
# Joint Research Centre

## the European Commission's in-house science service

*Serving society*
*Stimulating innovation*
*Supporting legislation*

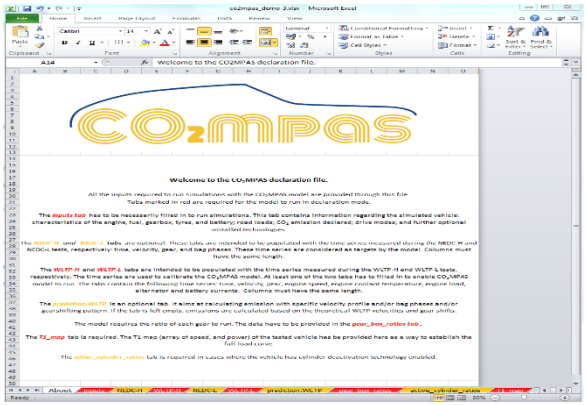
# $CO_2$MPAS: Dice Workflow

**Ispra, 24-Nov-2016**

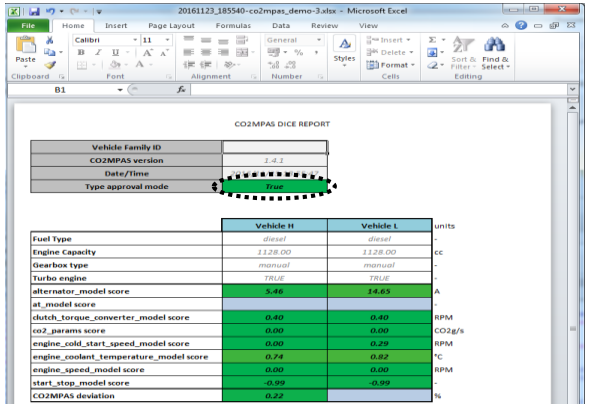
K. Anagnostopoulos, V. Valverde, J. Pavlovic
B. Ciuffo, G. Fontaras, S. Tsiakmakis, D. Komnos

European Commission

## $CO_2$MPAS Input file (in *"declaration mode"*)



## $CO_2$MPAS Output file (includes DICE & OUT Reports)

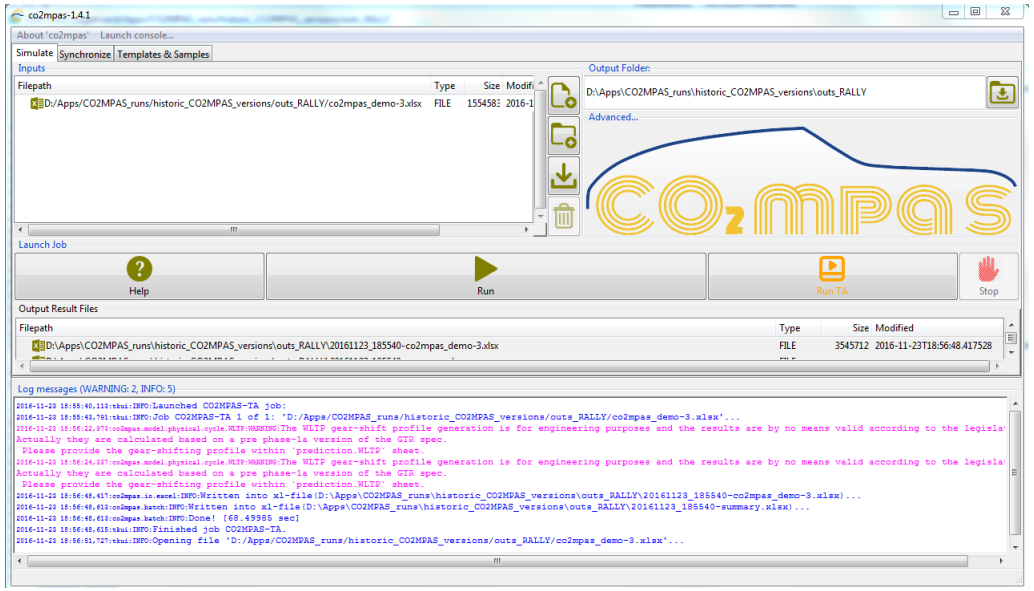


CO2MPAS DICE REPORT

| | |
|---|---|
| Vehicle Family ID | |
| CO2MPAS version | 1.4.1 |
| Date/Time | [redacted] |
| Type approval mode | true |

| | Vehicle H | Vehicle L | units |
|---|---|---|---|
| Fuel Type | diesel | diesel | - |
| Engine Capacity | 1128.00 | 1128.00 | cc |
| Gearbox type | manual | manual | - |
| Turbo engine | TRUE | TRUE | - |
| alternator_model score | 5.46 | 14.65 | A |
| at_model score | | | |
| clutch_torque_converter_model score | 0.40 | 0.40 | RPM |
| co2_params score | 0.00 | 0.00 | CO2g/s |
| engine_cold_start_speed_model score | 0.00 | 0.29 | RPM |
| engine_coolant_temperature_model score | 0.74 | 0.82 | °C |
| engine_speed_model score | 0.00 | 0.00 | RPM |
| start_stop_model score | -0.99 | -0.99 | - |
| CO2MPAS deviation | 0.22 | | % |

## $CO_2$MPAS Type Approval command ("*Run TA*" button)




"fingerprint " all files

Input + Output =>

**Hash #1:** *9fcdef88aea75363aa8e1eb0b75*

European Commission

DICE

copy & paste the *random number* into $CO_2$MPAS DICE

(tab in the GUI, under development)

Recipients:
- TS (“*sender*”)
- TAA
- JRC
- DG. CLIMA

**DICE Decision:=**
*DICE Report + OK/SAMPLE*
(to be included in **TAA e-files**)

**DICE stamp :=**
*DICE email + random number*

**Timestamp server:** generates a time-stamp (*random number*) of **what files** are sent **when**.

The stamp is a “witness” that the files have *indeed* been sent
(sender cannot *repudiate* later)

Input + Output + Decision =>
**Hash #2:** *cc805b4772e78f59570bd8883e*

**DICE email :=**
*Hash #1+ DICE Report*

**TAA report** :=
*OUT Report + OK/SAMPLE + HASH 2*
(to be included in **TA printed docs**)

PDF

Input + Output =>
**Hash #1:** *9fcdef88aea75363aa8e1eb0b75*

European Commission

Hash #2 is sent to TAA along with all e-files, and it is *unequivocally* associated with:

- The $CO_2$MPAS Input file contents;
- The $CO_2$MPAS Output file contents;
- Who sent the file for type approving;
- When the file was sent;
- What was the result of the dice (OK/SAMPLE).

Input + Output + Decision =>
**Hash #2:** *cc805b4772e78f59570bd8883e*

The *"printed"* TAA Report is *unequivocally* associated with the above Hash #2 and contains all key simulation results.


Timestamp Hash #1 distributed to Supervising bodies is *unequivocally* associated to Input & Output.

Input + Output =>
**Hash #1:** *9fcdef88aea75363aa8e1eb0b75*

CO2MPAS

European Commission

# OUTPUT report sample

| | |
|---|---|
| **Vehicle Family ID** | |
| **CO2MPAS version** | *1.4.3.dev0* |
| **Date/Time** | *2016/11/22-15:03:28* |
| **Type approval mode** | ***True*** |

| NEDC Average Specific CO2 Emissions* | Vehicle H | Vehicle L | units |
|---|---|---|---|
| NEDC CO2 declared value | *147.21* | | g/km |
| NEDC CO2MPAS simulated | *141.12* | | g/km |
| CO2MPAS deviation | ***-4.14*** | | % |

*Ki factor - corrected

| NEDC CO2MPAS CO2 Emissions | Vehicle H | Vehicle L | |
|---|---|---|---|
| CO2MPAS simulated NEDC | *141.12* | | g/km |
| CO2MPAS simulated UDC | *133.81* | | g/km |
| CO2MPAS simulated EUDC | *145.36* | | g/km |

| NEDC Inputs | Vehicle H | Vehicle L | |
|---|---|---|---|
| F0 | *216.21* | | N |
| F1 | *0.8790* | | N/km/h |
| F2 | *0.0436* | | N/(km/h)2 |
| Inertia | *1723.0* | | kg |
| **WLTP Inputs** | **Vehicle H** | **Vehicle L** | |
| F0 | *222.21* | | N |
| F1 | *0.8920* | | N/km/h |
| F2 | *0.0436* | | N/(km/h)2 |
| Test Mass | *1873.0* | | kg |
| CO2 emission phase Low | *156.89* | | g/km |
| CO2 emission phase Medium | *150.53* | | g/km |
| CO2 emission phase High | *149.54* | | g/km |
| CO2 emission phase Extra-High | *195.93* | | g/km |

# DICE Report sample

| | |
|---|---|
| **Vehicle Family ID** | |
| **CO2MPAS version** | *1.4.3.dev0* |
| **Date/Time** | *2016/11/22-15:03:28* |
| **Type approval mode** | ***True*** |

| | **Vehicle H** | **Vehicle L** | units |
|---|---|---|---|
| **Fuel Type** | *diesel* | *diesel* | - |
| **Engine Capacity** | *997.00* | *997.00* | cc |
| **Gearbox type** | *automatic* | *automatic* | - |
| **Turbo engine** | *TRUE* | *TRUE* | - |
| **alternator_model score** | ***4.56*** | | A |
| **at_model score** | ***-0.95*** | | - |
| **clutch_torque_converter_model score** | ***4.71*** | | RPM |
| **co2_params score** | ***0.00*** | | CO2g/s |
| **engine_cold_start_speed_model score** | ***18.74*** | | RPM |
| **engine_coolant_temperature_model score** | ***0.51*** | | ° C |
| **engine_speed_model score** | ***0.02*** | ***91.36*** | RPM |
| **start_stop_model score** | ***-0.99*** | | - |
| **CO2MPAS deviation** | ***-4.14*** | | % |

CO2MPAS

European Commission