| WLTP DHC subgroup | |
|---|---|
| **Date** | **21/12/09** |
| **Title** | **Further guidelines for data collection and reporting** |
| **Working paper number** | **WLTP-DHC-02-14** |
| **Author** | **EU** |

## 1.0. Introduction

These guidelines are additional to the WLTP-DHC guidelines and should be followed when collecting data in the EU.

## 2.0. Parameters to be recorded/monitored

The following parameters should be recorded. Those highlighted in grey are optional.

### 2.1. Vehicle information

| Parameter | Example |
|---|---|
| Vehicle category | SR1 definition (1-1, 1-2, 2) |
| | EU type (M1, N1, etc.) |
| Engine type | Petrol/Diesel/other (please specify) |
| Engine displacement | |
| Curb mass | |
| Gross vehicle weight | |
| Transmission | Automatic/manual/CVT |
| Number of gears | |
| Maximum Rated power | |
| Maximum Rated engine speed | |
| Vehicle make/model[1] | Ford/Focus |
| Year of first registration | |
| Emission category | |
| Maximum rated vehicle speed | |
| Adaptive speed equipment | Yes/No |
| Cruise control | Yes/No |
| Gear shift indicator | Yes/No |

[1]Mandatory unless in privacy issues

### 2.2. Journey information

| Parameter | Example |
|---|---|
| Country/Region/City | UK, London |
| Start date and time of journey | 09:00, 08/01/09 |
| Weather conditions[1] | Heavy snow |
| Vehicle load | 100 kg |
| Driver pays fuel | Yes/No |
| Driver instructed | Yes/No |

[1]Adverse weather conditions (e.g. low visibility) must be recorded

### 2.3. Continuous information (at least 1 Hz)

| Parameter | Measurement equipment |
|---|---|
| Continuous time signal | |
| Road type | Urban/Rural/Motorway |
| Driving period | Peak/Off-peak/Weekend |
| Time stamp | |
| Vehicle speed | OBD (and GPS if available) |
| Engine speed | OBD, photoelectric pick-up, ignition pulsation |
| Vehicle position (latitude) | GPS |
| Vehicle position (longitude) | GPS |
| Vehicle position (altitude) | GPS |
| GPS number of satellites | GPS |
| GPS signal quality | GPS |
| Vehicle acceleration | OBD, GPS, accelerometer |
| Engine torque/load | OBD |
| Coolant temperature | OBD |
| Gear used | OBD |
| Clutch signal | OBD, assume from engine speed, clutch depression switch |
| Brake signal | OBD |
| Recommended gear | OBD |

## 3.0. Data resolution

All continuous data should be collected at a frequency of 1 Hz or greater. Raw data should be recorded and submitted for analysis. Please note that vehicle speed is required with resolution of at least two decimal places (i.e. 25.89 km/hour) to enable accurate calculation of acceleration.

## 4.0. Reporting format

Data should be reported using the template provided (see reporting_template.xls). Data may be recorded using MS Excel or csv formatted files. Please note that csv formatted files will be required if large amounts of data are collected (Excel is limited in capacity).

The reporting template has three worksheets; these are described below. Please ensure data are reported using the correct units (e.g. km/hour). Each package of in-use data should be given a unique filename. This filename will act as the identification key, linking the information recorded in the three worksheets.

### 4.1. Measurement equipment

This worksheet should be used to record what measurement equipment was used to record the collected data. For example, vehicle speed may be measured using either GPS data or directly from the ECU.

### 4.2. Vehicle and journey information

This worksheet should be used to record general parameters such as vehicle parameters and journey details.

### 4.3. Continuous information

This worksheet should be used to record those parameters that should be recorded on a continuous basis, e.g. vehicle speed, engine speed, etc.

### 4.4. Driver information

This worksheet should be used to record information on the vehicle driver. This information is not mandatory; however, it may be useful e.g. when undertaking the gear shift analysis.

## 5.0. Reporting/submitting data

Raw data should be submitted to [insert address] once ready for data analysis.