

# VECTO 2.2

22.07.2015



## Release Notes

# VECTO 2.2

## Main updates

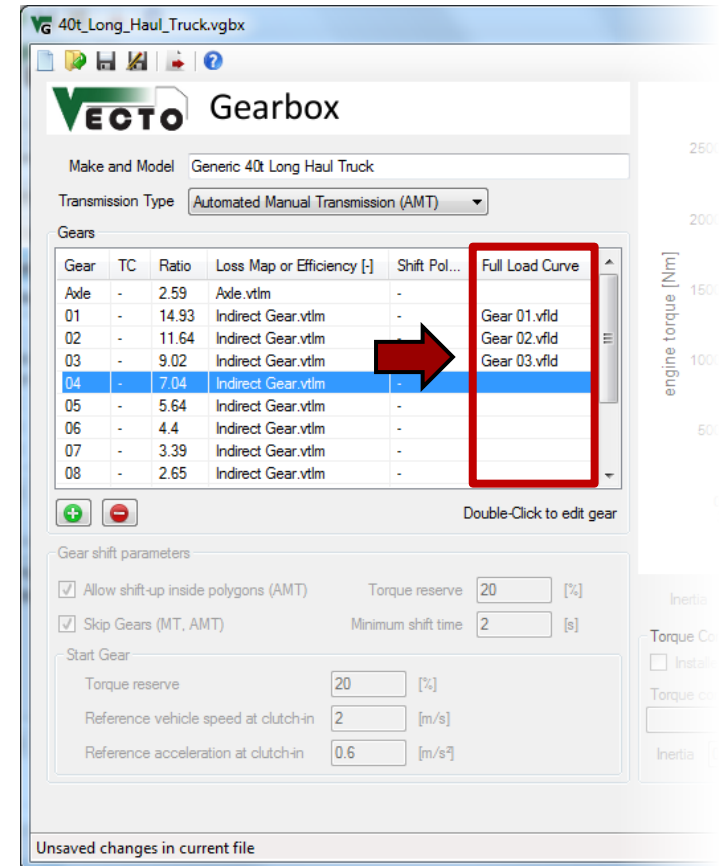
- Moved gear-specific Full Load Curves to Gearbox File
- Combined Drag Coefficient \* Cross Sectional Area in one input parameter
- Removed WHTC Correction Factor Calculation.
- Added link to CITnet / JIRA

# Gear-specific Full Load Curves

Gear-specific Full Load Curves are now defined in the Gearbox File

- Used for torque limiting
- Basis for generic shift polygons\*
- If no file is defined, the engine full load curve is used.

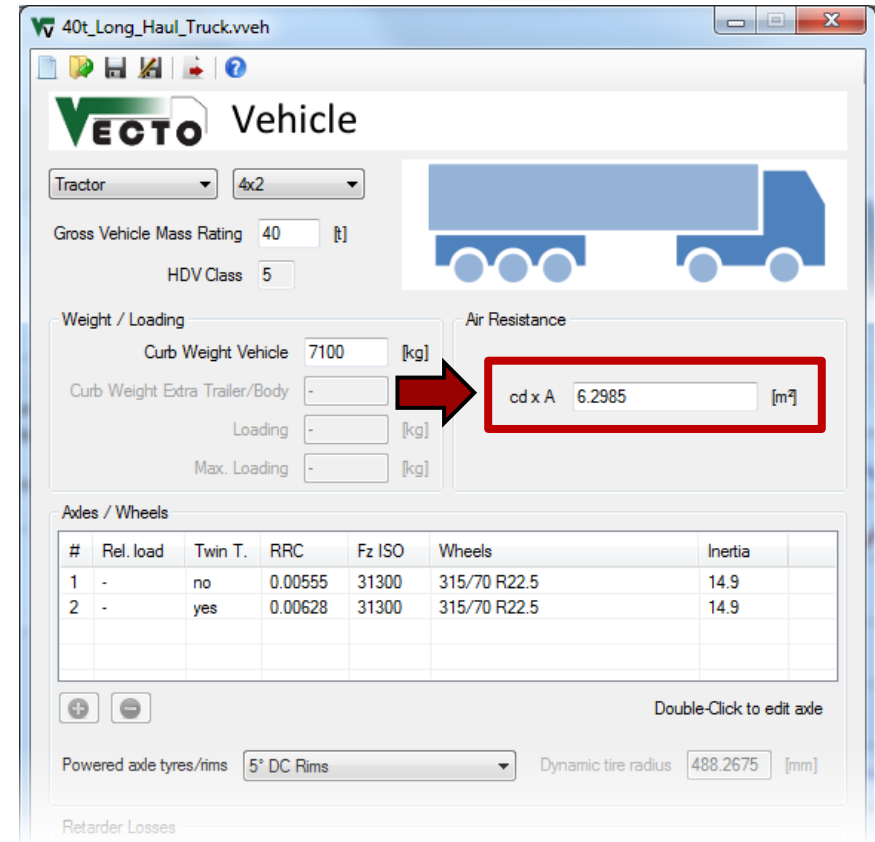
\* If the engine full load torque is lower than the gear full load, then the engine full load is used to prevent unreasonable shifting with small engines.



# Combined Drag Coefficient \* Cross Sectional Area

VECTO now uses the  $c_d x A$  product instead of separating the two parameters

- VECTO CSE exports the  $c_d x A$  product, which can now be inserted into VECTO without separating.
- Old .vveh files are compatible.



40t\_Long\_Haul\_Truck.vveh

**VECTO Vehicle**

Tractor 4x2

Gross Vehicle Mass Rating 40 [t]

HDV Class 5

**Weight / Loading**

Curb Weight Vehicle 7100 [kg]

Curb Weight Extra Trailer/Body - [kg]

Loading - [kg]

Max. Loading - [kg]

**Air Resistance**

cd x A 6.2985 [m²]

**Axes / Wheels**

#	Rel. load	Twin T.	RRC	Fz ISO	Wheels	Inertia
1	-	no	0.00555	31300	315/70 R22.5	14.9
2	-	yes	0.00628	31300	315/70 R22.5	14.9

Powered axle tyres/rims 5" DC Rims

Dynamic tire radius 488.2675 [mm]

Retarder Losses

# Removed WHTC Correction Factor Calculation

The WHTC Correction Factors are now calculated in an external tool, VECTO-Engine and have to be entered in the VECTO Engine file (.veng)

VECTO-Engine (distributed separately)

**VECTO-Engine 1.0**

**Input**

Fuel Map: J:\VECTO-Engine 1.0\Test data\Test.vmap

Full Load and Drag Curve: J:\VECTO-Engine 1.0\Test data\Test.vfld

**Main**

P\_max: 185 [kW]

**Engine Test Speeds**

n\_idle: 600 [1/min]    n\_95h: 2420 [1/min]  
 n\_lo: 1090 [1/min]    n\_hi: 2600 [1/min]  
 n\_pref: 1530 [1/min]

**WHTC Results**

Urban: 230 [g/kWh]  
 Rural: 220 [g/kWh]  
 Motorway: 210 [g/kWh]

**START**

**Output**

Message

Initialising...  
 Starting WHTC Simulation...  
 Calculating Correction Factors...  
 WHTC Results:  
 Urban: 222.0 [g/kWh], Correction Factor = 1.04  
 Rural: 207.0 [g/kWh], Correction Factor = 1.06  
 Motorway: 202.9 [g/kWh], Correction Factor = 1.03  
 Completed. Engine and Map files can now be exported.

**WHTC Correction Factors**

Urban: 1.04    Rural: 1.06    Motorway: 1.03

## Engine Editor

**VE 40t\_Long\_Haul\_Truck.veng**

**VECTO Engine**

Make and Model: Generic 40t Long Haul Truck

Idling Engine Speed: 560 [rpm]    Inertia incl. Flywheel: 5.1471

Displacement: 12730 [ccm]

Full Load and Drag Curve: 40t\_Long\_Haul\_Truck.vfld

Fuel Consumption Map: 40t\_Long\_Haul\_Truck.vmap

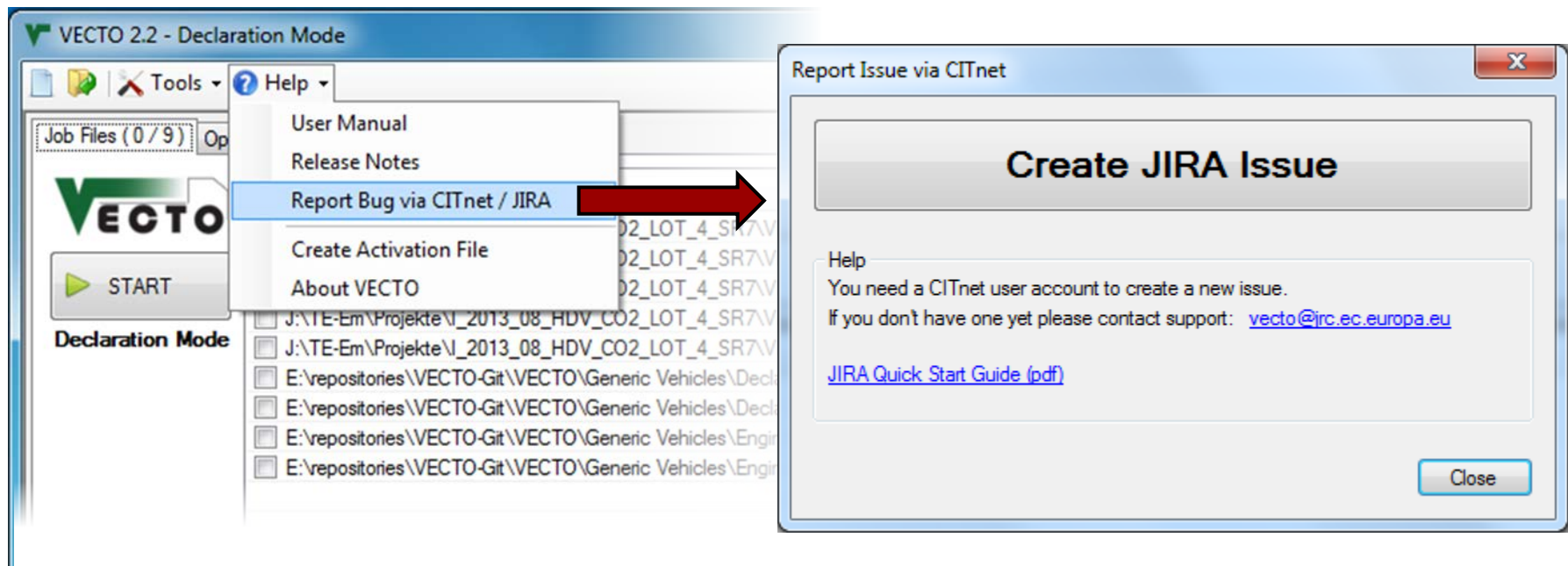
**WHTC Correction**

Correction Factors calculated with VECTO-Engine

Urban: 1.04    Rural: 1.06    Motorway: 1.03

# Create JIRA Issue

Use the button in the Help menu to go to JIRA or open a Quick Start Guide.



# Full Changelog since V2.1.4

## VECTO 2.2

- Bugfix: Error in Declaration Mode Pneumatic System aux power calculation ([kW] were interpreted as [W])
- Bugfix: Error in Declaration Mode Electric System aux power calculation
- Moved gear-specific Full Load Curves to Gearbox File
- Combined Drag Coefficient \* Cross Sectional Area in one input parameter
- Updated .vgbx file format (Added gear-specific Full Load Curves)
- Updated .veng file format (Removed gear-specific Full Load Curves)
- Updated .vveh file format (Combined Drag Coefficient \* Cross Sectional Area in one parameter)
- Updated Generic Vehicles (new file formats)
- Removed WHTC Correction Factor Calculation. Now in external tool, VECTO-Engine.
- Test Options are now only available in Engineering Mode
- Gearbox Editor now shows generic and user-defined shift polygons (if available)
- Various small updates in GUI
- Added 'Create JIRA Issue' dialog

For full changelog see VECTO Main Form > Help > User Manual or [CITnet](#).

# Full Changelog since V2.1

## VECTO 2.1.4

- Bugfixes in start gear and (A)MT shift model
- Updated Coach .vcdv file for higher speeds to avoid extrapolation
- Renamed output "FC" to "FC-Map" for better clarification
- Same header for g/h and g/km output
- Reduced minimum turbine speed for 1C-to-2C AT up-shift condition from 900 to 700rpm.
- Updated cross wind correction parameters to current White Book values

## VECTO 2.1.3

- PwheelPos output in VSUM file.
- Implemented new  $C_d \cdot A(v)$  method
- Bugfix in TC model
- Bugfix: Unit error in  $C_d(v)$  methods caused incorrect Delta- $C_d$  value being used

## VECTO 2.1.2

- Improved TC iteration for higher precision
- Extended possible TC speed ratio

## VECTO 2.1.1

- Bugfix: Incorrect torque calculation in AT/TC model caused early up-shifts
- Updated C-to-C shift strategy with acc\_min rule (see V2.1)

For full changelog see VECTO Main Form > Help > User Manual or [CITnet](#).



# VECTO 2.1

21.04.2015



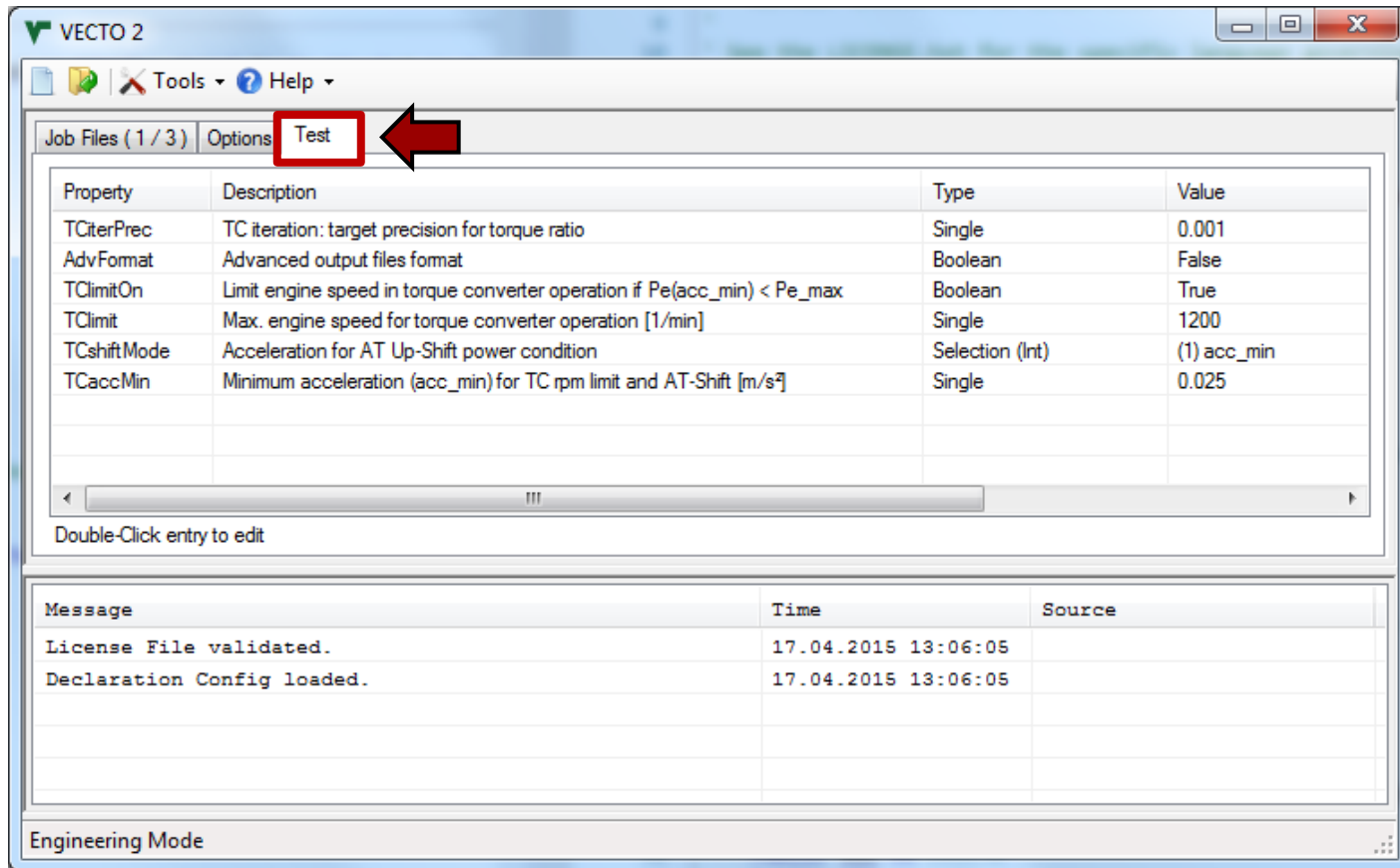
## Release Notes

# VECTO 2.1

- **New AT/TC options:**
  - Limit engine rpm in torque converter operation  $\text{acc.} \geq \text{acc}_{\min}$
  - Shift up (C-to-L, L-to-L) if  $\text{acc.} \geq \text{acc}_{\min}$  and next-gear-rpm > threshold
  - rpm limit [1/min] and  $\text{acc}_{\min}$  [m/s<sup>2</sup>] parameters are currently user-defined
  - C-to-C up-shift condition based on N80h engine speed (instead of N95h)
- **P<sub>wheel</sub> input (SiCo test mode)**
  - P<sub>wheel</sub> as cycle input
  - Overwrites power calculation
  - VECTO only calculates power train losses, engine torque/rpm and fuel consumption

# AT/TC model update

"Test" tab in main form includes new parameters.



*Note: This is a temporary solution until model and parameters are verified!*

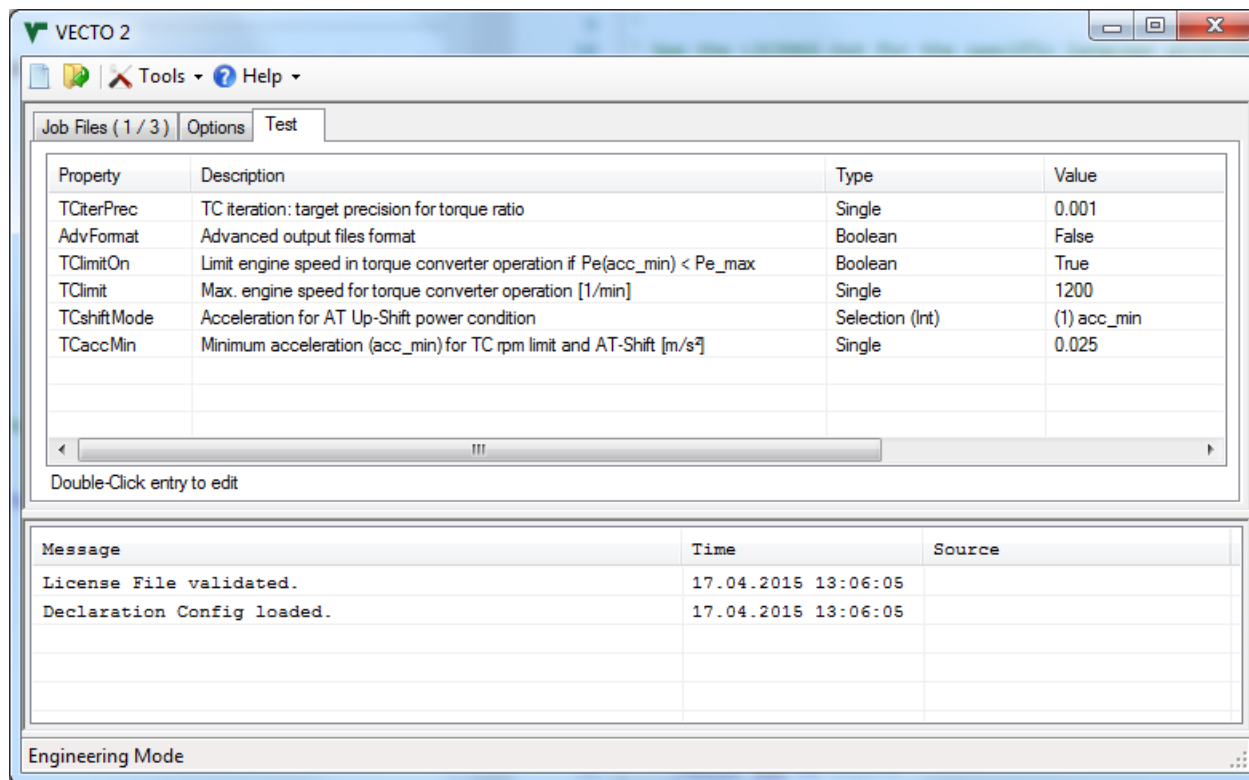
# AT/TC model update

- **New AT/TC paramters:**
  - **TClimitOn (True / False)**
    - Enables engine rpm limit in TC operation
  - **TClimit [1/min]**
    - engine rpm limit (if TClimitOn = True)
  - **TCshiftMode (0/1)**
    - **Mode 0: acc\_target** - Shift up if power demand with target acc. < power-max (pre-V2.1 default)
    - **Mode 1: acc\_min** - Shift up if power demand with min. acc. < power-max
  - **TCaccMin [m/s<sup>2</sup>]**
    - Minimum acceleration for ShiftMode 1 and TClimit

*Note: This is a temporary solution until model and parameters are verified!*

# AT/TC model update

- Change parameters in Test tab by double-click
- Parameters are saved on application level (..\config\DEVconfig.txt)



*Note: This is a temporary solution until model and parameters are verified!*

# **P<sub>wheel</sub> Input (SiCo Mode)**

- **P<sub>wheel</sub>** can be defined in driving cycle to overwrite power calculation
- Requires **Gear** and **Engine Speed** input
- Cycle identifier: <Pwheel>
- Only time-based cycles are supported
- Distance Correction must be disabled (Options tab in main form)

Example driving cycle

<t>	<Pwheel>	<Gear>	<n>
1	0.0	0	560.0
2	0.0	0	560.0
3	14.0	1	593.2
4	51.9	1	705.5
5	60.0	2	690.0
6	85.6	2	868.4
7	92.0	3	820.0
8	112.3	3	897.6
...	...	...	...

# $P_{\text{wheel}}$ Input (SiCo Mode)

- **Constant point calculation**
  - Define (at least) two identical times steps
  - (Optional) Add additional auxiliary power consumption with **<Padd>**
  - It is suggested to define **one cycle per constant point** and use **Batch Mode**

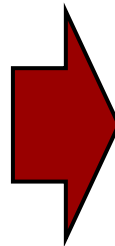
## Example: Calculation of two constant points tests

Cycle 1.vdri

<t>	<Pwheel>	<Gear>	<n>	<Padd>
1	50.0	3	980.0	3.0
2	50.0	3	980.0	3.0

Cycle 2.vdri

<t>	<Pwheel>	<Gear>	<n>	<Padd>
1	160.0	4	1020.0	3.0
2	160.0	4	1020.0	3.0



.vsum results

Cycle [-]	time [s]	Ppos [kW]	Pneg [kW]	FCh [g/h]
Cycle 1.vdri	1	57.4	0	11481.3
Cycle 2.vdri	1	172.0	0	31922.2

# Full Changelog V2.1

- Limit engine rpm in torque converter operation acc. > acc\_min
- Shift up (C-to-L, L-to-L) if acc. > acc\_min and next-gear-rpm > threshold
- C-to-C up-shift condition based on N80h engine speed (instead of N95h)
- Pwheel-Input (SiCo Mode)
- FC [g/h] is always saved in output (in addition to [g/km]), not only in Engine Only mode
- GUI: Corrected air density unit in GUI
- Bugfix: Format error in .vmod header