Procedure for Performance Measurement

1. Introduction

When measuring performance on a dynamometer, vehicle-specific and environmental factors can influence the test result. In order to ensure accurate, reproducible test results, the vehicle must be conditioned for the test and the performance measurement measures must be taken with the vehicle-specific characteristics in mind and under comparable conditions.

2. Purpose

The purpose of this manual is to determine the parameters for measurement of wheel performance. The procedure should form the basis for transparent measurement.

3. Scope

This procedural manual applies to dynamometers for the measurement of wheel performance. The following steps are to be considered supplementary to the existing operation manual for the dynamometer. ABT Sportsline reserves the right to check all test results and does not consider the measurement results themselves as binding. ABT Sportsline shall not be liable for the correct implementation of wheel performance measurement and the accuracy of the measurement results.

4. Preparation of the Vehicle

4.1. The error memory of the engine control unit and the transmission control unit must be read. If errors are present, they are to be recorded and addressed. There must be no performance-relevant error stored in the log.

4.2. For diesel vehicles, the particulate filter status must be read. If it is above 15%, it must be reduced via suitable measures and in accordance with manufacturer's instructions.

4.3. The vehicle must be filled with the highest quality fuel (gasoline engine at least RON 98, RON 102, diesel CN 49 or higher)

4.4. The following value blocks must be recorded at speeds of 200 rpm with VAS 5053 or similar during the performance measurement. The values must be selected according to manufacturer and model under <Tracking Functions>.

4.4.1. Gasoline Engine: Rotational speed, air density, engine temperature, manifold temperature, oil temperature, manifold pressure target and actual, duty cycle turbocharger, knock control, ignition angle, lambda values

4.4.2. Diesel Engine: Rotational speed, air density, injection volume, engine temperature, manifold temperature, oil temperature, exhaust temperature turbocharger before turbine, manifold pressure target and actual, duty cycle of turbocharger

4.5. The tires used must be of the vehicle manufacturer's standard size and be approved for the required speed range. Do not test any vehicles with winter tires, remolded tires or new tires.

4.6. Tires must be inflated to the vehicle-specific pressures and corrected if necessary.

4.7. Tires must be checked for foreign objects and damage.

4.8. The following environmental conditions must be maintained in the testing area, in accordance with EEC 80/1269: Room temperature 20 - 25 °C,

measured in the vicinity of the air intake of the air filter. Air pressure 900 - 1050 hPa. Intake manifold temperature max. 50 °C.

4.9. Fan output should be set in such a way that the intake manifold temperature does not reach temperatures more than 25 °C above the testing room temperature. The fan output should be positioned in such a way that the coolers are fully covered and the air stream creates a draft along the underbody, thereby also cooling the exhaust system. The engine hood should be opened slightly to facilitate an uninterrupted cooling air stream in the engine compartment.

5. Engine Conditioning

5.1. Engine water temperature min: 80 °C

5.2. Oil temperature: Min 70 °C

5.3. Intake manifold or charging air temperature should differ only slightly from room temperature at start of measurement.

5.4. The air conditioning system must be switched to <OFF> or <ECON>.

5.5. Switch off all electric devices.

5.6. Battery charge status must be at least 90%.

5.7. If necessary, test mode should be activated on the vehicle.

6. Measurement

6.1. In principle, the manufacturer's specifications must be followed.

6.2. Prior to first measurement, the vehicle must be run in at approx 100 km/h on the dynamometer for a brief period.

6.3. Manual transmission and DSG: Measurement must be taken in direct gear.

6.4. Automatic and Multitronic transmission: Direct gear is to be engaged and accelerator depressed fully without kickdown.

6.5. If a speed of 260 km/h is exceeded on the dynamometer, the measurement should be made in the next lowest gear – please observe the maximum authorized speed range of the dynamometer.

6.6. Measurements of automatic vehicles (incl. Multitronic) must be corrected, due to load-dependent losses in the drive train. Please take the values from the manufacturer's specifications, e.g. Audi
KDNR 1001 engine.
Transmission: 0%
Automatic transmission (DSG): 3.5 %
Automatic transmission with lock-up torque converter (Tiptronic): 3.5 %
CVT Transmission (Multitronic): 4.5 %
Four-wheel drive (Quattro and 4-Motion) additional: 1 %

7. Evaluation and Presentation of Results

Values collected during continuous measurement of manual vehicles under normal conditions and in the nominal performance range are to be compared to the nominal curve. Depending on the dynamometer model, the measured values are to be corrected in accordance with manufacturer's specifications before or after the measurement. This measurement method is in accordance with the EEC norm 80/1269 to 12/99. The marginal conditions were adjusted to the norm in the frame of physical possibility.

8. Cause and Effect

Performance too low	Poor fuel quality, engine knocking, octane rating too low (e.g. RON 95), cooling period between measurements too short, air intake temperature too high
	Conditioning incorrect, insufficient cooling, cooling period between measurements too short
	Duration of measurement
	Wrong gear
Inconsistent performance	Check dynamometer, engine knocking, air intake temperature too high
	Wheel slippage
	Leak in the boost pressure / intake air system
Drop in performance during measurement	Knocking combustion (reduction in ignition angle due to poor quality fuel)
	Air intake temperature too high (reduction in ignition angle)
	Leak in the boost pressure / intake air system
Performance too high	No free rolling, left in gear when rolling, brakes applied when rolling
	Speed too high (incorrect gear engaged)
	Standard values of dynamometer – loss of towing capacity on single roller <20% of standard capacity, twin roller <30% of standard capacity
	Correction figures too high (transmission etc.)

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