rule out that a vehicle is presently in a regeneration phase (particulate filter burn-off, SCR system regeneration). If the emissions in both phases differ greatly, regeneration may have occurred, and the test has to be repeated. The distance covered per phase of the BAB motorway cycle is 10 km. 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 its standard operation temperature.

A complete cycle shall consist of two exact same phases and a pre-con phase as shown in figure A5/1.

The two same phases help to recognize regenerations and other anomalies. If such anomalies will be recognized, the test is void.

Gear shift instructions

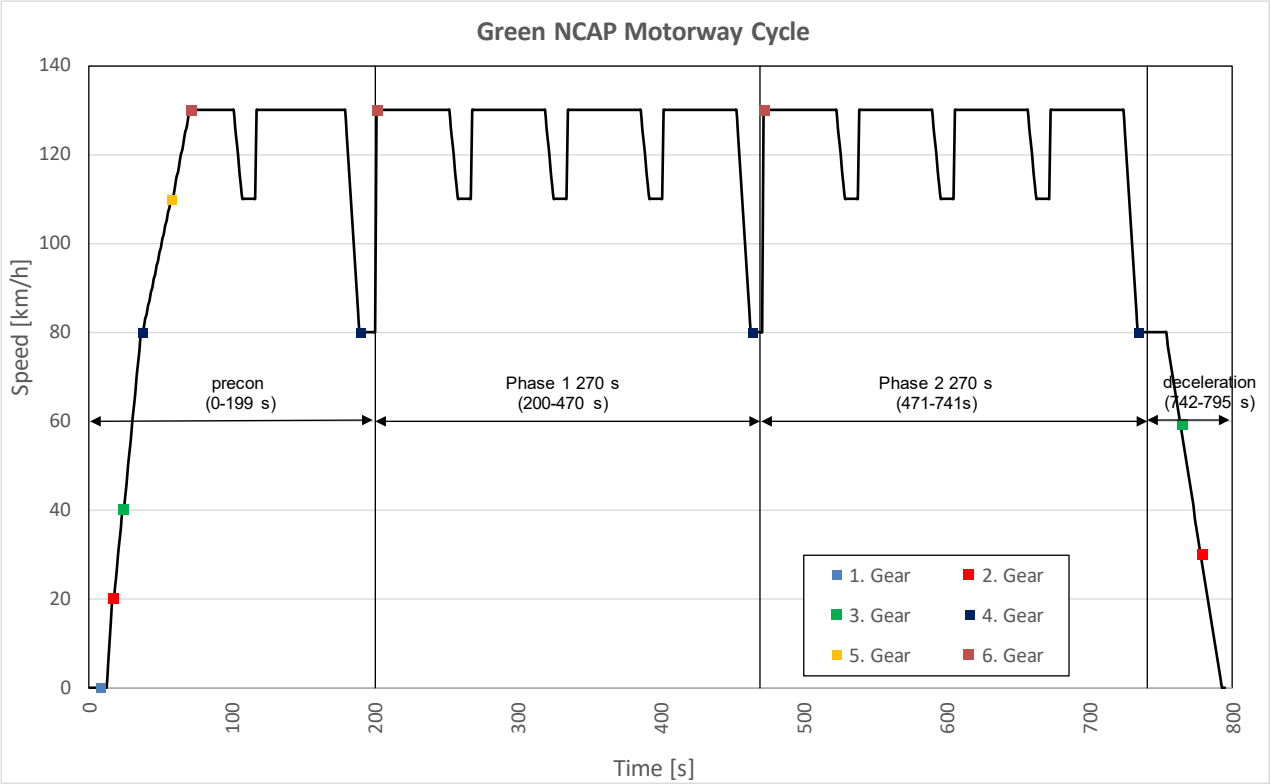
With manual gearbox, the accelerations from 110 kph up to 130 kph have to be driven in the highest gear and throttle pedal fully stepped on.

The accelerations from 80 kph up to 130 kph have to be driven in 4th gear and throttle pedal fully stepped on.

With automatic gearbox, the accelerations from 80 kph up to 130 kph as well as the accelerations from 110 kph up to 130 kph have to be driven in automatic gear and throttle pedal fully stepped on (“kick-down”).

Speed trace tolerances and driving instructions shall be followed according to *GNT_WLTC +_Test_Procedure*. The maximum acceleration parts are excluded from these driving instructions.

Figure A 5/1: Green NCAP Motorway Cycle



Remark: Accelerations from 110 km/h up to 130 km/h have to be driven in the highest applicable gear – not necessarily the 6th as shown in the graphics.

Table A5/1: Green NCAP Motorway Cycle

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
0	0	47	92	94	130	141	130
1	0	48	93	95	130	142	130
2	0	49	95	96	130	143	130
3	0	50	96	97	130	144	130
4	0	51	98	98	130	145	130
5	0	52	99	99	130	146	130
6	0	53	101	100	130	147	130
7	0	54	102	101	130	148	130
8	0	55	104	102	130	149	130
9	0	56	105	103	130	150	130
10	0	57	107	104	126	151	130

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
11	0	58	108	105	123	152	130
12	0	59	110	106	120	153	130
13	5	60	110	107	116	154	130
14	10	61	111	108	113	155	130
15	15	62	113	109	110	156	130
16	20	63	115	110	110	157	130
17	20	64	116	111	110	158	130
18	23	65	118	112	110	159	130
19	26	66	120	113	110	160	130
20	30	67	121	114	110	161	130
21	33	68	123	115	110	162	130
22	36	69	125	116	110	163	130
23	40	70	126	117	110	164	130
24	40	71	128	118	110	165	130
25	43	72	130	119	130	166	130
26	46	73	130	120	130	167	130
27	50	74	130	121	130	168	130
28	53	75	130	122	130	169	130
29	56	76	130	123	130	170	130
30	60	77	130	124	130	171	130
31	63	78	130	125	130	172	130
32	66	79	130	126	130	173	130
33	70	80	130	127	130	174	130
34	73	81	130	128	130	175	130
35	76	82	130	129	130	176	130
36	80	83	130	130	130	177	130
37	80	84	130	131	130	178	130
38	81	85	130	132	130	179	130

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
39	83	86	130	133	130	180	130
40	84	87	130	134	130	181	130
41	86	88	130	135	130	182	125
42	87	89	130	136	130	183	120
43	89	90	130	137	130	184	115
44	90	91	130	138	130	185	110
45	91	92	130	139	130	186	105
46	92	93	130	140	130	187	100
188	95	237	130	286	130	335	110
189	90	238	130	287	130	336	110
190	85	239	130	288	130	337	130
191	80	240	130	289	130	338	130
192	80	241	130	290	130	339	130
193	80	242	130	291	130	340	130
194	80	243	130	292	130	341	130
195	80	244	130	293	130	342	130
196	80	245	130	294	130	343	130
197	80	246	130	295	130	344	130
198	80	247	130	296	130	345	130
199	80	248	130	297	130	346	130
200	80	249	130	298	130	347	130
201	80	250	130	299	130	348	130
202	80	251	130	300	130	349	130
203	130	252	130	301	130	350	130
204	130	253	130	302	130	351	130
205	130	254	130	303	130	352	130
206	130	255	126	304	130	353	130
207	130	256	123	305	130	354	130

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
208	130	257	120	306	130	355	130
209	130	258	116	307	130	356	130
210	130	259	113	308	130	357	130
211	130	260	110	309	130	358	130
212	130	261	110	310	130	359	130
213	130	262	110	311	130	360	130
214	130	263	110	312	130	361	130
215	130	264	110	313	130	362	130
216	130	265	110	314	130	363	130
217	130	266	110	315	130	364	130
218	130	267	110	316	130	365	130
219	130	268	110	317	130	366	130
220	130	269	110	318	130	367	130
221	130	270	130	319	130	368	130
222	130	271	130	320	130	369	130
223	130	272	130	321	130	370	130
224	130	273	130	322	126	371	130
225	130	274	130	323	123	372	130
226	130	275	130	324	120	373	130
227	130	276	130	325	116	374	130
228	130	277	130	326	113	375	130
229	130	278	130	327	110	376	130
230	130	279	130	328	110	377	130
231	130	280	130	329	110	378	130
232	130	281	130	330	110	379	130
233	130	282	130	331	110	380	130
234	130	283	130	332	110	381	130
235	130	284	130	333	110	382	130

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
236	130	285	130	334	110	383	130
384	130	433	130	482	130	531	110
385	130	434	130	483	130	532	110
386	130	435	130	484	130	533	110
387	130	436	130	485	130	534	110
388	130	437	130	486	130	535	110
389	126	438	130	487	130	536	110
390	123	439	130	488	130	537	110
391	120	440	130	489	130	538	110
392	116	441	130	490	130	539	110
393	113	442	130	491	130	540	110
394	110	443	130	492	130	541	130
395	110	444	130	493	130	542	130
396	110	445	130	494	130	543	130
397	110	446	130	495	130	544	130
398	110	447	130	496	130	545	130
399	110	448	130	497	130	546	130
400	110	449	130	498	130	547	130
401	110	450	130	499	130	548	130
402	110	451	130	500	130	549	130
403	110	452	130	501	130	550	130
404	130	453	130	502	130	551	130
405	130	454	130	503	130	552	130
406	130	455	130	504	130	553	130
407	130	456	125	505	130	554	130
408	130	457	120	506	130	555	130
409	130	458	115	507	130	556	130
410	130	459	110	508	130	557	130

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
411	130	460	105	509	130	558	130
412	130	461	100	510	130	559	130
413	130	462	95	511	130	560	130
414	130	463	90	512	130	561	130
415	130	464	85	513	130	562	130
416	130	465	80	514	130	563	130
417	130	466	80	515	130	564	130
418	130	467	80	516	130	565	130
419	130	468	80	517	130	566	130
420	130	469	80	518	130	567	130
421	130	470	80	519	130	568	130
422	130	471	80	520	130	569	130
423	130	472	80	521	130	570	130
424	130	473	80	522	130	571	130
425	130	474	130	523	130	572	130
426	130	475	130	524	130	573	130
427	130	476	130	525	130	574	130
428	130	477	130	526	126	575	130
429	130	478	130	527	123	576	130
430	130	479	130	528	120	577	130
431	130	480	130	529	116	578	130
432	130	481	130	530	113	579	130
580	130						
581	130						
582	130						
583	130						
584	130						
585	130						

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
586	130						
587	130						
588	130						
589	130						

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
590	130	637	130	684	130	731	105
591	130	638	130	685	130	732	100
592	130	639	130	686	130	733	95
593	126	640	130	687	130	734	90
594	123	641	130	688	130	735	85
595	120	642	130	689	130	736	80
596	116	643	130	690	130	737	80
597	113	644	130	691	130	738	80
598	110	645	130	692	130	739	80
599	110	646	130	693	130	740	80
600	110	647	130	694	130	741	80
601	110	648	130	695	130	742	80
602	110	649	130	696	130	743	80
603	110	650	130	697	130	744	80
604	110	651	130	698	130	745	80
605	110	652	130	699	130	746	80
606	110	653	130	700	130	747	80
607	110	654	130	701	130	748	80
608	130	655	130	702	130	749	80
609	130	656	130	703	130	750	80
610	130	657	130	704	130	751	80
611	130	658	130	705	130	752	80
612	130	659	130	706	130	753	80
613	130	660	126	707	130	754	80
614	130	661	123	708	130	755	80

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
615	130	662	120	709	130	756	80
616	130	663	116	710	130	757	77
617	130	664	113	711	130	758	75
618	130	665	110	712	130	759	73
619	130	666	110	713	130	760	71
620	130	667	110	714	130	761	69
621	130	668	110	715	130	762	67
622	130	669	110	716	130	763	65
623	130	670	110	717	130	764	63
624	130	671	110	718	130	765	61
625	130	672	110	719	130	766	59
626	130	673	110	720	130	767	57
627	130	674	110	721	130	768	55
628	130	675	130	722	130	769	53
629	130	676	130	723	130	770	51
630	130	677	130	724	130	771	49
631	130	678	130	725	130	772	47
632	130	679	130	726	130	773	45
633	130	680	130	727	125	774	43
634	130	681	130	728	120	775	41
635	130	682	130	729	115	776	38
636	130	683	130	730	110	777	36
778	34						
779	32						
780	30						
781	28						
782	26						
783	24						
784	22						
785	20						
786	18						
787	16						

Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h	Time in s	Speed in km/h
788	14						
789	12						
790	10						
791	8						
792	6						
793	4						
794	2						
795	0						
796	0						
797	0						