Works 2013

Mobile Emission

Version 7.0.0

USER GUIDE

www.technologismiki.com

TECHNO logismiki
Advanced Technical Software

5 Imitou str, 15561, Cholargos, Athens, Greece
tel: ++30 210 65 64 147 - fax: ++30 210 65 48 461
www.technologismiki.com - info@technologismiki.com

Mobile Emission

TechnoLogismiki

Mobile Emission

Publisher

TechnoLogismiki

Editors

Fotis Fotopoulos
Aristotelis Charalampakis

Technical Assistance

Antigoni Egglezou

Printed: September 2012 in Athens, Greece.

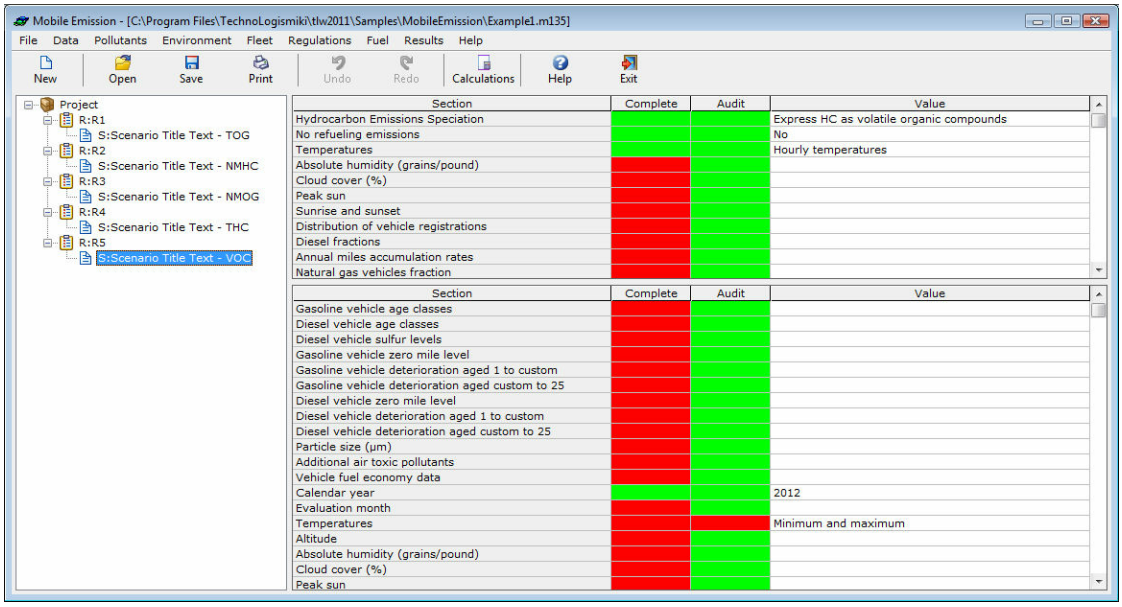
Table of Contents

Chapter

1 About the program

1.1 What does the program do?

This program calculates the emission from various types of vehicles such as trucks, automobiles, motorcycles, buses etc. The calculation is based on data regarding fleet and fuel characteristics, meteorological data and the chosen policy regarding pollution.



The program is capable of handling any number of runs and scenarios. The calculations are based on the well-known Mobile 6.2 model of EPA.

In particular, the program can calculate the concentrations of hydrocarbons, carbon monoxide, nitrogen oxides and carbon dioxide. The following particulates are also calculated: Sulfur oxides (SO_2, SO_4), lead, ammonia, brake-wear, tire-wear etc.
Finally, the following air toxics are calculated: benzene, methyl-tertiary-butyl ether, 1,3 butadiene, formaldehyde, acetaldehyde, acrolein.

NOTE: Due to the complexity of the model, detailed information is provided in the following separate manuals:

C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\UserGuide.pdf
C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\SensitivityAnalysis.pdf
C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\TechnicalGuidance.pdf

1.2 Data input

The following steps must be followed for proper data input:

1. Enter the general data.

2. Add at least one run.
3. Add at least one scenario.
4. The following data are required:
- Year
- Fuel vapor pressure RVP

5. Enter the rest of the data.

Some data may be entered in both runs and a scenarios. The program will attempt to apply the data to the run. If this is not possible, it will attempt to apply the data to the scenario. When no data are found, default values are used.

1.3 Minimum requirements

The minimum requirements for the usage of the programs are the following:

- Windows 2000/ XP/ 2003/ Vista/ 7 (for each case, the latest service packs, updates & patches must be installed)
- Pentium III 800 MHz
- 800x600 with 256 color palette
- 700 MB free disk space
- CD-Rom

If your system does not meet one or more of the above requirements, it is highly recommended that you upgrade it before installing the programs. The recommended system configuration is the following:

- Windows 2000/ XP/ 2003/ Vista/ 7 (for each case, the latest service packs, updates & patches must be installed)
- Pentium IV 2.0 GHz
- 1280x768 with 16-bit color palette
- 1.2 GB free disk space
- CD-Rom
- Internet connection

1.4 Technical support

Support through the Internet

TechnoLogismiki offers technical support 24 hours per day, 365 days per year, through the web site where you can get information on the latest programs and services.

Support by e-mail

Please use the dedicated e-mail addresses for better customer service:

- for questions regarding sales: sales@technologismiki.com
- for questions regarding the usage of programs: support@technologismiki.com
- for any other question or comment: info@technologismiki.com

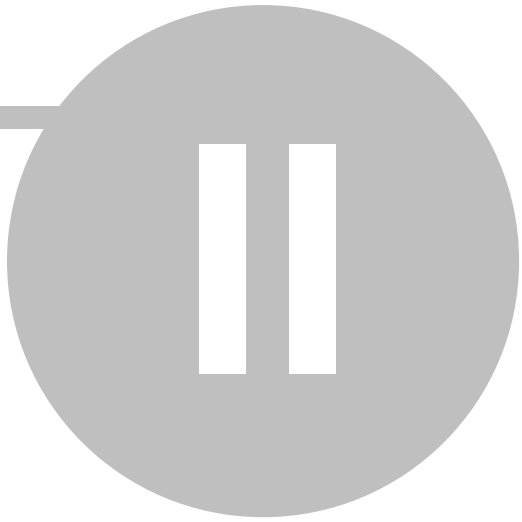
The normal response time is within two business days. If your inquiry cannot be answered by e-mail, a customer service representative will contact you by telephone.

Interactive Support

Business days, 09:00 - 17:00 Eastern European Time:

- Telephone [3 lines]: ++30-210-656-4147
- Fax: ++30-210-654-8461
- Address: 5, Imittou street, Cholargos, 15561, Athens, Greece.

Chapter



2 File

2.1 File menu

With this menu, you can perform file operations and print reports. In the **File** menu you can select one of the following options:

- New Project
- Open Project
- Save Project
- Save Project As
- Import
  - Mobile 6.x Input File
  - Mobile 5.x Input File
- Export
  - Mobile 6.2 Input File
- Print Setup
- Print
- Print To
  - Print to File
  - Print to Word
  - Print to Word (Formatted)
  - Print to Excel
- Exit

2.2 New Project

With this option, a new project is started. All data, results, graphs, titles etc. of the previous project are erased.

To create a new project:

1. Select **New project** from the **File** menu.
2. If a project is already loaded and changes have been made, a warning message will appear that asks the user whether to save the changes or not.
3. The current project is erased and a new project is started.

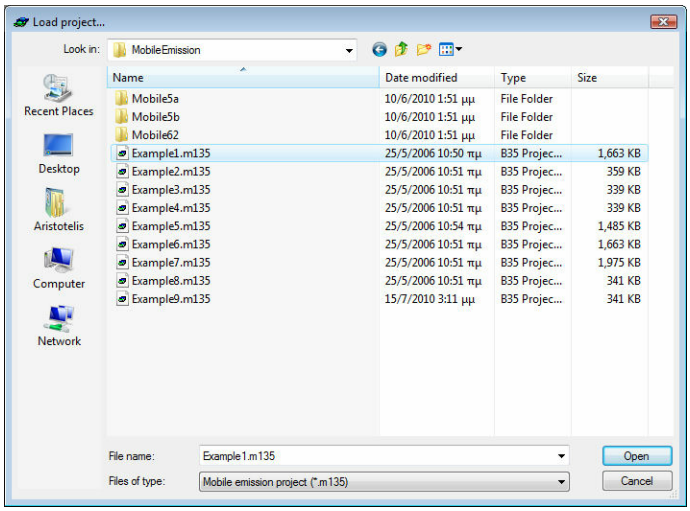
2.3 Open Project

With this option, an existing project is loaded. The project may be located locally, in a network or in an external media device such as a CD-Rom. If a project is already loaded and changes have been made, a warning message will appear that asks whether to save the changes or not. When a project is loaded, all data of the previous project are lost.

To open an existing project:

1. Select **Open project** from the **File** menu.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Mobile Emission project" with the extension .m35.
4. Select the file by clicking on it.

5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



NOTE: You can find sample projects in the installation folder of the program: C:\Program Files\TechnoLogismiki\TLW20132\Samples\MobileEmission

Supported file types

- **M35** (Mobile Emission project): Files created by version 2012 and 2013 of Mobile Emission.
- **M135** (Mobile Emission project): Files created by versions 2011, 2010, 2009, 2008 or 2007 of Mobile Emission.
- **BCK** (Backup files): If you have selected from program options the creation of backup copy when a file is loaded, then the file can be loaded by selecting Backup files (*.bck) from the Files of type drop-down list.
- ***.*** (All files): Displays all files in the current folder.

NOTE: If a message "Could not load project. File may be corrupt or saved by an unknown or incompatible version of the program" then either you are trying to load a project that does not belong to this program or the file is used (and locked) by another process in your computer.

2.4 Save Project

With this option, you can save all data of a project into a file. The file may be saved locally, in a network location or in an external media device such as a disk.

The filename and path will be asked only the first time you are saving a project. When the filename and path are set, all subsequent saves will be made to the same file.

When you want to rename a file or save it in a new location, use Save project as... from the **File** menu.

To save the current project:

1. Select **Save project** from the **File** menu.
2. If the location of the file is already set, the project is saved to this file without any messages. If the filename is not set, a dialog box will appear that allows the selection

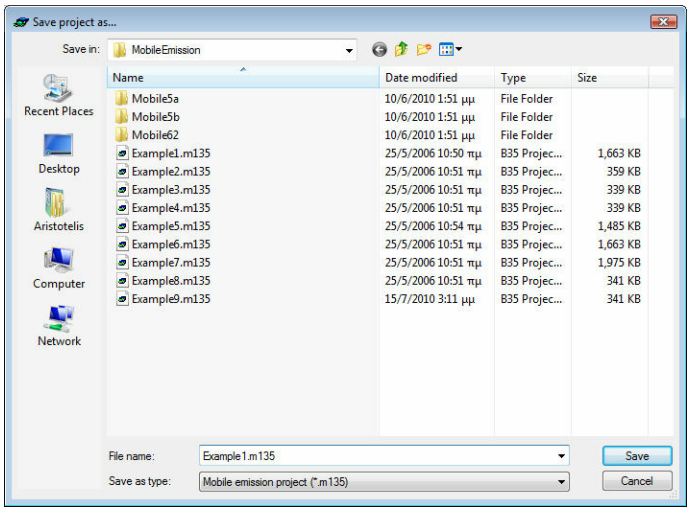
of the filename and path.

2.5 Save Project As

With this option, the current project is saved just as in the case of Save project, but with the difference that the name and/or location of the file can be changed. In this way, you can create backup files or move a project to another media device.

To save a project with another name and/or to another location:

1. Select **Save project as** from the **File** menu.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the project with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: If a file with the same name and in the same path already exists, a warning message will appear that asks whether to overwrite the file or not. If you answer Yes, then the existing file is erased and the new file takes its place. If you answer No, the existing file remains intact but NO changes of the current project are saved.

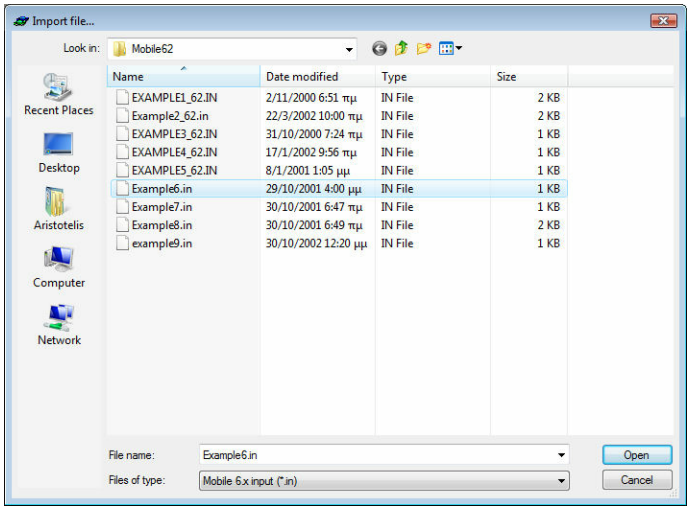
2.6 Import

2.6.1 Mobile 6.x Input File

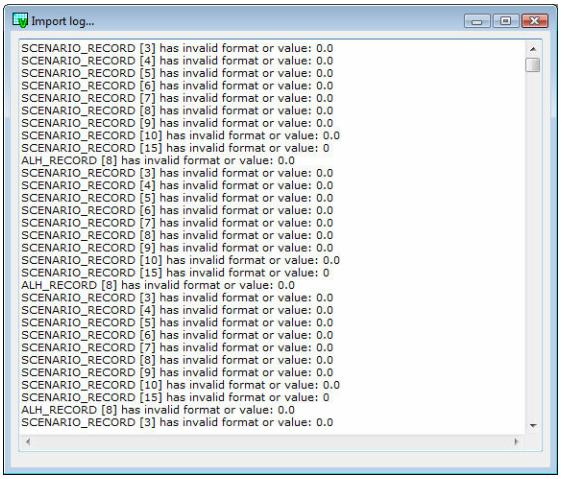
With this option, you can import data from an input file created for Mobile 6.0, 6.1, or 6.2 model. Any existing data will be overwritten.

To import data from an input file created for Mobile 6.0, 6.1, or 6.2 model:

1. Select **Import** from the **File** menu.
2. Select **Mobile 6.x Input File** from the **Import** menu. The following form appears:



3. Select the path of the file.
4. Select the file type from the **Files of type** drop-down list. The default option is "Mobile 5.x Input File" with the extension .in.
5. Select the file by clicking on it.
6. Select **Open** to open and analyze the file. If one or more problems or warnings occur during import, a form containing detailed information appears:

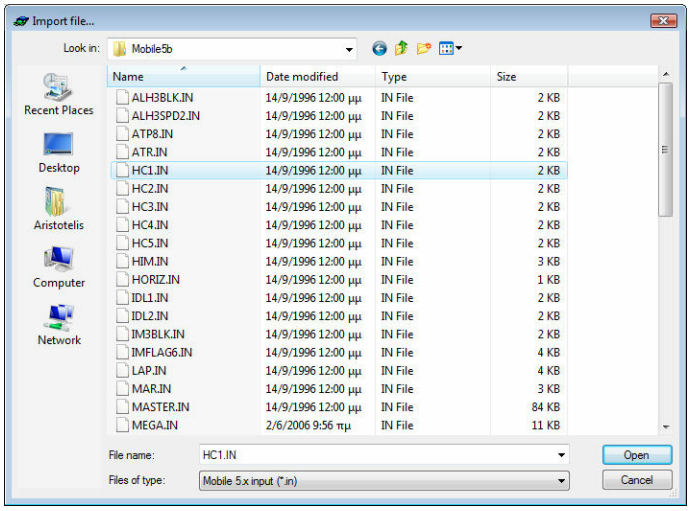


2.6.2 Mobile 5x Input File

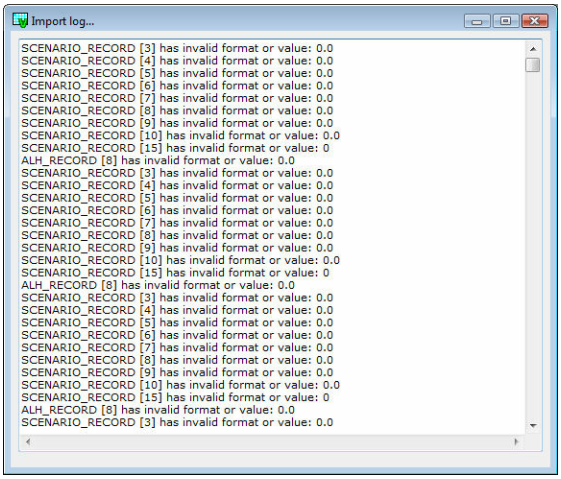
With this option, you can import data from an input file created for Mobile 5.0 model. Any existing data will be overwritten. All compatible data are transferred to the Mobile 6.2 format; any incompatible data are ignored.

To import data from an input file created for Mobile 5.0 model:

1. Select **Import** from the **File** menu.
2. Select **Mobile 5.x Input File** from the **Import** menu. The following form appears:



3. Select the path of the file.
4. Select the file type from the **Files of type** drop-down list. The default option is "Mobile 5.x Input File" with the extension .in.
5. Select the file by clicking on it.
6. Select **Open** to open and analyze the file. If one or more problems or warnings occur during import, a form containing detailed information appears:



NOTE: The direct use of Mobile 5.0 projects is not recommended, as the latest model (6.2) is far more sophisticated and improved.

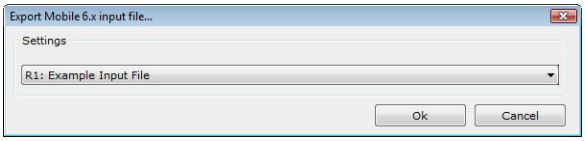
2.7 Export

2.7.1 Mobile 6.2 Input File

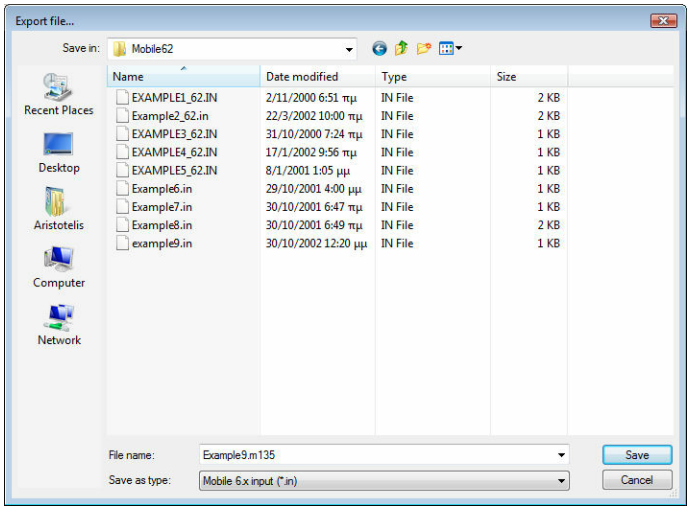
With this option, you can create a file that can be used by Mobile 6.2.

To create a file that can be used by Mobile 6.2:

1. Select **Export** from the **File** menu.
2. Select **Mobile 6.2 Input File** from the **Export** menu. The following form appears:



4. Select **Ok** to proceed with the export. Select **Cancel** to cancel the operation.
5. The file selection form appears:



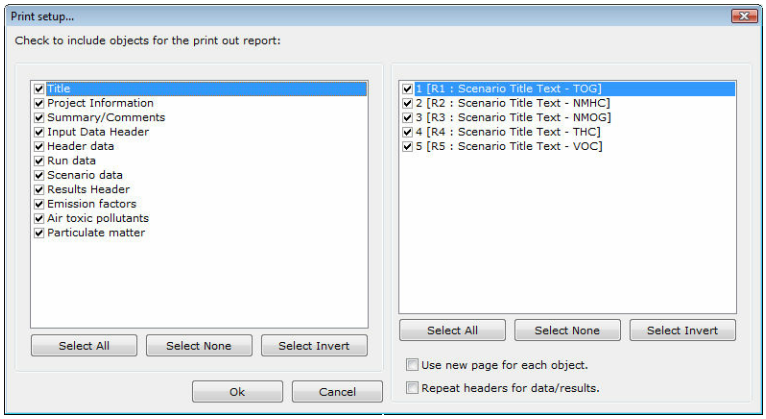
6. Select the path of the file.
7. Type the filename in the **File name** text box.
8. Select **Save** to create the file. Select **Cancel** to cancel the operation.

2.8 Print setup

With this option, you can select which parts of the project will be included in the printouts. When a new project is created, a full report is selected by default.

To modify the print setup:

1. Select **Print setup** from the **File** menu.
2. Select the **sections** (Title, Project information etc) that will be printed for each solution, from the list on the left.
3. Select the **solutions** that will be included in the report from the list on the right.
4. Check **Use new page for each object** if you want to use a new page for each solution in the report.
5. Check **Repeat headers for data/results** if you want to repeat the headers when large tables span multiple pages.
6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



The quick keys (**Select all, Select None, Select Invert**) can be used to quickly select all objects, deselect all objects and invert the current selection of a list.

NOTE: The changes are saved with the project. The above preferences are used to all printouts, either to the printer or to other formats such as Word file, Excel file etc.

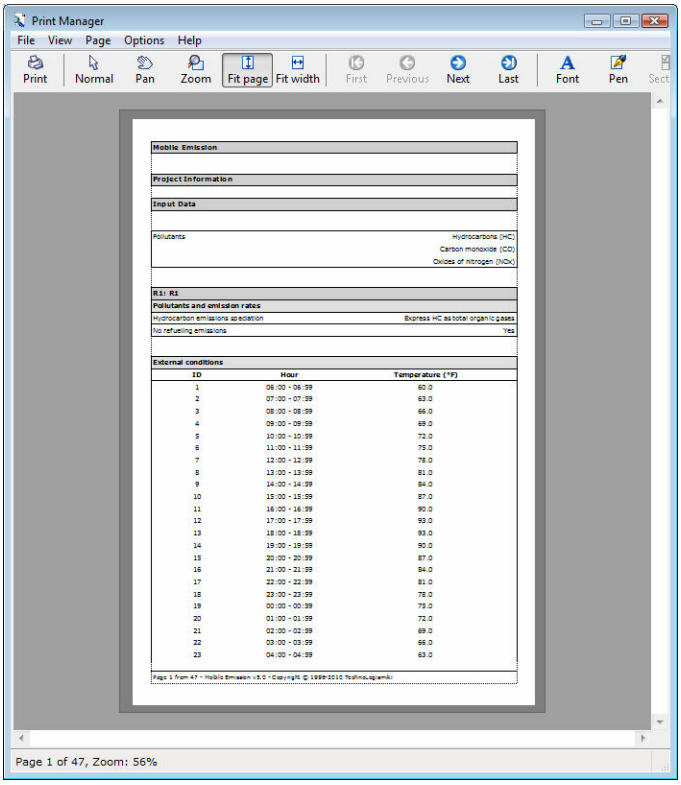
2.9 Print

With this option, you can prepare a report to be printed to a local, network or virtual printer such as Adobe PDF Writer. The parts of the project that will be included in the report are determined from print setup.

By selecting **Print**, the report is not printed directly; instead, a document is prepared and a preview of the printout is created by the **Print manager.** You can print the report by clicking the **Print** button of the toolbar of **Print manager.**

To create a report:

1. Select **Print** from the **File** menu.
2. A report is prepared and sent to **Print manager.** A preview of the document appears.
3. You can print the report by clicking the **Print** button of the toolbar.



NOTE: A complete user manual on the capabilities of **Print manager** can be found in the corresponding help file.

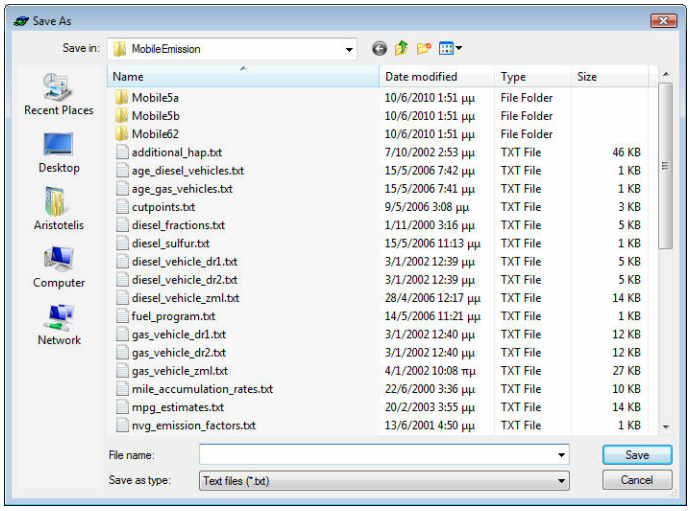
2.10 Print to

2.10.1 Print to File

With this option, you can create a simple text file containing a report of the project. This file is recognized and can be further modified by word processors such as Microsoft Word, OpenOffice Writer etc.

To print to a text file:

1. Select **Print to** from the **File** menu.
2. Select **Print to file** from the **Print to** menu.
3. Select the path of the file.
4. Type the filename in the **File name** text box.
5. Select **Save** to create the file.



The parts of the project that will be included in the report are determined from print setup.

NOTE: If a file with the same name and in the same path already exists, a warning message will appear that asks whether to overwrite the file or not. If you answer Yes, then the existing file is erased and the new file takes its place. If you answer No, the existing file remains intact but the report is NOT printed.

2.10.2 Print to Word

If Microsoft Word (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Word file containing the report can be created. Note that Microsoft Word is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Word.

To print the report to a Microsoft Word file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Word** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print setup.

2.10.3 Print to Word (Formatted)

If Microsoft Word (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Word file containing the report can be created. Note that Microsoft Word is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Word.

To print the report to a formatted Microsoft Word file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Word (Formatted)** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print

setup. This operation is much slower than the regular print to word function. However, the final output requires minimal user intervention as it comes fully formatted with tables, alignment, font styles, etc.

NOTE: Do not use Copy (CTRL+C) on any of the programs running during this operation. If you do so, it will most likely affect the communication between Microsoft Word and the clipboard and as a result the final document will be corrupt.

2.10.4 Print to Excel

If Microsoft Excel (version 97, 2000, XP, 2003 or later) has been installed in the system, then a Microsoft Excel file containing the report can be created. Note that Microsoft Excel is a separate program and it is not included in TechnoLogismiki's products. Moreover, no technical support is offered regarding the usage of Microsoft Excel.

To print the report to a Microsoft Excel file:

1. Select **Print to** from the **File** menu.
2. Select **Print to Excel** from the **Print to** menu.

The parts of the project that will be included in the report are determined from print setup.

2.11 Exit

With this option, you can exit the program. If there are changes in the current project that have not been saved then the program will:

- either ask the user to save the changes
- or save the changes
- or ignore the changes

depending on what you have selected in General preferences.

To exit the program:

1. Select **Exit** from **File** menu.
2. If you are asked whether to save the changes or not, you can save changes or ignore them.
3. The program is terminated.

Chapter

3 Data

3.1 Data menu

With this menu, you can add and modify data. In the **Data** menu you can select one of the following options:

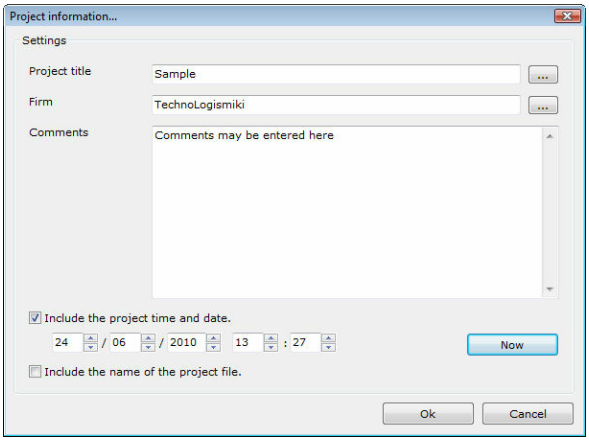
- Project Info
- Undo
- Redo
- Project Properties
- Add Run
- Delete Run
- Change Run
- Add Scenario
- Delete Scenario
- Change Scenario
- Units
  - Metric System
  - English
- Options
  - General Preferences
  - Grid Editing
  - Customize Toolbar

3.2 Project Info

With this option, you can add project information that include, optionally, title, author and comments. If you want, this information can be included in the reports. The empty fields are ignored.

To add or modify the project information:

1. Select **Project info** from the **Data** menu.
2. Type the project title, author and comments.
3. Check **Include project time and date** if you want to include the time and date in the project.
3.1. Type the day, month, year, hours and minutes in the corresponding text boxes. Alternatively, you may click on the up/down arrows to increase or decrease the respective value in the text box.
3.2. If you click on **Now** then all text boxes are filled with the current values automatically.
4. Check **Include the name of the project file** if you want the full path and filename of the project to be included in the report.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



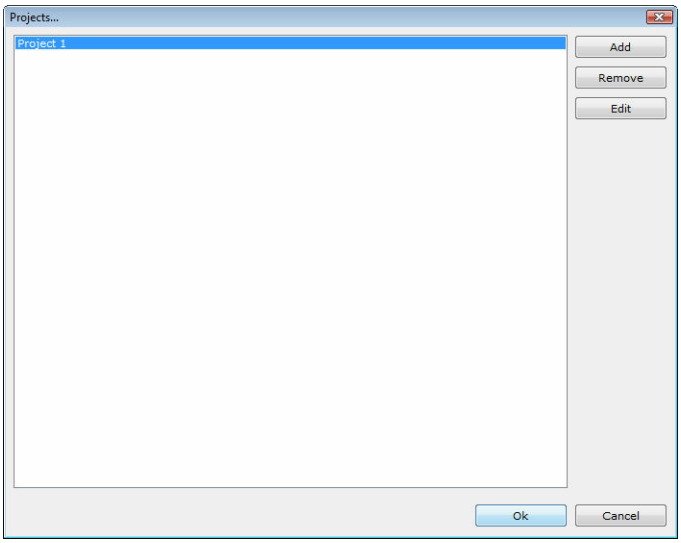
By selecting the buttons with the ellipses (...) next to the project title and author, you can access the corresponding databases.

Project title database

For the completion of a project, more than one programs may be needed. For convenience, you can add the project title to the database and retrieve it from all programs.

To use the project title database:

1. Select the button with the ellipses (...) next to the project title text box. The project title database appears.
2. Select **Add** to add a new title to the database.
3. Select **Remove** to remove the selected entry from the database. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
4. Select **Edit** to modify the selected entry.
5. Select **Ok** to use the currently selected project title and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

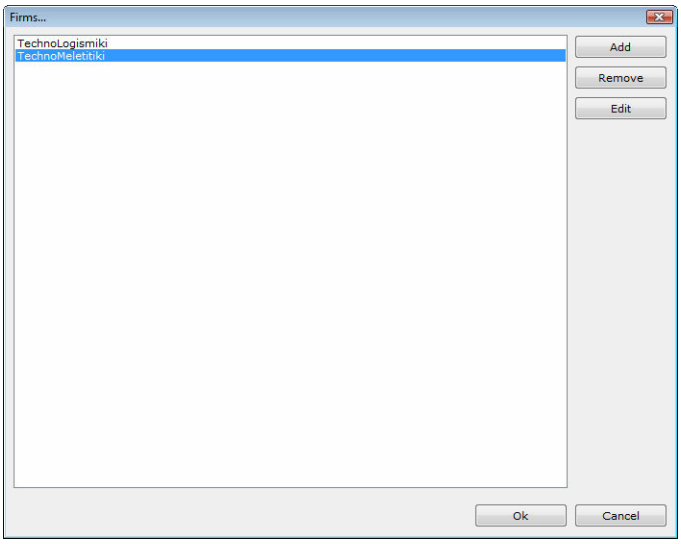


Author database

An engineer may be involved in multiple projects. For convenience, you can add the author name to the database and retrieve it from all programs.

To use the author database:

1. Select the button with the ellipses (...) next to the author text box. The author database appears.
2. Select **Add** to add a new author to the database.
3. Select **Remove** to remove the selected entry from the database. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
4. Select **Edit** to modify the selected entry.
5. Select **Ok** to use the currently selected author and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



3.3 Undo

Undo cancels the last committed change in the project.

To cancel the last committed change:

1. Select **Undo** from the **Data** menu.
2. The last committed change is canceled.

To cancel an undo command, you may use the redo function which is described below. Redo becomes available once undo is used.

It is possible to undo more than one recent changes and to redo them, by following the step described above. The number of actions that are kept in memory and may be undone or redone is 20 by default. This means that the program is able to keep track of up to 20 successive changes and undo them. This number may change for all programs, using the option in the main menu. For more information, please consult main menu user guide.

NOTE: Some changes cannot be undone like the new project or the save project

functions.

3.4 Redo

Redo cancels the latest undo command.

To redo the latest change that was undone:

1. Select **Redo** from the **Data** menu.
2. The latest undone change is redone.

To undo a redo, you may use the undo command.

It is possible to redo more than one changes that were previously undone by following the steps described above. The number of actions that are kept in memory and may be undone or redone is 20 by default. This means that the program is able to keep track of up to 20 successive changes that are undone and redo them. This number may change for all programs, using the option in the main menu. For more information, please consult main menu user guide.

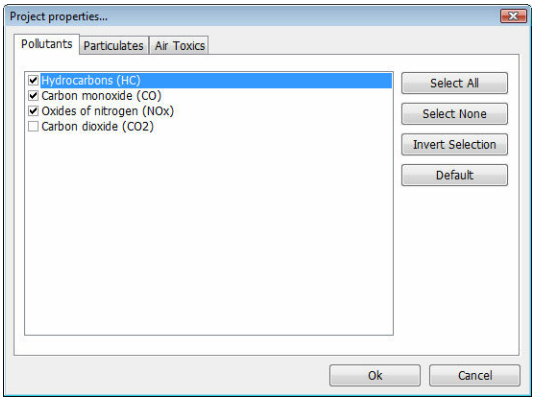
3.5 Project Properties

With this option, you can modify the properties of the project.

To modify the properties of the project:

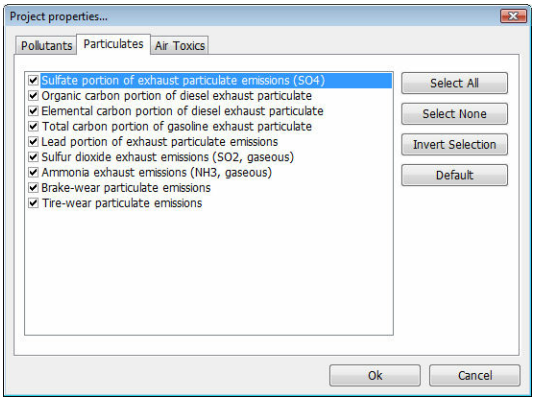
1. Select **Project Properties** from the **Data** menu. The project properties form appears.

In the Pollutants Tab:



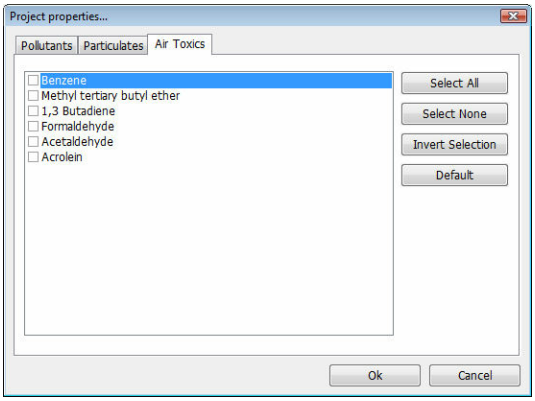
2. Select the pollutants that will be taken into account. The quick keys (**Select all, Select None, Select Invert**) can be used to quickly select all objects, deselect all objects and invert the current selection. Select **Default** to restore the default selection.

In the Particulates Tab:



2. Select the particulates that will be taken into account. The quick keys (**Select all, Select None, Select Invert**) can be used to quickly select all objects, deselect all objects and invert the current selection. Select **Default** to restore the default selection.

In the Air Toxics Tab:



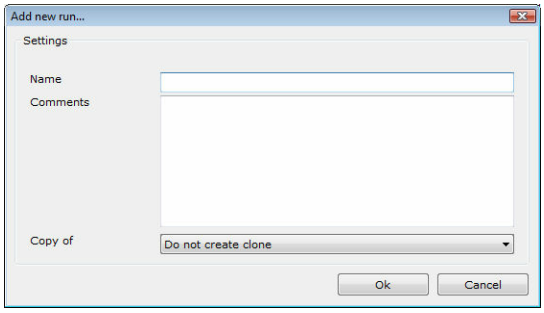
3. Select the air toxics that will be taken into account. The quick keys (**Select all, Select None, Select Invert**) can be used to quickly select all objects, deselect all objects and invert the current selection. Select **Default** to restore the default selection.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

3.6 Add Run

With this option, you can add a run to the project. Optionally, this can be a copy of another existing run.

To add a run to the project:

1. Select **Add Run** from the **Data** menu. The following form appears:



2. Enter a unique **name** for the run.
3. Optionally, enter **comments.**
4. If you wish to create a copy of an existing run, select it from the drop-down list.
5. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.7 Delete Run

With this option, you can delete an existing run from the project.

To delete an existing run from the project:

1. Select the run to be deleted from the list in the main form.
2. Select **Delete Run** from the **Data** menu. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
3. Select **Yes** to proceed with the deletion. Select **No** to cancel the operation.

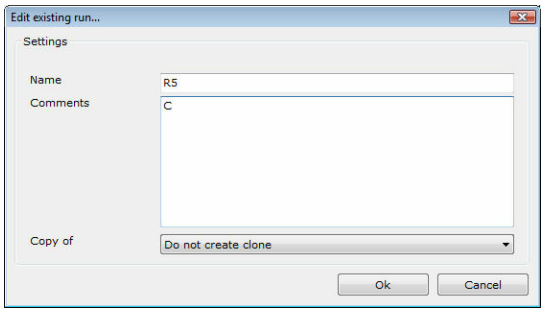
NOTE: If a run contains one or more scenarios, these are deleted as well.

3.8 Change Run

With this option, you can modify the contents of an existing run.

To modify the contents of an existing run:

1. Select the run to be modified from the list in the main form:
2. Select **Change Run** from the **Data** menu. The following form appears:



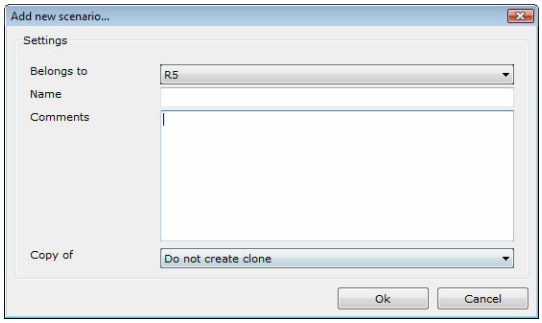
3. Make the appropriate modifications.
4. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.9 Add Scenario

With this option, you can add a scenario to a run. Optionally, this can be a copy of another existing scenario, either of the same run or of another.

To add a scenario to a run:

1. Select **Add Scenario** from the **Data** menu. The following form appears:



2. Select the run to which the new scenario belongs using the drop-down list.
3. Enter a **name** for the scenario.
4. Optionally, enter **comments.**
5. If you wish to create a copy of an existing scenario, select it from the drop-down list.
6. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

NOTE:
- A run may contain one or many scenarios.
- A scenario always belongs to a run. You cannot add a scenario if there is no run defined.

3.10 Delete Scenario

With this option, you can delete an existing scenario from a run.

To delete an existing scenario from a :

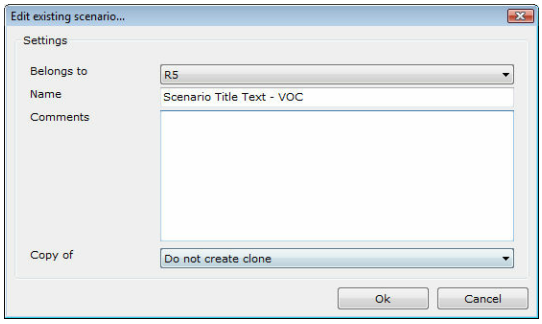
1. Select the scenario to be deleted from the list in the main form.
2. Select **Delete Scenario** from the **Data** menu. You will be asked for confirmation only if you have selected to confirm deletions in the General preferences tab.
3. Select **Yes** to proceed with the deletion. Select **No** to cancel the operation.

3.11 Change Scenario

With this option, you can modify the contents of an existing scenario.

To modify the contents of an existing scenario:

1. Select the scenario to be modified from the list in the main form:
2. Select **Change Scenario** from the **Data** menu. The following form appears:



3. Make the appropriate modifications.
4. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.12 Units

3.12.1 Metric System

With this option, the metric unit system is used for both the input data and the results.

To use the metric unit system:

1. Select **Units** from the **Data** menu.
2. Select **Metric System** from the **Units** menu. The metric unit system is used.

3.12.2 English

With this option, the English unit system is used for both the input data and the results.

To use the English unit system:

1. Select **Units** from the **Data** menu.
2. Select **English** from the **Units** menu. The English unit system is used.

3.13 Options

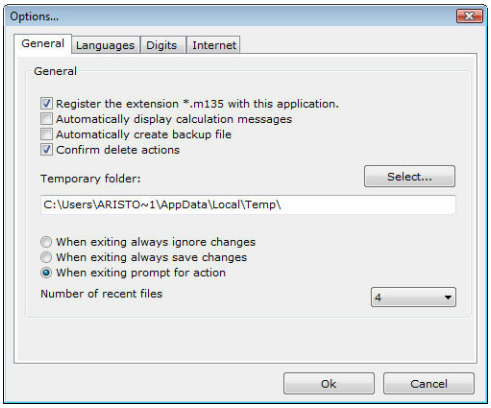
3.13.1 General preferences

With this option, you can modify the general preferences of the program.

To modify the general preferences:

1. Select **Options** from the **Data** menu.
2. Select **General preferences** from the **Options** menu.
3. The general preferences dialog box appears. The preferences are grouped into four tabs. You can select a tab by clicking on its name.

General Tab



This tab contains general preferences regarding the usage of the program.

Check **Register the extension *.m35 with this application** to associate the extension .m35 with this program. This extension is used by the program when saving a project. In this way, you will be able to run the program and load a project by double-clicking on the project filename in Windows Explorer.

Check **Automatically display calculation messages** if you want the report details to be automatically displayed when you calculate the results.

Check **Automatically create backup file** if you want a backup file (with the extension .bck) to be created every time a project is loaded. By default, this file is created in the temporary folder of Windows.

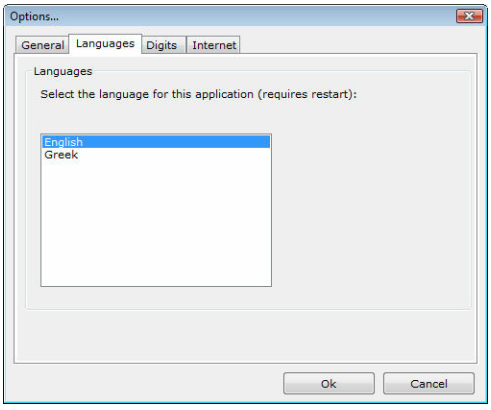
Check **Confirm delete actions** if you want to be asked for confirmation each time an object is about to be deleted. This setting affects the behaviour of all delete actions, for example the deletion of an object.

You can also modify the temporary folder that will be used for the creation of backup files. By default, this folder is the temporary folder of Windows.

Finally, there are three options regarding the termination of the program:

- **When exiting always ignore changes** - All changes since the last save of the project are ignored.
- **When exiting always save changes** - All changes in the current project are automatically saved. If the filename of the project is not set, a dialog box will appear that allows the selection of the filename, as when selecting Save project as from the **File** menu.
- **When exiting prompt for action** - If there are changes in the current project, then a dialog box will appear. You can choose to save or ignore the changes. If the filename of the project is not set, a dialog box will appear that allows the selection of the filename, as when selecting Save project as from the **File** menu.

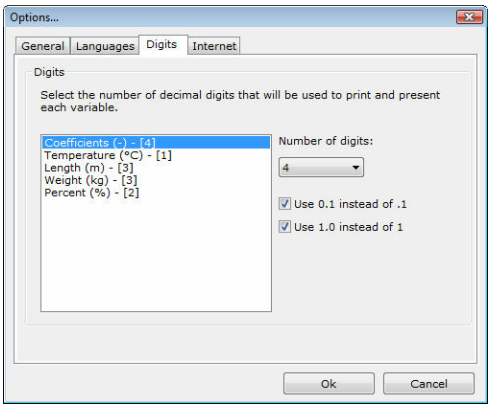
Languages Tab



If more than one language packs have been installed, then you can choose the language of the program. In the above case, there are two language packs; English (that are already selected) and Greek. If you change the language, all forms, menus, messages, help files will reflect the chosen language.

In order for the changes to take effect, you must restart the program.

Digits Tab



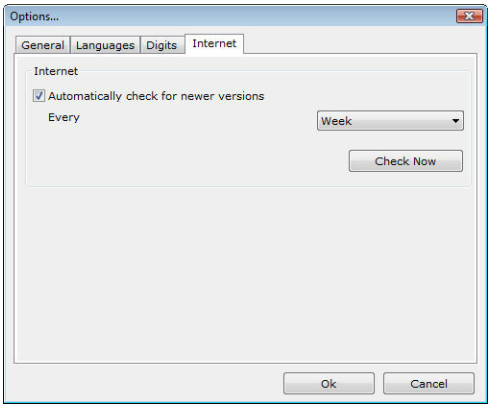
With this tab, you can modify the way the results are presented. All values used in the program are displayed in the list on the left.

For each value, you can select the number of decimal digits using the **Number of digits** drop-down list.

Check **Use 0.1 instead of .1** to use a preceding zero when displaying numbers between -1 and 1, for example -0.08 instead of -.08 and 0.98 instead of .98.

Check **Use 1.0 instead of 1** to use trailing zeros (when necessary) in order to display a number with the decimal digits selected in the **Number of digits** drop-down list, for example 1.1600 instead of 1.16 (when the number of digits is set to 4).

Internet Tab



The program can automatically check for newer versions over the Internet. Check **Automatically check for newer versions** to enable this feature. The check is automatically performed at an interval specified in the **Every** drop-down list. Select **Check now** to manually check for newer versions.

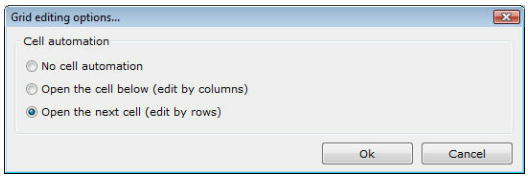
When a newer version is found, you will be prompted to download and install the latest version.

NOTE: TechnoLogismiki protects your privacy. During the check for newer versions, no data is transferred from your computer to the Internet.

Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.13.2 Grid editiing

With this option, you can modify the behavior of grids.



The behaviour of all editable grids is controlled by the preferences in this dialog box.

Select **No cell automation** if you want the active cell to remain the same when hitting ENTER.

Select **Open the cell below (edit by columns)** if you want to activate the cell below when hitting ENTER. This is particularly useful when editing tables by columns.

Select **Open the next cell (edit by rows)** if you want to activate the next cell on the right when hitting ENTER. This is particularly useful when editing tables by rows.

In some cases, the program may automatically fill some missing values (for example, when performing linear interpolation). In this case, you can select a distinctive color in order to recognize these values. You can choose the color by clicking on the button in the **Auto-complete settings** frame.

NOTE: These preferences affect all projects, old and new.

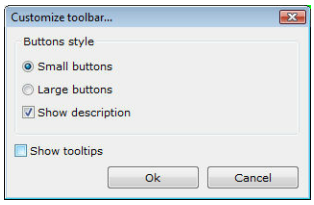
Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.

3.13.3 Customize toolbar

With this option, you can customize the toolbar of the main form.

To customize the toolbar of the main form:

1. Select **Options** from the **Data** menu.
2. Select **Customize toolbar** from the **Options** menu.
3. Make the appropriate changes.
4. Select **Ok** to apply the changes and close the dialog box. Select **Cancel** to close the dialog box without applying any changes.



The toolbar may contain small or large buttons.

Check **Show description** if you want a small description to be displayed under the buttons.

Check **Show tooltips** if you want tooltips to be displayed when the mouse pointer hovers over a button for 2-3 seconds.

NOTE: These preferences affect all projects, old and new.

Chapter IV

4 Pollutants

4.1 Pollutants menu

This menu is used to enter and manage all data relevant to pollutants. In particular, the following options are offered via this menu:

- Particulate emission factors
  - Gasoline vehicle age classes
  - Gasoline vehicle zero kilometer level
  - Gasoline vehicle deterioration (1-age)
  - Gasoline vehicle deterioration (age-25)
  - Diesel vehicle age classes
  - Diesel vehicle sulfur
  - Diesel vehicle zero kilometer level
  - Diesel vehicle deterioration (1-age)
  - Diesel vehicle deterioration (age-25)
- Particle size limit
- Hydrocarbon emissions speciation
- No refueling emissions
- User defined air toxic pollutants
  - Add air toxic pollutant
  - Delete air toxic pollutant
  - Change air toxic pollutant
  - Clear all records
  - Import from file
  - Export to file
- Fuel economy data

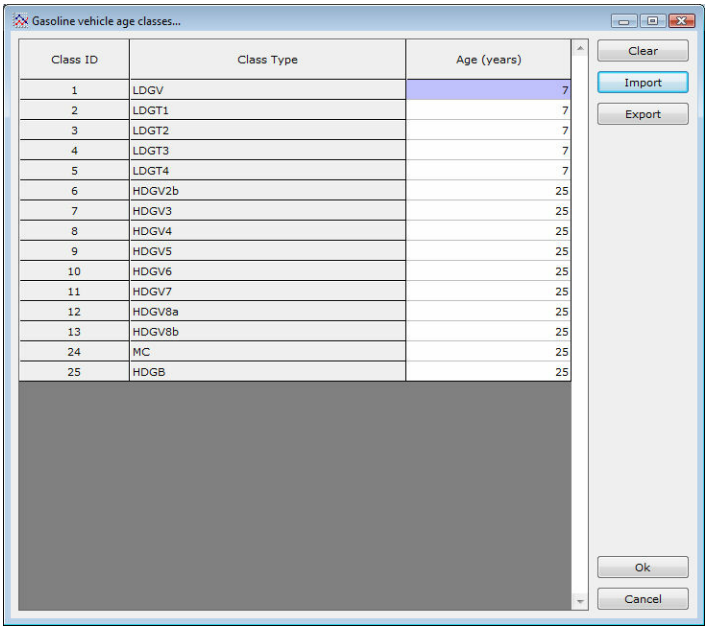
4.2 Particulate emission factors

4.2.1 Gasoline vehicle age classes

For the 15 gasoline vehicles categories, enter the ages (from 1 to 25) that will be used to separate the gasoline vehicle deterioration. For example, if for the LDGV category the value 10 is entered, then the deterioration will be taken into account for vehicles between 1 to 10 years old and 10 to 25 years old. If the age is set equal to 1 or 25, one of the two deterioration categories will be obsolete.

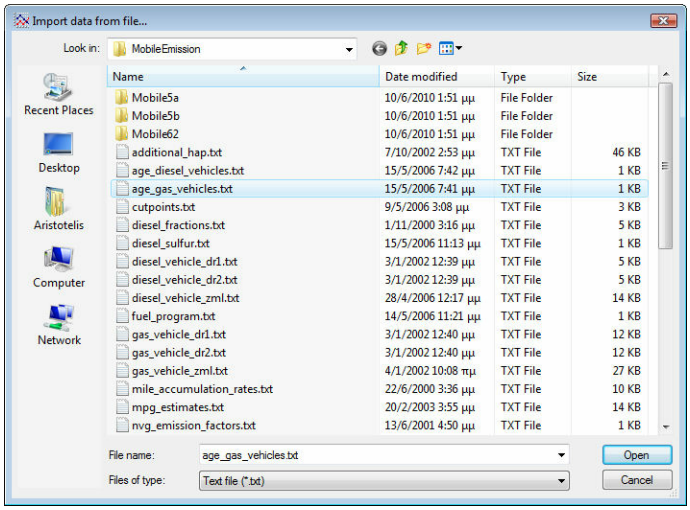
To edit the gasoline vehicle age classes:

1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Gasoline Vehicle Age Classes**.
4. The ages are directly entered in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



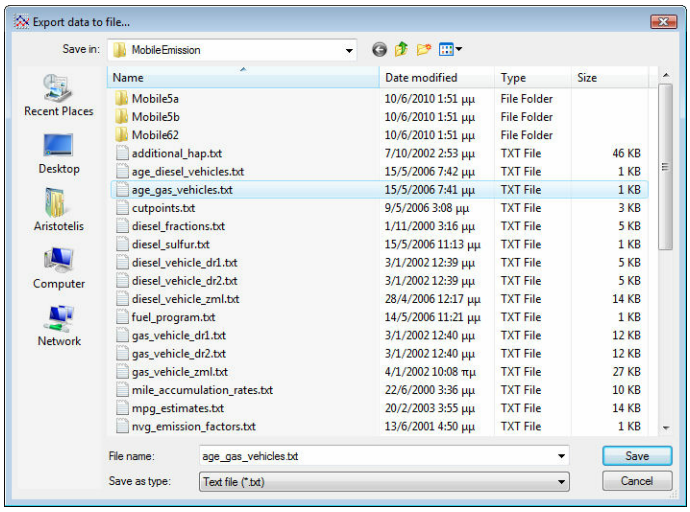
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.2.2 Gasoline vehicle zero kilometer level

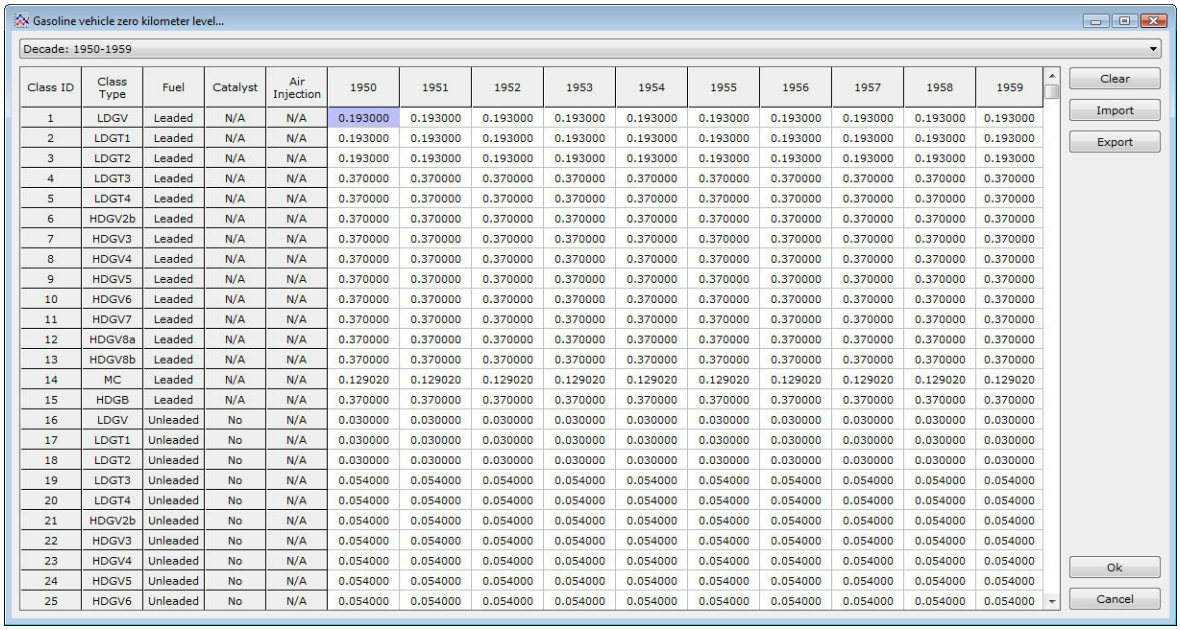
The zero kilometer level (or mile for English units) of gasoline vehicles is the pollutant emission of brand new gasoline vehicles, which are entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units).

For each of the 15 gasoline vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles that operate with:

- Leaded fuel, without catalyst and without air injection
- Unleaded fuel, without catalyst and without air injection (1st generation catalyst vehicles)
- Unleaded fuel, with catalyst, but no air injection
- Unleaded fuel, with catalyst and with air injection

To edit the gasoline vehicle zero kilometer level:

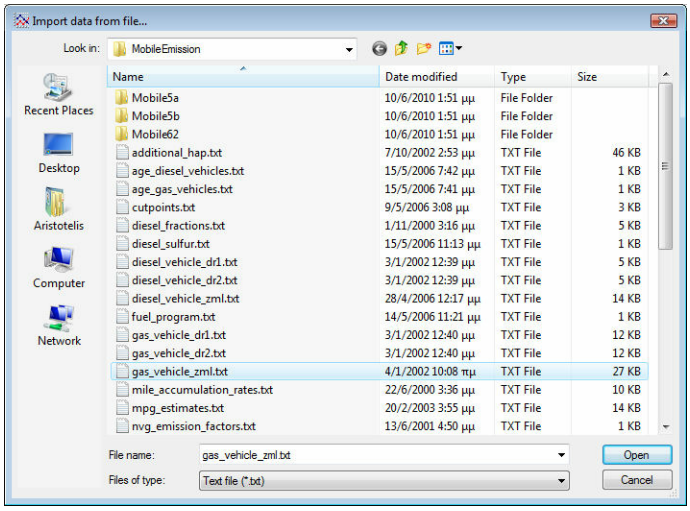
1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Gasoline Vehicle Zero Kilometer Level**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	Class Type	Fuel	Catalyst	Air Injection	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1	LDGV	Leaded	N/A	N/A	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000
2	LDGT1	Leaded	N/A	N/A	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000
3	LDGT2	Leaded	N/A	N/A	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000	0.193000
4	LDGT3	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
5	LDGT4	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
6	HDGV2b	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
7	HDGV3	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
8	HDGV4	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
9	HDGV5	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
10	HDGV6	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
11	HDGV7	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
12	HDGV8a	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
13	HDGV8b	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
14	MC	Leaded	N/A	N/A	0.129020	0.129020	0.129020	0.129020	0.129020	0.129020	0.129020	0.129020	0.129020	0.129020
15	HDGB	Leaded	N/A	N/A	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000	0.370000
16	LDGV	Unleaded	No	N/A	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000
17	LDGT1	Unleaded	No	N/A	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000
18	LDGT2	Unleaded	No	N/A	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000	0.030000
19	LDGT3	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
20	LDGT4	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
21	HDGV2b	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
22	HDGV3	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
23	HDGV4	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
24	HDGV5	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000
25	HDGV6	Unleaded	No	N/A	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000	0.054000

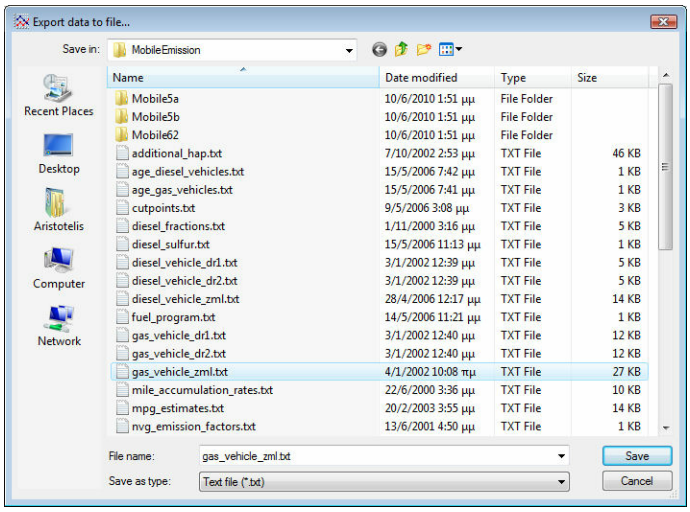
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.2.3 Gasoline vehicle deterioration (1-age)

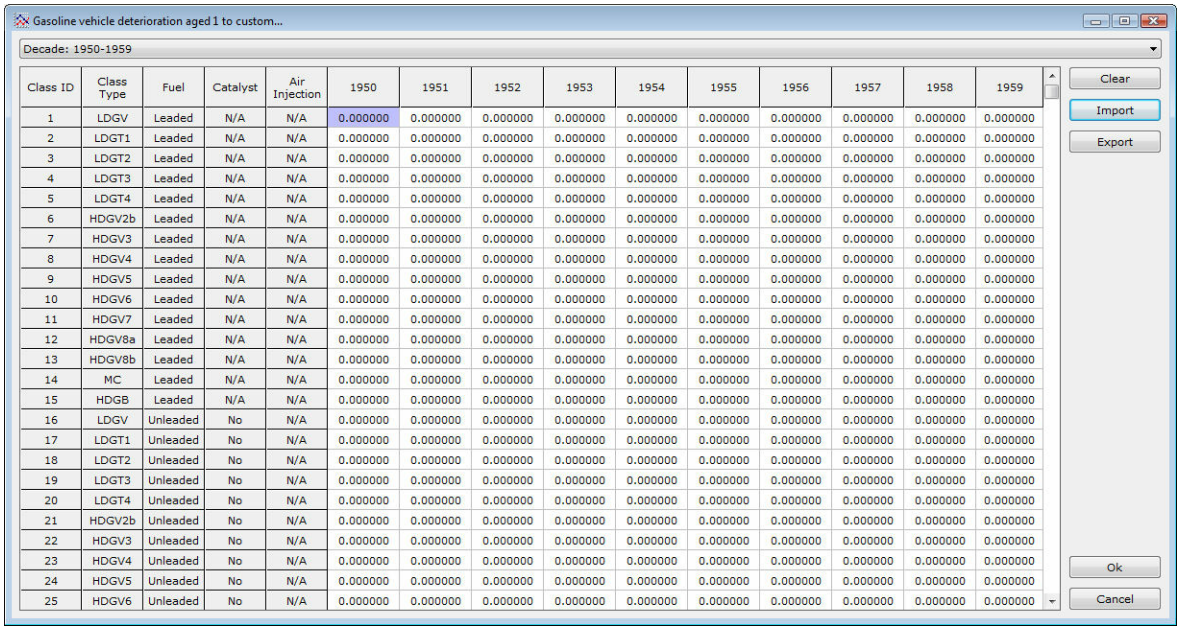
The gasoline vehicle deterioration quantifies the effect of vehicle aging of the emission control mechanism to the pollutant emission. The deterioration is entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units) and corresponds to gasoline vehicles between 1 year and an age which has been entered in the gasoline vehicle age classes form.

For each of the 15 gasoline vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles that operate with:

- Leaded fuel, without catalyst and without air injection
- Unleaded fuel, without catalyst and without air injection (1st generation catalyst vehicles)
- Unleaded fuel, with catalyst, but no air injection
- Unleaded fuel, with catalyst and with air injection

To edit the gasoline vehicle deterioration:

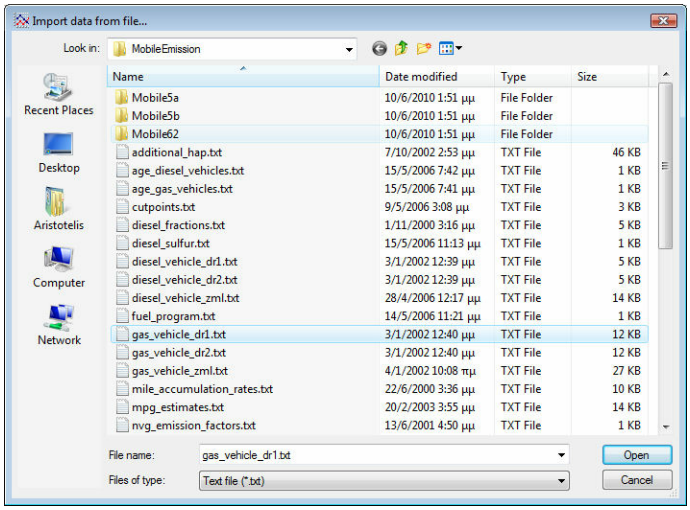
1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Gasoline Vehicle Deterioration (1-age)**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	Class Type	Fuel	Catalyst	Air Injection	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1	LDGV	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	LDGT1	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	LDGT2	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	LDGT3	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5	LDGT4	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
6	HDGV2b	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	HDGV3	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	HDGV4	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	HDGV5	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
10	HDGV6	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11	HDGV7	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
12	HDGV8a	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
13	HDGV8b	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	MC	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
15	HDGB	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
16	LDGV	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
17	LDGT1	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
18	LDGT2	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
19	LDGT3	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
20	LDGT4	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
21	HDGV2b	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
22	HDGV3	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
23	HDGV4	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
24	HDGV5	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25	HDGV6	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

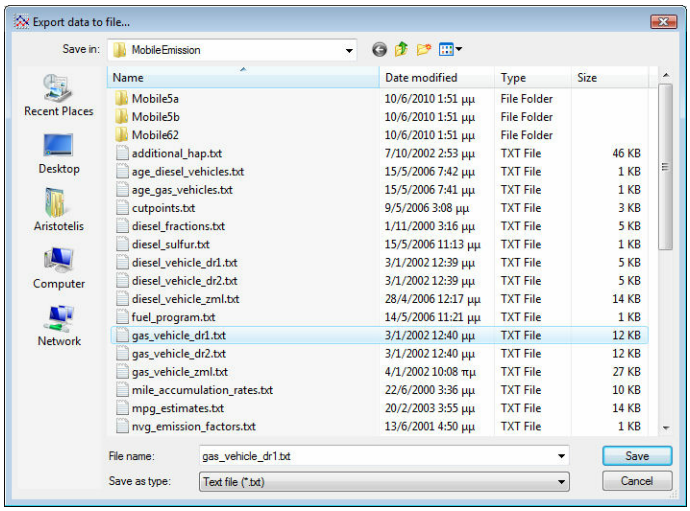
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.2.4 Gasoline vehicle deterioration (age-25)

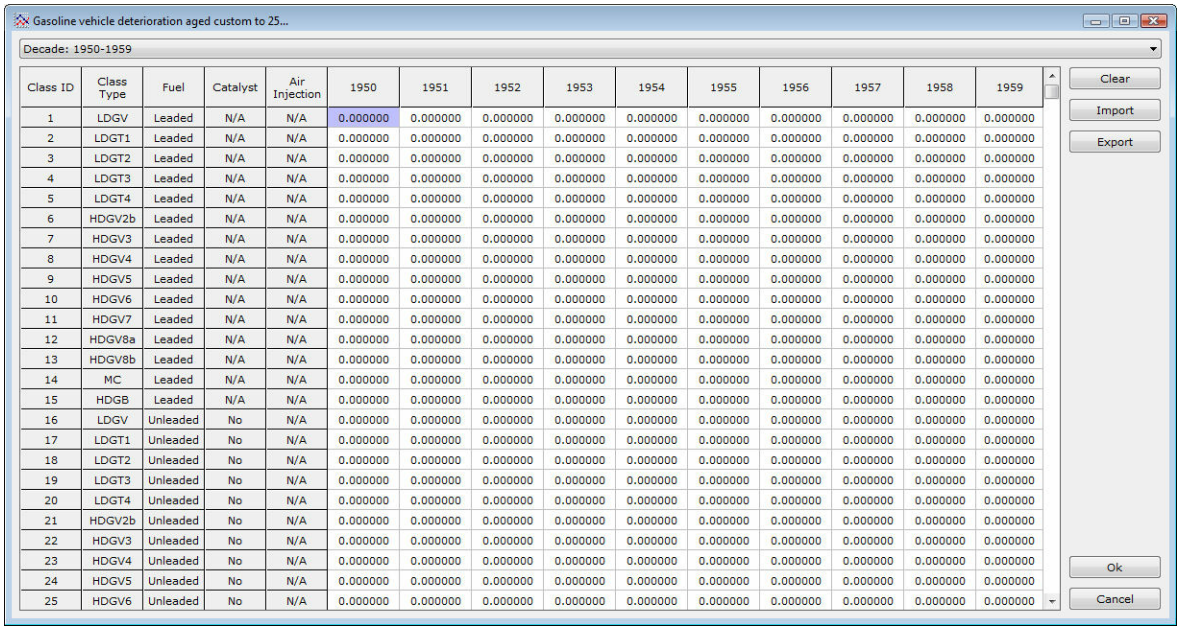
The gasoline vehicle deterioration quantifies the effect of vehicle aging of the emission control mechanism to the pollutant emission. The deterioration is entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units) and corresponds to gasoline vehicles between an age which has been entered in the gasoline vehicle age classes form and 25 years.

For each of the 15 gasoline vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles that operate with:

- Leaded fuel, without catalyst and without air injection
- Unleaded fuel, without catalyst and without air injection (1st generation catalyst vehicles)
- Unleaded fuel, with catalyst, but no air injection
- Unleaded fuel, with catalyst and with air injection

To edit the gasoline vehicle deterioration:

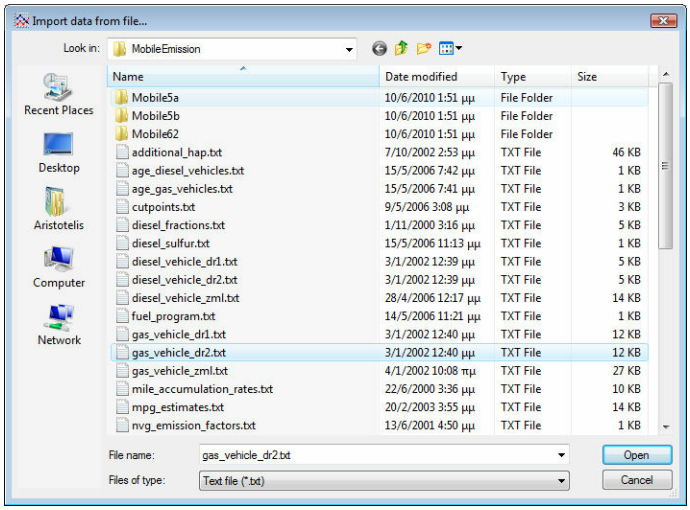
1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Gasoline Vehicle Deterioration (age-25)**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	Class Type	Fuel	Catalyst	Air Injection	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1	LDGV	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	LDGT1	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
3	LDGT2	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	LDGT3	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5	LDGT4	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
6	HDGV2b	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	HDGV3	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	HDGV4	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	HDGV5	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
10	HDGV6	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11	HDGV7	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
12	HDGV8a	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
13	HDGV8b	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	MC	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
15	HDGB	Leaded	N/A	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
16	LDGV	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
17	LDGT1	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
18	LDGT2	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
19	LDGT3	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
20	LDGT4	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
21	HDGV2b	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
22	HDGV3	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
23	HDGV4	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
24	HDGV5	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25	HDGV6	Unleaded	No	N/A	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

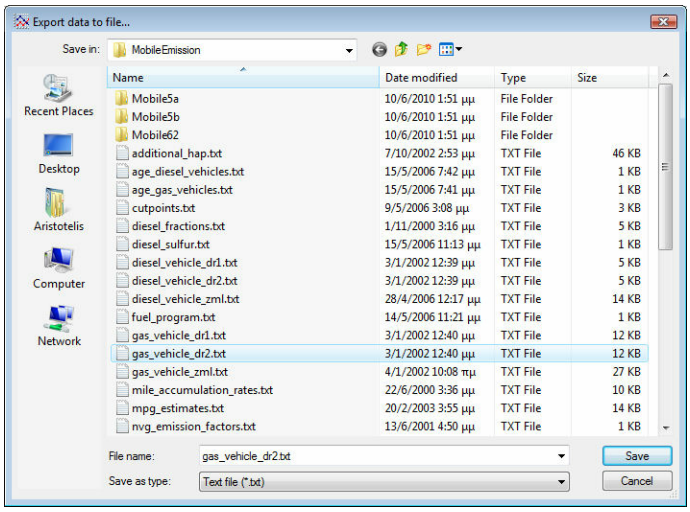
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



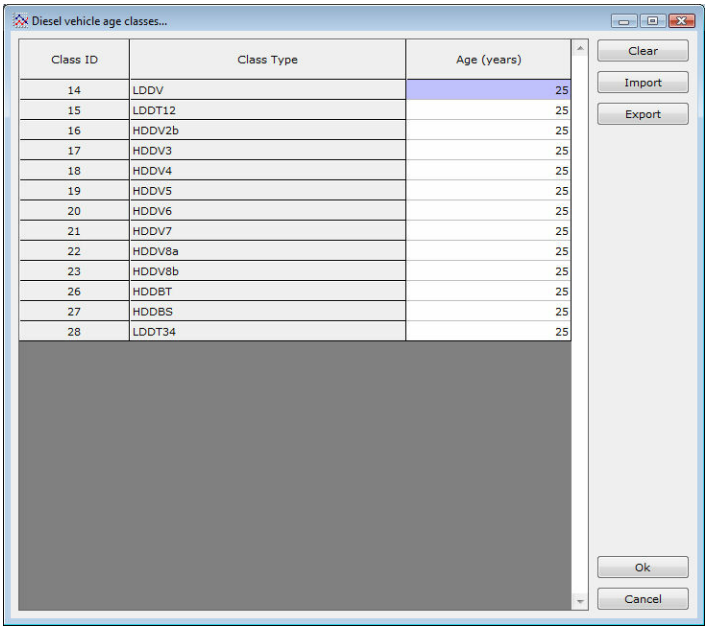
NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.2.5 Diesel vehicle age classes

For the 13 diesel vehicles categories, enter the ages (from 1 to 25) that will be used to separate the diesel vehicle deterioration. For example, if for the LDDV category the value 10 is entered, then the deterioration will be taken into account for vehicles between 1 to 10 years old and 10 to 25 years old. If the age is set equal to 1 or 25, one of the two deterioration categories will be obsolete.

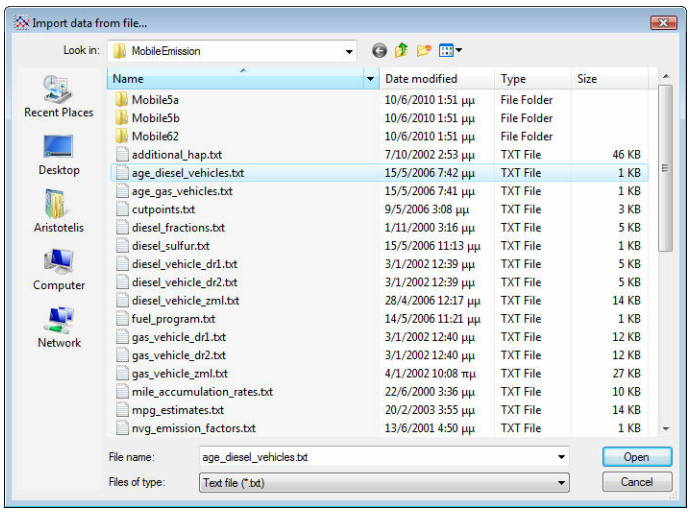
To edit the diesel vehicle age classes:

1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Diesel Vehicle Age Classes**.
4. The ages are directly entered in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



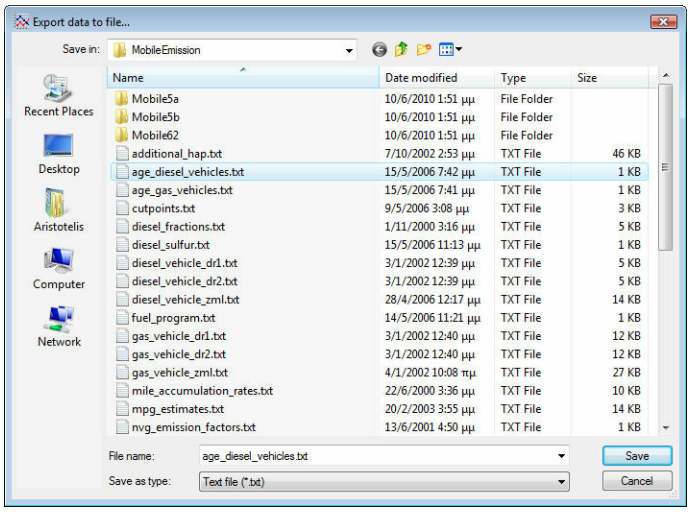
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



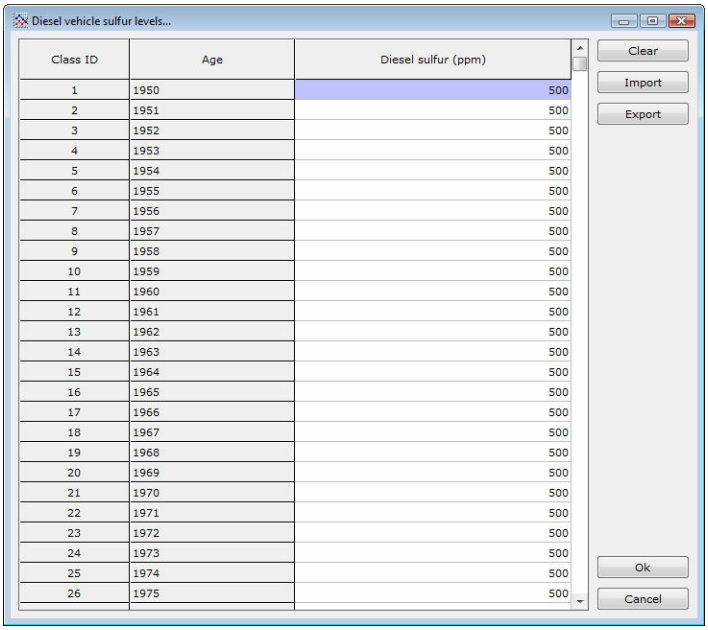
NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.2.6 Diesel vehicle sulfur

For each year between 1950 until 2020, the sulfur levels are entered for diesel vehicles. The default value for diesel vehicle sulfur is 500 ppm (parts per million). Through this form, the user can change the default value. The only reason a user would need to change the sulfur level input is if they are entering alternate total exhaust particulate emission factors which are not based on tests using 500 ppm diesel fuel sulfur.

To edit the diesel vehicle sulfur:

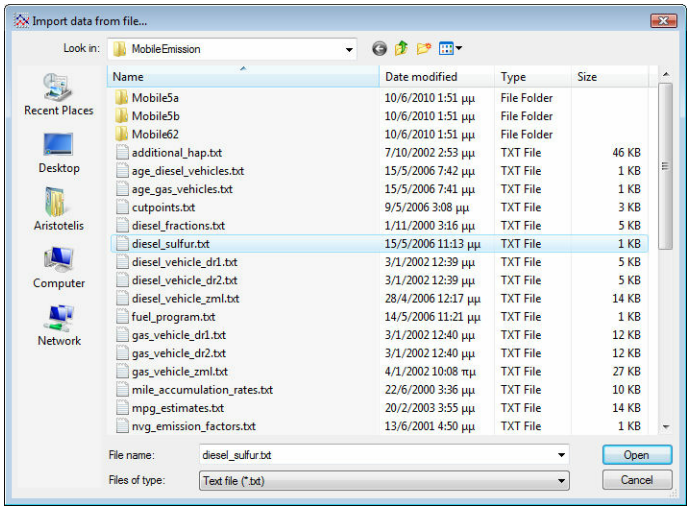
1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Diesel Vehicle Sulfur** .
4. The ages are directly entered in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	Age	Diesel sulfur (ppm)
1	1950	500
2	1951	500
3	1952	500
4	1953	500
5	1954	500
6	1955	500
7	1956	500
8	1957	500
9	1958	500
10	1959	500
11	1960	500
12	1961	500
13	1962	500
14	1963	500
15	1964	500
16	1965	500
17	1966	500
18	1967	500
19	1968	500
20	1969	500
21	1970	500
22	1971	500
23	1972	500
24	1973	500
25	1974	500
26	1975	500

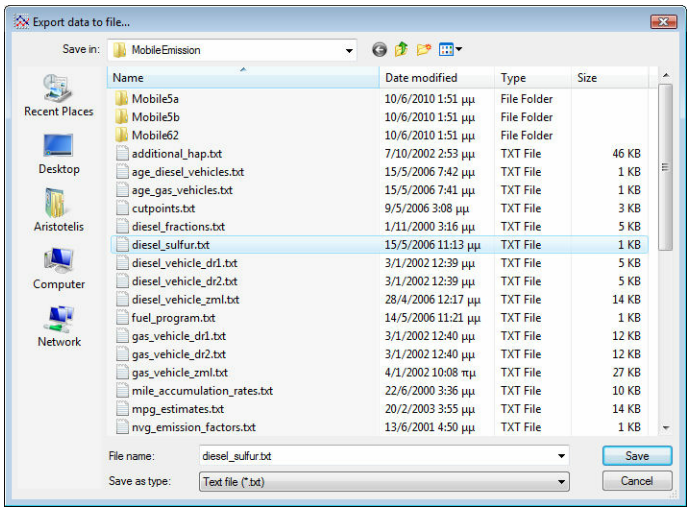
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

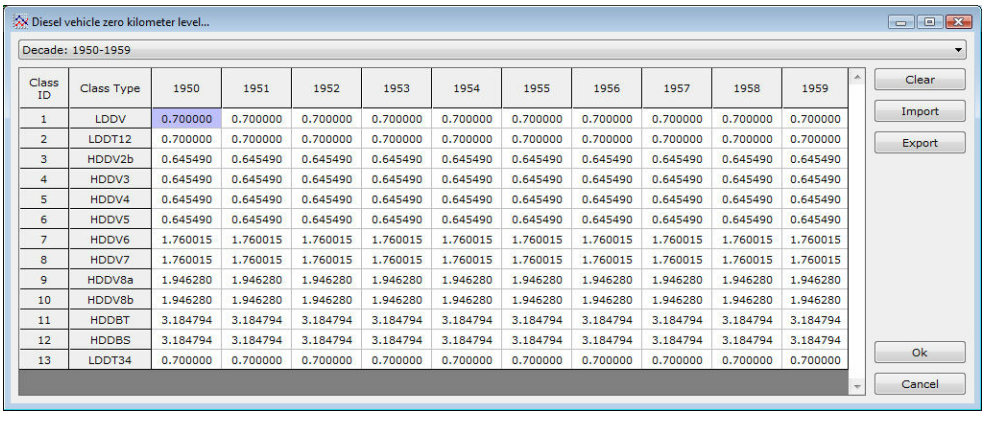
4.2.7 Diesel vehicle zero kilometer level

The zero kilometer level (or mile for English units) of diesel vehicles is the pollutant emission of brand new diesel vehicles, which are entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units).

For each of the 13 diesel vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles.

To edit the diesel vehicle zero kilometer level:

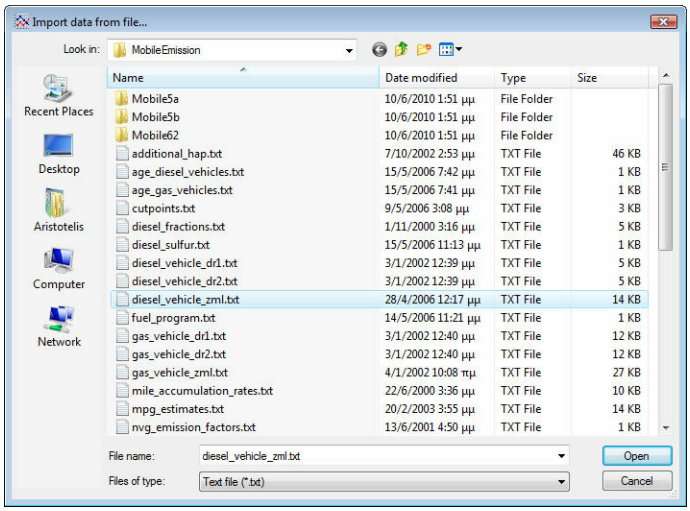
1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Diesel Vehicle Zero Kilometer Level**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	Class Type	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1	LDDV	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000
2	LDDT12	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000
3	HDDV2b	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490
4	HDDV3	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490
5	HDDV4	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490
6	HDDV5	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490	0.645490
7	HDDV6	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015
8	HDDV7	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015	1.760015
9	HDDV8a	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280
10	HDDV8b	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280	1.946280
11	HDDBT	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794
12	HDDBS	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794	3.184794
13	LDDT34	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000	0.700000

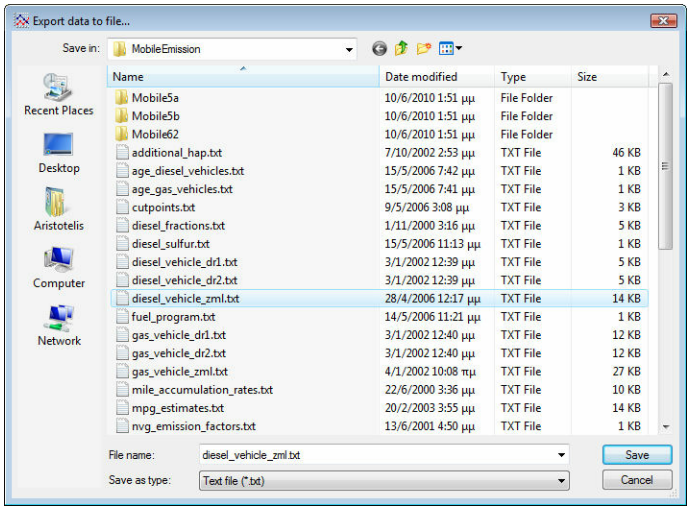
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

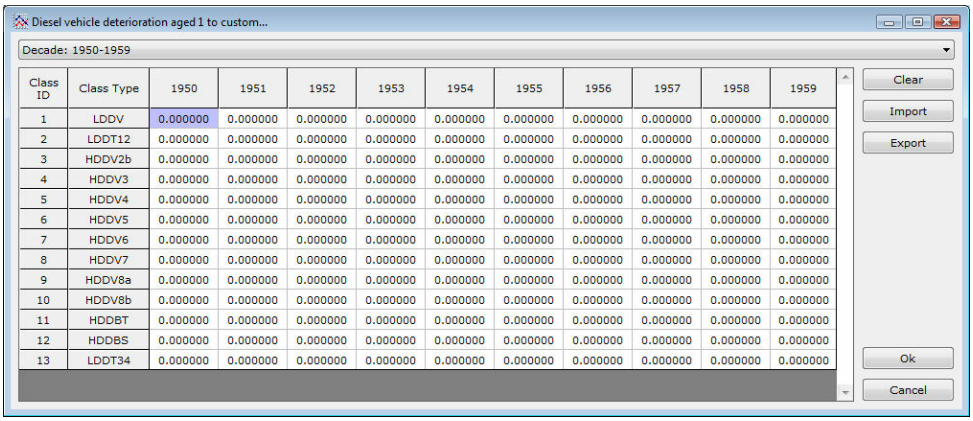
4.2.8 Diesel vehicle deterioration (1-age)

The diesel vehicle deterioration quantifies the effect of vehicle aging of the emission control mechanism to the pollutant emission. The deterioration is entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units) and corresponds to diesel vehicles between 1 year and an age which has been entered in the gasoline vehicle age classes form.

For each of the 13 diesel vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles.

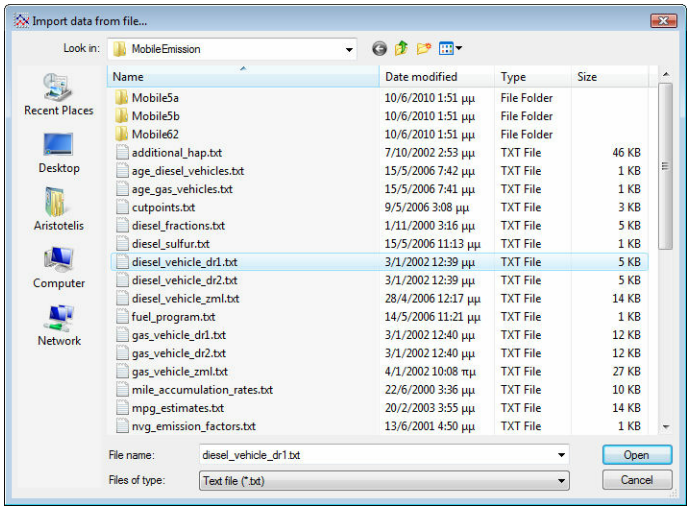
To edit the diesel vehicle deterioration:

1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Diesel Vehicle Deterioration (1-age)**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



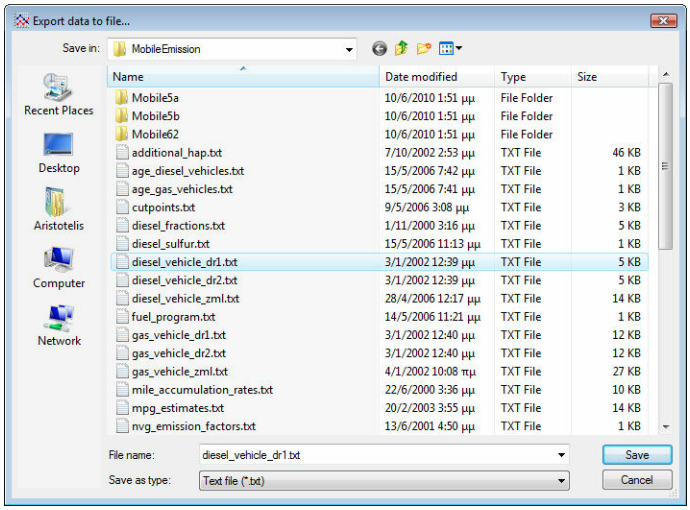
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: The data above is required only if the particulates command has been specified in the project properties.

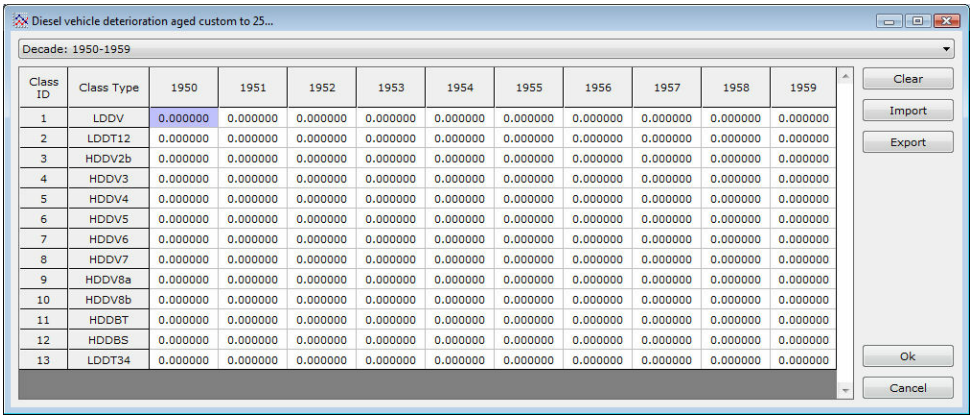
4.2.9 Diesel vehicle deterioration (age-25)

The diesel vehicle deterioration quantifies the effect of vehicle aging of the emission control mechanism to the pollutant emission. The deterioration is entered in grams per km per 10000 km (metric system) or in grams per mile per 10000 miles (English units) and corresponds to diesel vehicles between an age which has been entered in the gasoline vehicle age classes form and 25 years.

For each of the 13 diesel vehicles categories, the values from 1950 to 2020 of the emitted pollutants are required, for all brand new vehicles.

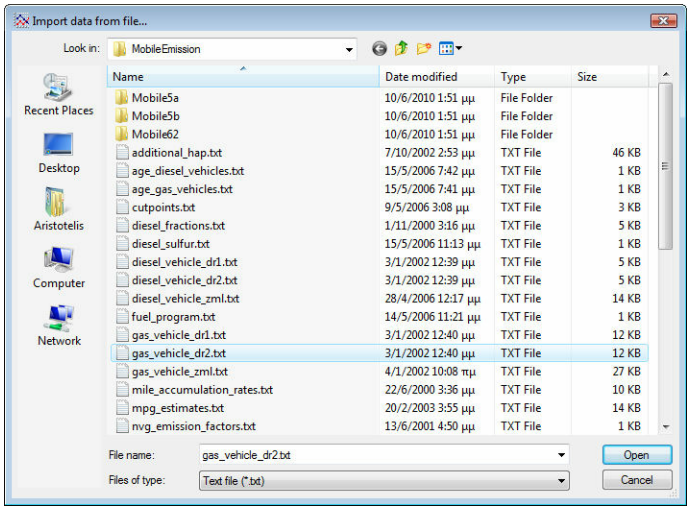
To edit the diesel vehicle deterioration:

1. Select a scenario.
2. From the **Pollutants** menu choose the **Particulate Emission Factors**.
3. From the pop-up menu select the **Diesel Vehicle Deterioration (age-25)**.
4. Select a decade from the drop-down list.
5. Enter the zero kilometer level for each combination.
6. Repeat steps 4 and 5 until all data have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



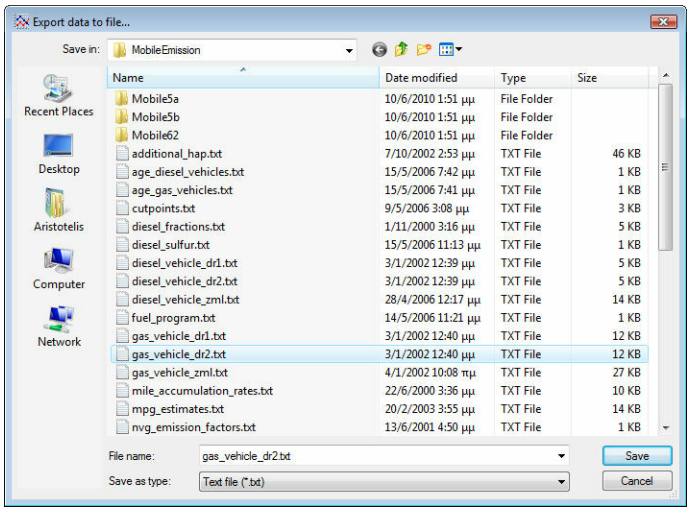
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



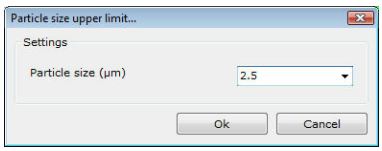
NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.3 Particle size limit

Allows the user to specify the maximum particulate size cutoff (PSC) that is used by the model. The emission factors reported for particulate pollutants represent the estimated grams per kilometer (grams per mile for English units) of particles with aerodynamic diameters less than or equal to the PSC. The maximum PSC allowed by the model is 10.0 micrometers and the minimum PSC is 1.0 micrometer.

To edit the particle size limit:

1. Select a scenario.
2. From the **Pollutants** menu select the **Particle Size Limit**.
3. Select a value from the drop-down list or enter the PSC directly in the drop list.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



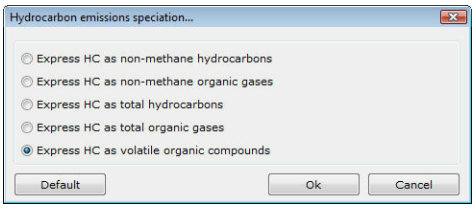
NOTE: The data above is required only if the particulates command has been specified in the project properties.

4.4 Hydrocabron emissions speciation

This command allows the user to specify the particular hydrocarbon species that is reported in the exhaust emission output.

To specify the hydrocarbon species:

1. Select a run.
2. From the **Pollutant** menu select **Hydrocarbon Emission Speciation**.
3. Choose one from the given options.
4. Press **Default** to restore the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



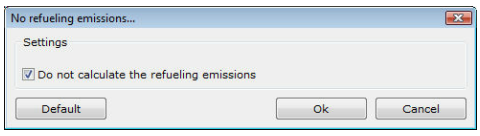
NOTE: This command is optional. If no option is selected then the hydrocarbons will be reported as volatile organic compounds (VOC).

4.5 No refueling emissions

This command directs the model not to calculate the refueling emissions (also referred to as Stage II emissions) from gasoline-fueled vehicles. Thus, the composite hydrocarbon emissions reported to descriptive output will not include refueling emissions.

To select or exclude refueling emissions:

1. Select a run.
2. From the **Pollutants** menu select the **No Refueling Emissions**.
3. Either check or uncheck the option.
4. Press **Default** to restore the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If no option is selected then the program will report the refueling emissions.

4.6 User defined air toxic pollutants

4.6.1 User defined air toxic pollutants

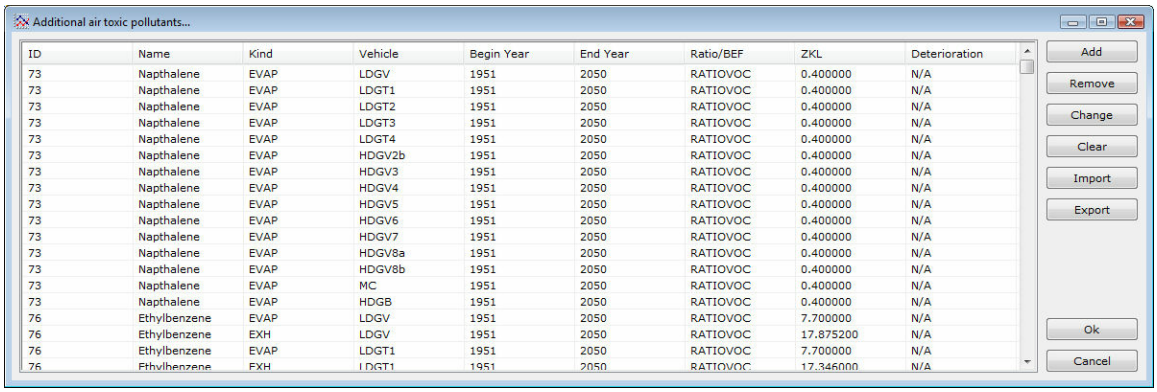
This command allows the user to enter emission factors or air toxic ratios for additional air toxic pollutants. The program will read these additional emission factors or ratios

and calculate composite results for additional pollutants the user may define.

The additional emission factors must be input to the program in units of milligrams per kilometer (milligrams per mile for English units). The ratios are entered as ratios of the Air Toxic pollutant in milligrams per kilometer (milligrams per mile for English units) to the Total VOC, Total TOG or Exhaust PM emission factor (expressed in grams/ kilometer or grams/mile for English units).

To manage user defined air toxic pollutants:

1. Select a scenario.
2. From the **Pollutants** menu select the **User Defined Air Toxic Pollutants**.
3. Edit all data relevant to user defined air toxic pollutants.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



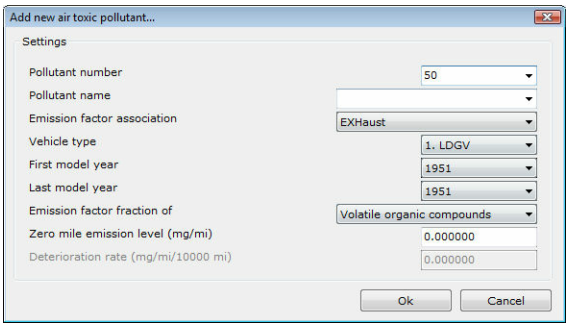
NOTE: If this command is not specified, no additional air toxics are modeled.

4.6.2 Add air toxic pollutant

To add a new air toxic pollutant:

1. Press Add to display the form which is used to add a new air toxic pollutant.
2. Select from the drop-down list or type-in the **pollutant number** from 50 to 99.
3. Enter the **pollutant name**. Any name can be specified for a pollutant as long as it is used consistently in all of the input records.
4. Select whether the pollutant is associated with **exhaust** or **evaporative** processes. All evaporative exhaust air toxic emission factors must be ratio types. No basic emission factor (BEF) types will be allowed for evaporative air toxic emission factors. Note, a single evaporative ratio will be applied to all evaporative emission types (hot soak, diurnal, resting loss, etc). There can be up to 50 user defined air toxic pollutants.
5. Select the **vehicle type** associated with the pollutant. You can select any of the 28 vehicle categories.
6. Select the **first model year** for a particular air toxic emission factor from the drop-down list. It can range from 1951 through 2025. The model year range established by first and last model years for a pollutant must include the complete 25 year range of model years needed to compute emission factors for a given calendar year. For example, if the user desires to model calendar year 2000, then first model year on at least one record must be no later than 1975. The exception is that model years prior to 1951 will use 1951 entries.

7. Select the **last model year** for a particular air toxic emission factor from the drop-down list. This is the last model year of coverage for a particular air toxic emission factor. It can range from 1951 through 2050. The last model year on at least one record for the pollutant must be equal to or later than the calendar year which is being modeled. For example, if calendar year 2000 is being modeled, then last model year can be 2000 or later.
8. Select the **emission factor fraction** from the drop-down list. This is a categorized field that accepts a test entry of RATIOVOC, RATIOTOG, RATIOPM or BEF. RATIOVOC indicates an emission factor that is a fraction of the VOC emissions. RATIOTOG indicates an emission factor that is a fraction of the TOG emissions. RATIOPM indicates an emission factor that is a fraction of the total exhaust PM. If the user enters RATIOPM, then the particulates command must be specified so that the program will calculate total exhaust particulate emission factors to use in calculating the Air Toxic emission factor. An error message will result if there is a conflict. If the user enters RATIOPM, then the particulates command must be specified so that the program will calculate total exhaust particulate emission factors to use in calculating the Air Toxic emission factor. An error message will result if there is a conflict. Note that the user-specified particle size cutoff value is used to calculate the PM emissions to which the HAP emissions are ratioed. If the RATIOVOC, RATIOTOG or RATIO PM commands are specified, then the user shall enter the appropriate fraction in the Zero Kilometer (Mile) Level (ZKL/ZML) field. If the user enters BEF, then the program shall read a zero kilometer (mile) emission level and the deterioration rate for the pollutant.
9. Enter the **zero kilometer** (or mile for English units) **emission level**. This is a numeric field where either the air toxic emission fraction
is specified or the zero kilometer (mile) emission level in units of milligrams per kilometer (mile) is specified.
10. If the basic emission factors (BEF) has been selected in step 8, then enter the **deterioration rate**. This is a numeric field where deterioration rate emission level in units of milligrams per kilometer (mile) per 10,000 kilometers (miles) is specified. It is blank if the RATIO is specified in step 8.
11. Select **Ok** to add the new air toxic pollutant at the end of the list and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



4.6.3 Delete air toxic pollutant

The selected from the list air toxic pollutant is removed.

To delete an existing air toxic pollutant:

1. Select from the list of air toxic pollutants the record which is about to be removed.
2. When the user clicks **Remove** it is asked whether he confirms the removal of the selected record, if the confirmation option has been activated in the general preferences.

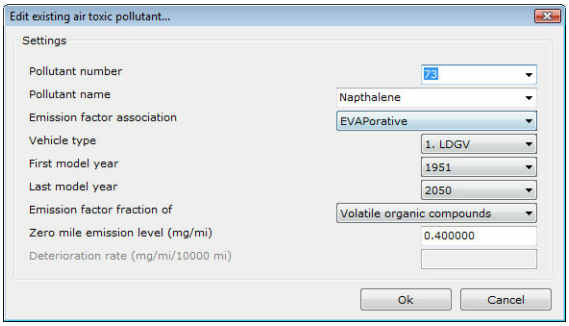
3. The selected record is removed.

4.6.4 Change air toxic pollutant

The user may change the properties of an existing air toxic pollutant.

To change the properties of an existing air toxic pollutant:

1. Select from the list of air toxic pollutants the record which is about to be changed.
2. Click on **Change** to open the form used to commit changes to an existing record.
3. Make the changes.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



4.6.5 Clear all records

All existing records are removed from the list.

To remove all existing records:

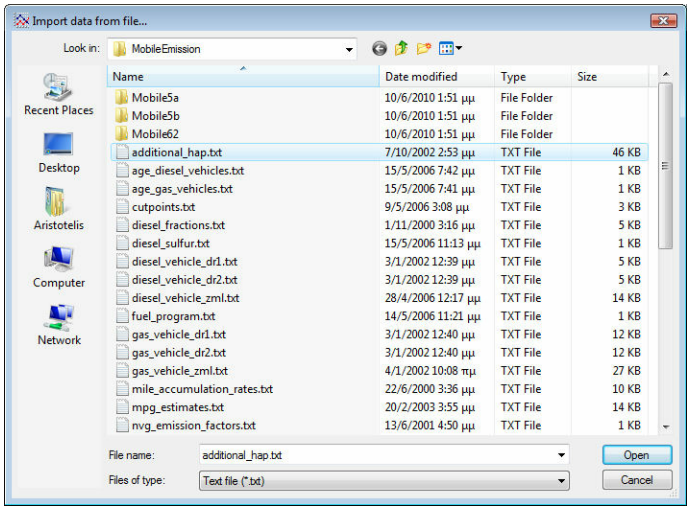
1. Click **Clear**. The user will be asked to confirm the global removal.
2. Select **Yes** to remove all records.

4.6.6 Import from file

Additional air toxic pollutant records may be imported from an external file. The existing records will be kept and the new records will be appended to the existing ones.

To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.

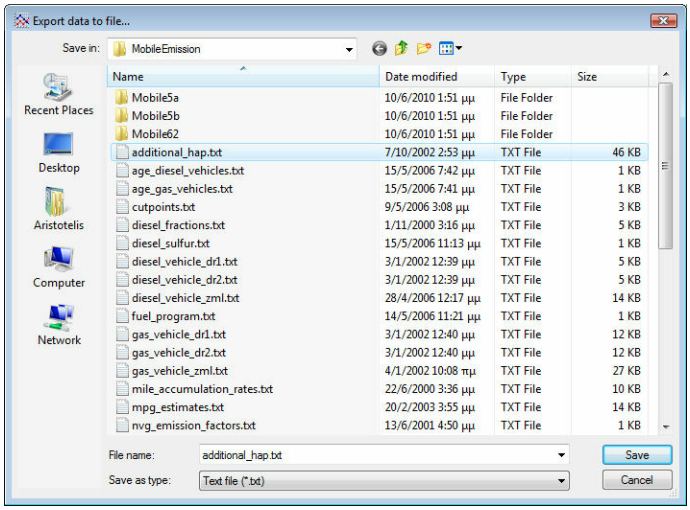


4.6.7 Export to file

The current recordset of additional air toxic pollutants is exported to an external file.

To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.

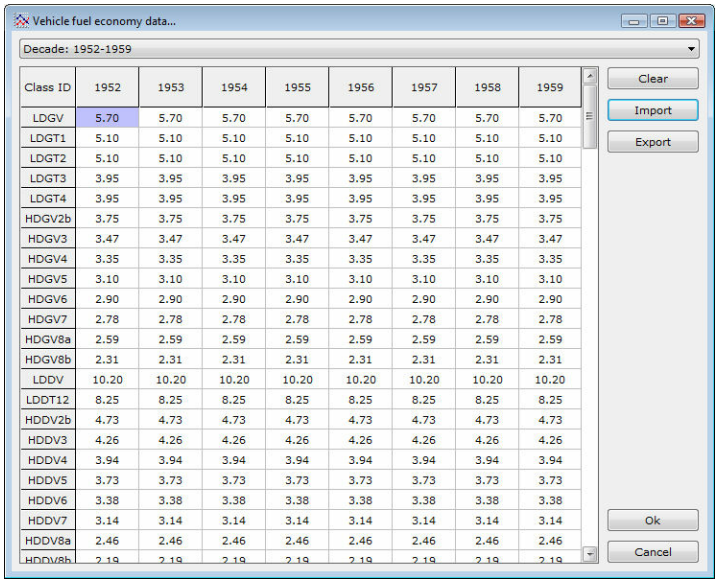


4.7 Fuel economy data

This command allows the user to enter fuel economy performance data by vehicle class and model year (between 1952 and 2050) to replace the default values built into the model. This capability could be used to estimate the effect of the introduction into the fleet of more fuel efficient vehicles. Fuel economy values have a small effect on evaporative refueling losses and sulfate particulate emissions in addition to strongly affecting CO_2 emissions.

To enter vehicle fuel economy data:

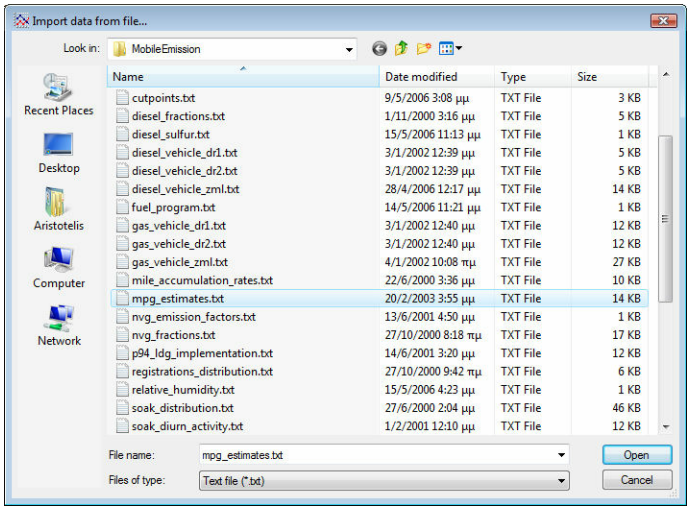
1. Select a scenario.
2. From the **Pollutant** menu select **Fuel Economy Data**.
3. Select a decade from the drop-down list.
4. Type in the desired values in the table in kilometer per liter (metric system) or miles per gallon (English units).
5. Repeat steps 3 and 4 until all values have been entered.
6. Optionally, click on **Clear** to delete all entered values.
7. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Class ID	1952	1953	1954	1955	1956	1957	1958	1959
LDGV	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
LDGT1	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
LDGT2	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
LDGT3	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95
LDGT4	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95
HDGV2b	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HDGV3	3.47	3.47	3.47	3.47	3.47	3.47	3.47	3.47
HDGV4	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
HDGV5	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
HDGV6	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
HDGV7	2.78	2.78	2.78	2.78	2.78	2.78	2.78	2.78
HDGV8a	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
HDGV8b	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31
LDDV	10.20	10.20	10.20	10.20	10.20	10.20	10.20	10.20
LDDT12	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
HDDV2b	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
HDDV3	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26
HDDV4	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
HDDV5	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73
HDDV6	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
HDDV7	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14
HDDV8a	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
HDDV8b	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19

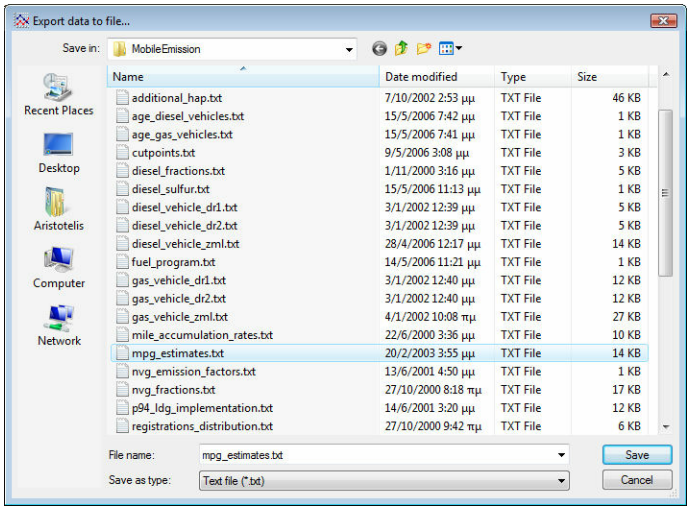
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: If this command is not specified then the default fuel economy values built into the model are used.

Chapter

5 Environment

5.1 Environment menu

This menu is used to enter or edit all data relevant to the external (environmental) conditions of the study area. In particular, the following options are offered via this menu:

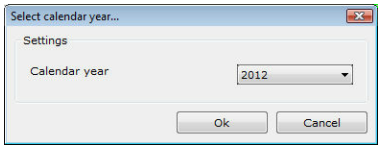
- Calendar year
- Evaluation month
- Ambient daily temperature
- Altitude
- Absolute humidity
- Cloud cover
- Peak sun
- Sunrise and sunset
- Relative humidity
- Barometric pressure

5.2 Calendar year

This command identifies the calendar year for which emission factors are to be calculated, often referred to as calendar year of evaluation. The program can model emission factors for the calendar years 1952 to 2050, inclusive.

To select a calendar year:

1. Select a scenario.
2. From the **Environment** menu select **Calendar Year**.
3. Select a calendar year from the drop-down menu from 1952 to 2050.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: Users must supply this information.

5.3 Evaluation month

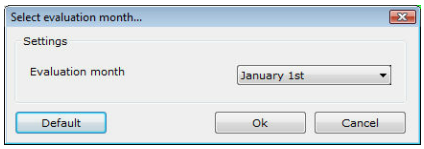
This command provides the option of calculating emission factors for January 1 or July 1 of the calendar year of evaluation. The model allows the choice of January 1st or July 1st. The specified month will affect emission calculations in two ways:

- by changing the composition of the fleet (July 1 emission factors will reflect an additional six months of fleet turnover, or replacement of older vehicles by new vehicles), and
- by changing how the effects of reformulated gasoline (RFG) are modeled. If the user selects January 1st, the model will apply winter season RFG rules. If the user selects July 1st, the model will apply summer season RFG rules.

The value of month is independent of temperature, fuel volatility, and other inputs, which users still must select in a way that is consistent with the evaluation month. It is possible to estimate the emission results for any evaluation date (month) by mathematical interpolation between two results. For example, using the same input parameters, two runs for January and July can be used to estimate May 1st emissions, by weighting the January results by 0.333 and weighting the July results by 0.667. Care should be taken to assure that both the two runs use the appropriate parameters (i.e., temperature, fuels, etc.) and the programs in use that would apply on the target evaluation date.

To select the evaluation month:

1. Select a scenario.
2. From the **Environment** menu select the **Evaluation Month**.
3. Select the evaluation month from the drop-down list.
4. Click the **Default** button to select the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



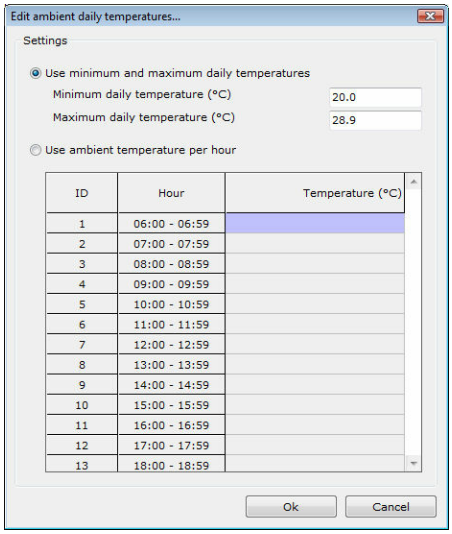
NOTE: This command is optional. If no evaluation month is set or the N/A value is selected from the drop-down list, then January 1st is automatically set as the evaluation month.

5.4 Ambient daily temperature

Enter either the maximum and minimum daily temperature or the ambient temperature for each hour of the day.

To enter the minimum and maximum daily temperature:

1. Select a scenario or a run.
2. From the **Environment** menu select **Ambient Daily Temperature**.
3. Activate the **Use minimum and maximum daily temperatures** option.
4. Enter the **minimum daily temperature** which may vary from -18 to +38 degrees Celsius (0 to 100 degrees Fahrenheit).
5. Enter the **maximum daily temperature** which may vary from -12 to +49 degrees Celsius (10 to 120 degrees Fahrenheit).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



To enter the ambient temperature for each hour of the day:

1. Select a scenario or a run.
2. From the **Environment** menu select **Ambient Daily Temperature**.
3. Activate the **Use ambient temperature per hour** option.
4. Type-in the hourly temperatures in the table. The temperatures should range from -18 to +49 degrees Celsius (0 to 120 degrees Fahrenheit).
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

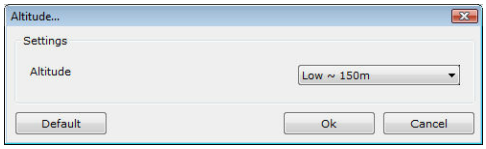
NOTE: This command is mandatory. The user must supply either the minimum and maximum daily temperatures or the ambient temperature for each hour of the day.

5.5 Altitude

This command indicates whether the model will calculate emissions for a high or a low-altitude region. It can calculate separate emission rates for high- and low-altitude regions. Low-altitude emission factors are based on conditions representative of approximately 150 meters (500 feet) above mean sea level. High-altitude factors are based on conditions representative of approximately 1700 meters (5,500 feet) above mean sea level. When high-altitude region emission factors are requested, the model also includes vehicles that were built to meet specific high-altitude emission standards.

To select an altitude:

1. Select a scenario.
2. From the **Environment** menu select **Altitude**.
3. Select the area type.
4. Click the **Default** button to select the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If no altitude is set or the N/A value is selected from the drop-down list, then low altitude is automatically set as the evaluation month.

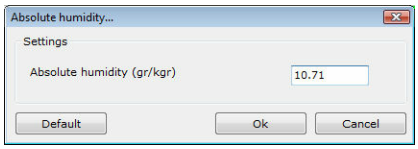
5.6 Absolute humidity

This command is used to specify a daily average for humidity. The humidity value affects Nox emissions. The model also converts the specified absolute humidity to relative humidity, which in turn is used to calculate a heat index. The heat index affects the portion of the vehicle fleet that the model determines is using air conditioning, thereby affecting CO, HC, and HC-related air toxics emissions.

This command requires one value in the data portion of the record that represents the absolute humidity in grams of water per kilogram of dry air (or grains of water per pound of dry air for English units). The value must be between 2.86 and 75.4 gr/kg or 20.0 and 528.0 grains/pound.

To enter the absolute humidity:

1. Select a scenario or a run.
2. From the **Environment** menu select **Absolute Humidity**.
3. Enter the desired value between 2.86 and 75.4 gr/kg or 20 and 528 grains/pound.
4. Optionally, press the **Default** button to enter the default value of the parameter which is equal to 10.71 gr/kg or 75 grains/pound.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If no absolute humidity is entered, then the default value of 10.71 gr/kg or 75 grains/pound will be used.

WARNING: The model does not check that the absolute humidity value and the temperature range yield a relative humidity which does not exceed 100 percent.

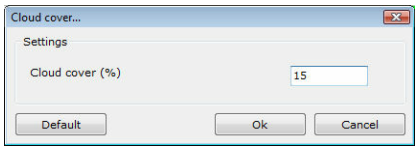
5.7 Cloud cover

This command allows users to specify an average percent cloud cover for a given day. This feature affects only the air conditioning correction. This value must be between 0% and 100%, inclusive.

To enter the cloud cover:

1. Select a scenario or a run.

2. From the **Environment** menu select **Cloud Cover**.
3. Enter the desired value which can range from 0 to 100%.
4. Optionally, press the **Default** button to enter the default value of the parameter which is equal to 0% (no cloud cover).
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If no cloud cover is entered, then the default value of 0% will be used.

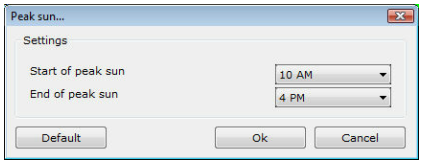
5.8 Peak sun

This command allows users to specify the midday hours when the sun is at peak intensity. This feature only affects the air-conditioning correction. The peak sun command requires two integers in the data portion of the record. Peak sun is applied as a range by virtue of the fact that the intensity of solar load is roughly within 5 percent of maximum solar load (noon) for several hours throughout mid-day, depending on the season.

The default times span the range of this condition for early summer conditions; in considering changes to the
default values, the user should evaluate data on direct solar radiation, commonly available through NOAA's Surface Radiation (SURFRAD) monitoring system. It is important to note that air conditioning adjustments are also applied at times outside the peak sun range, but
at a lesser magnitude per the reduced solar load.

To enter the peak sun:

1. Select a scenario or a run.
2. From the **Environment** menu select **Peak Sun**.
3. Select the **peak sun start time** from the drop-down list between 9 AM to 12 AM.
4. Select the **peak sun end time** from the drop-down list between 1 PM to 5 PM.
5. Optionally, press the **Default** button to enter the default values of the parameters which is equal to 10 AM and 4PM for the peak sun start and end time respectively.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



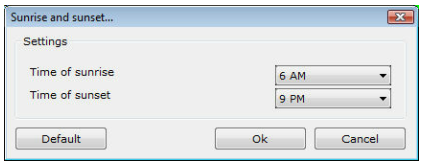
NOTE: This command is optional. If no peak sun start and end times are entered or the N/A values are selected, then the default values of 10 AM and 4 PM will be used.

5.9 Sunrise and sunset

This command allows users to specify the time of sunrise and sunset. This feature affects only the air-conditioning correction. The sunrise must be between 5 a.m. and 9 a.m. The sunset must be between 5 p.m. and 9 p.m. Although most of the units for time of day (in the model) count from 6 a.m., both of the sunrise and sunset values use the traditional clock time, counting from midnight.

To enter the sunrise and sunset values:

1. Select a scenario or a run.
2. From the **Environment** menu select **Sunrise And Sunset**.
3. Select the **sunrise time** from the drop-down list between 5 AM to 9 AM.
4. Select the **sunset time** from the drop-down list between 5 PM to 9 PM.
5. Optionally, press the **Default** button to enter the default values of the parameters which is equal to 6 AM and 9 PM for the sunrise and sunset respectively.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If no sunrise and sunset times are entered or the N/A values are selected, then the default values of 6 AM and 9 PM will be used.

5.10 Relative humidity

This command is used to specify hourly relative humidity values and allows the user to relate these relative humidity values directly to the hourly temperature values (see also the barometric pressure command).

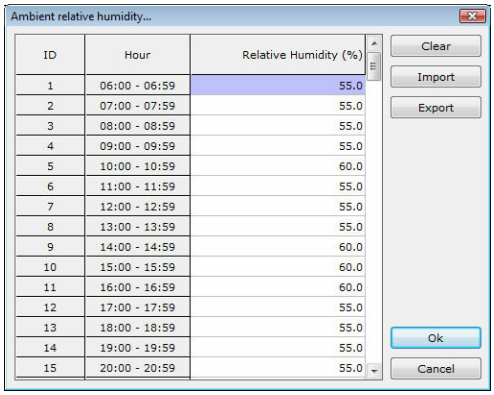
The humidity input directly affects Nox emissions through a humidity correction factor for Nox emissions. The humidity value also affects the model's air conditioning (A/C) correction factors for HC, CO, and Nox emissions. This is done in the model by calculating a heat index with the relative humidity inputs. The heat index is used in conjunction with vehicle A/C usage statistics to calculate the air conditioning correction factors.

The relative humidity command directs the model to use the 24 values of relative humidity entered by the user. The program will perform hour-specific calculations with the specified hourly values rather than use the single default value of absolute humidity. In particular, the hourly relative humidity values together with hourly temperature values and barometric pressure are used to calculate hourly absolute humidity values. Subsequently, hourly humidity effects on Nox emissions can be determined.

Also, the hourly relative humidity values are used directly to determine hourly heat indices which are used to determine the air conditioning effects on HC, CO, and Nox emissions.

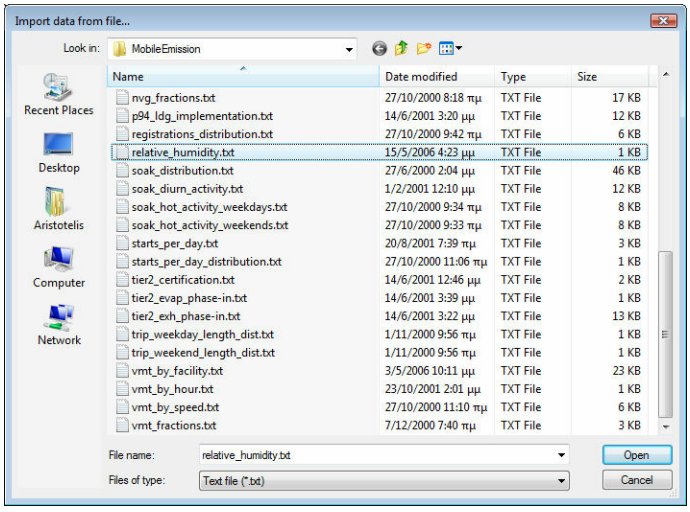
To enter the relative humidity:

1. Select a scenario.
2. From the **Environment** menu select **Relative Humidity**.
3. Enter the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



To import data from an external file:

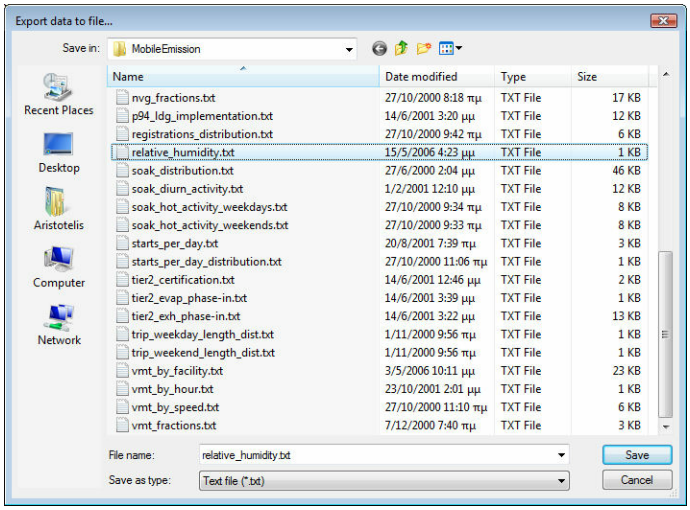
1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.

4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This command is optional. If no data are entered, then the absolute humidity is used instead of the relative humidity. If the relative humidity is used, then the barometric pressure is used as well.

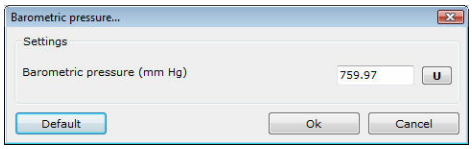
5.11 Barometric pressure

This command is used to specify a daily average barometric pressure. When the relative humidity command is used, the user supplied relative humidityvalues are converted to absolute humidity. This conversion requires values of temperature and barometric pressure. The barometric pressure command allows the user to change the default value of barometric pressure used in the humidity conversion.

This command requires one value that represents the barometric pressure in millimeters (inches for English units) of mercury. The value must be between 330.2 and 838.2 mm mercury or 13.0 and 33.0 inches of mercury.

To enter the barometric pressure:

1. Select a scenario or a run.
2. From the **Environment** menu select **Barometric Pressure**.
3. Enter the desired value between 330.2 and 838.2 mm Hg or 13 and 33 in Hg.
4. Optionally, press the **Default** button to enter the default value of the parameter which is equal to 759.95 mm Hg or 29.92 in Hg.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This command is optional. If the relative humidity is not used, then the barometric pressure is not used either. If the relative humidity is used and no

barometric pressure is specified, its default value will be used which is equal to 759.95 mm Hg or 29.92 in Hg.

Chapter VI

6 Fleet

6.1 Fleet menu

Fleet characteristic commands allow users to describe a given fleet by vehicle age, power source and activity level. Several of these commands involve vehicle age. In particular, the following options are offered via this menu:

- Distribution of vehicle registrations
- Diesel fractions
- Annual kilometers accumulation rates
- Vehicle kilometers traveled
  - Fractions
  - By facility
  - By hour
  - By speed
  - By average speed
- Natural gas vehicles
  - Fractions
  - Alternate emission factors
    - Add alternate emission factor
    - Delete alternate emission factor
    - Change alternate emission factor
    - Clear all records
    - Import from file
    - Export to file
- Starts per day
- Distribution of vehicle starts during the day
- Soak distribution
- Hot soak activity
- Diurn soak activity
- Weekday trip length distribution
- Weekend trip length distribution
- Select weekday or weekend

6.2 Distribution of vehicle registrations

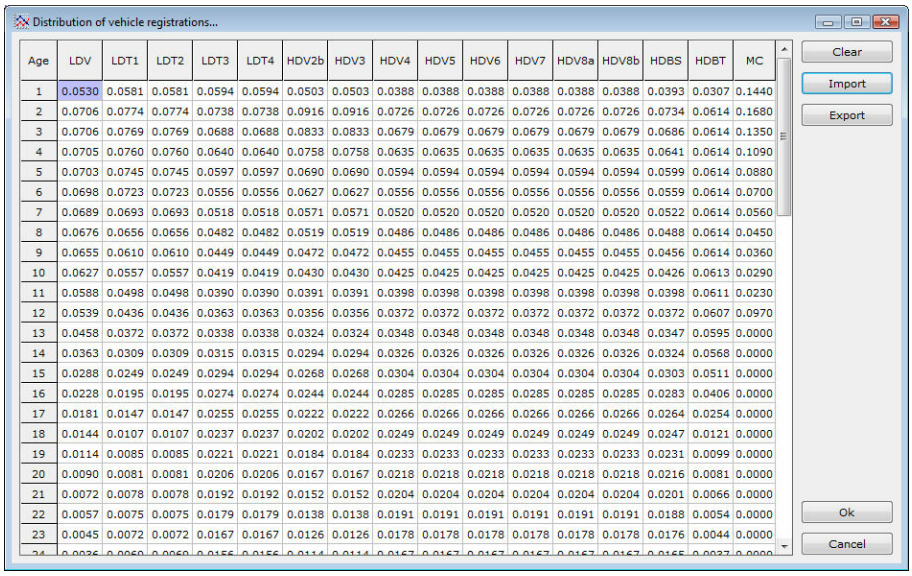
This command allows users to supply vehicle registration distributions by vehicle age for any of the 16 composite (combined gas and diesel) vehicle types. By default, the model applies a registration distribution for each of the 16 composite vehicle types based on U.S. vehicle fleet data.

Program users may specify vehicle registration data for each of 25 vehicle ages for one or more of the 16 composite vehicle types. Values are entered with four decimal digits. The sum of the 25 values should equal 1.0. If they do not, the program automatically normalizes all values to 1.0.

To enter the distribution of vehicle registrations:

1. Select a run.

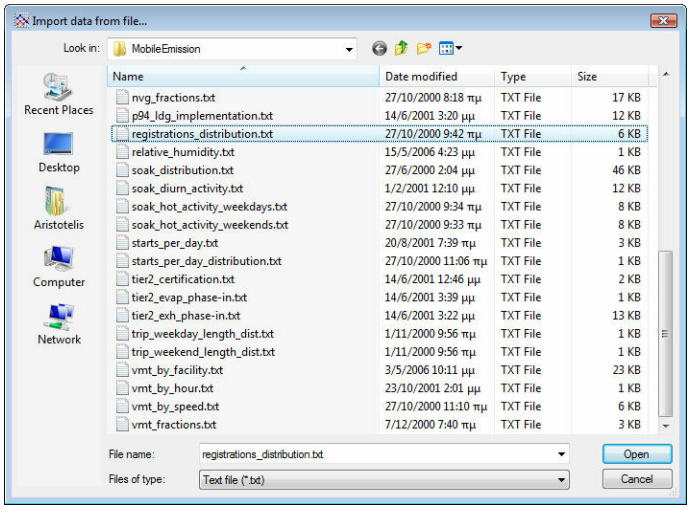
2. From the **Fleet** menu select **Distribution of Vehicle Registrations**.
3. Type in the desired values directly in the table. A value equal to 0 means that there are no vehicles in the category that corresponds to the column where this value belongs and for the age that corresponds to the row where this value belongs.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Age	LDV	LDT1	LDT2	LDT3	LDT4	HDV2b	HDV3	HDV4	HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS	HDBT	MC
1	0.0530	0.0581	0.0581	0.0594	0.0594	0.0503	0.0503	0.0388	0.0388	0.0388	0.0388	0.0388	0.0388	0.0393	0.0307	0.1440
2	0.0706	0.0774	0.0774	0.0738	0.0738	0.0916	0.0916	0.0726	0.0726	0.0726	0.0726	0.0726	0.0726	0.0734	0.0614	0.1680
3	0.0706	0.0769	0.0769	0.0688	0.0688	0.0833	0.0833	0.0679	0.0679	0.0679	0.0679	0.0679	0.0679	0.0686	0.0614	0.1350
4	0.0705	0.0760	0.0760	0.0640	0.0640	0.0758	0.0758	0.0635	0.0635	0.0635	0.0635	0.0635	0.0635	0.0641	0.0614	0.1090
5	0.0703	0.0745	0.0745	0.0597	0.0597	0.0690	0.0690	0.0594	0.0594	0.0594	0.0594	0.0594	0.0594	0.0599	0.0614	0.0880
6	0.0698	0.0723	0.0723	0.0556	0.0556	0.0627	0.0627	0.0556	0.0556	0.0556	0.0556	0.0556	0.0556	0.0559	0.0614	0.0700
7	0.0689	0.0693	0.0693	0.0518	0.0518	0.0571	0.0571	0.0520	0.0520	0.0520	0.0520	0.0520	0.0520	0.0522	0.0614	0.0560
8	0.0676	0.0656	0.0656	0.0482	0.0482	0.0519	0.0519	0.0486	0.0486	0.0486	0.0486	0.0486	0.0486	0.0488	0.0614	0.0450
9	0.0655	0.0610	0.0610	0.0449	0.0449	0.0472	0.0472	0.0455	0.0455	0.0455	0.0455	0.0455	0.0455	0.0456	0.0614	0.0360
10	0.0627	0.0557	0.0557	0.0419	0.0419	0.0430	0.0430	0.0425	0.0425	0.0425	0.0425	0.0425	0.0425	0.0426	0.0613	0.0290
11	0.0588	0.0498	0.0498	0.0390	0.0390	0.0391	0.0391	0.0398	0.0398	0.0398	0.0398	0.0398	0.0398	0.0398	0.0611	0.0230
12	0.0539	0.0436	0.0436	0.0363	0.0363	0.0356	0.0356	0.0372	0.0372	0.0372	0.0372	0.0372	0.0372	0.0372	0.0607	0.0970
13	0.0458	0.0372	0.0372	0.0338	0.0338	0.0324	0.0324	0.0348	0.0348	0.0348	0.0348	0.0348	0.0348	0.0347	0.0595	0.0000
14	0.0363	0.0309	0.0309	0.0315	0.0315	0.0294	0.0294	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0324	0.0568	0.0000
15	0.0288	0.0249	0.0249	0.0294	0.0294	0.0268	0.0268	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0303	0.0511	0.0000
16	0.0228	0.0195	0.0195	0.0274	0.0274	0.0244	0.0244	0.0285	0.0285	0.0285	0.0285	0.0285	0.0285	0.0283	0.0406	0.0000
17	0.0181	0.0147	0.0147	0.0255	0.0255	0.0222	0.0222	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0264	0.0254	0.0000
18	0.0144	0.0107	0.0107	0.0237	0.0237	0.0202	0.0202	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0247	0.0121	0.0000
19	0.0114	0.0085	0.0085	0.0221	0.0221	0.0184	0.0184	0.0233	0.0233	0.0233	0.0233	0.0233	0.0233	0.0231	0.0099	0.0000
20	0.0090	0.0081	0.0081	0.0206	0.0206	0.0167	0.0167	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0216	0.0081	0.0000
21	0.0072	0.0078	0.0078	0.0192	0.0192	0.0152	0.0152	0.0204	0.0204	0.0204	0.0204	0.0204	0.0204	0.0201	0.0066	0.0000
22	0.0057	0.0075	0.0075	0.0179	0.0179	0.0138	0.0138	0.0191	0.0191	0.0191	0.0191	0.0191	0.0191	0.0188	0.0054	0.0000
23	0.0045	0.0072	0.0072	0.0167	0.0167	0.0126	0.0126	0.0178	0.0178	0.0178	0.0178	0.0178	0.0178	0.0176	0.0044	0.0000

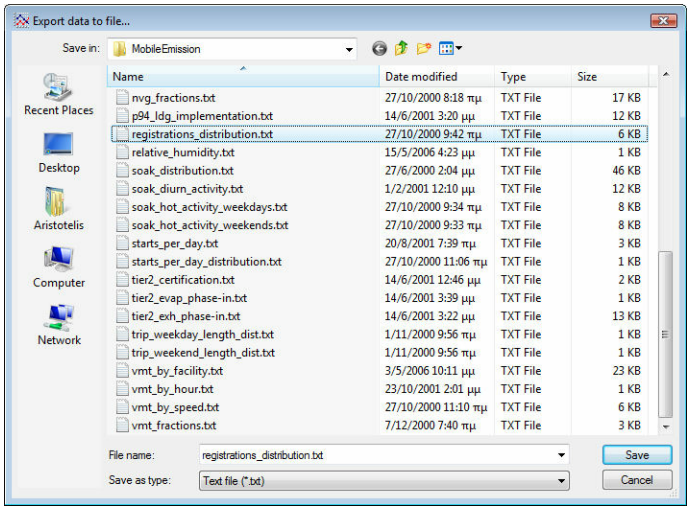
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.FLT.007, contains the default age distributions used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.3 Diesel fractions

This command permits users to supply locality-specific diesel fractions for 14 of the 16 composite vehicle categories by vehicle age.

- 1971 and earlier model years are assumed to have the same diesel fraction as the 1972 model year.
- 1997 and later model years are assumed to have the same diesel fraction as the 1996 model year.

Diesel fractions allow the program to perform separate calculations for gas and diesel subcategories, which have distinctly different emission rates. Urban/transit buses are assumed to be all diesel-fueled, and motorcycles are assumed to be all gasoline-fueled, so these two categories do not require a diesel fraction. That leaves 14 composite vehicle categories for which users can specify a diesel fraction.

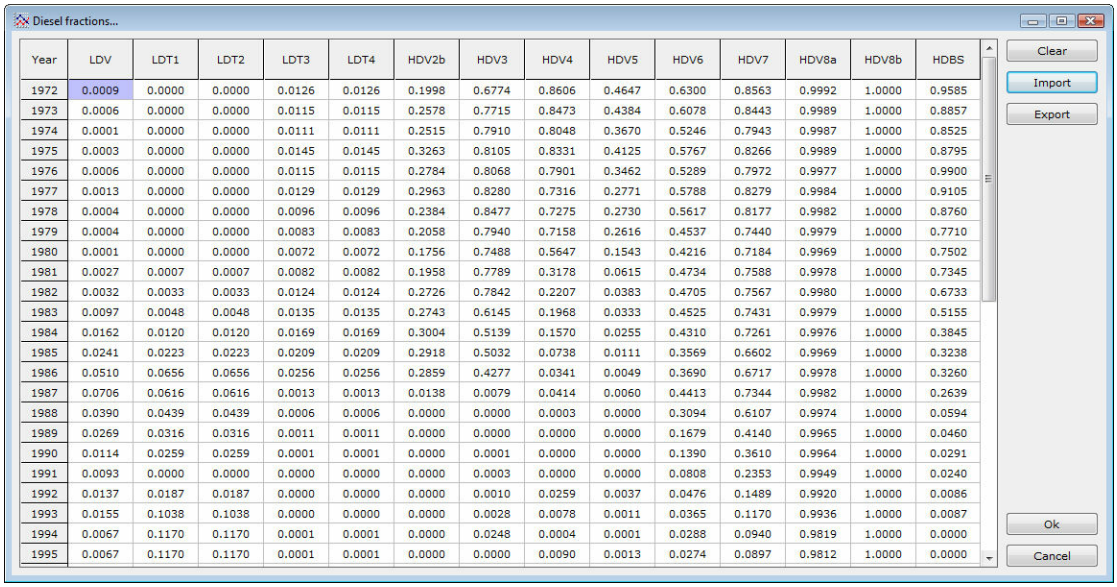
The diesel fraction represents the percent of diesels in a composite vehicle category for any vehicle age. The model year that the model applies to each value depends on the calendar year of evaluation. This means that the user must provide separate input for each calendar year to be modeled. The program assumes that all non-diesel vehicle sales are gasoline-fueled vehicles.

If the user selects this command, diesel fractions must be provided by age of vehicle and for each of the 14 composite vehicle types. With 14 vehicle categories and 25 vehicle ages, the user needs to enter 350 separate diesel fractions. The user must provide separate input for each scenario to run multiple calendar years.

For each one of the 25 years, a number between 0 and 1 is entered. This number dictates the percentage of vehicles of a particular category that use diesel. For example, if for a particular year the number 0.2 in entered for the LDV category, then 80% of the vehicles operate on gasoline, while the remaining 20% operate on diesel. The fractions are entered using four decimal digits accuracy.

To enter the diesel fractions:

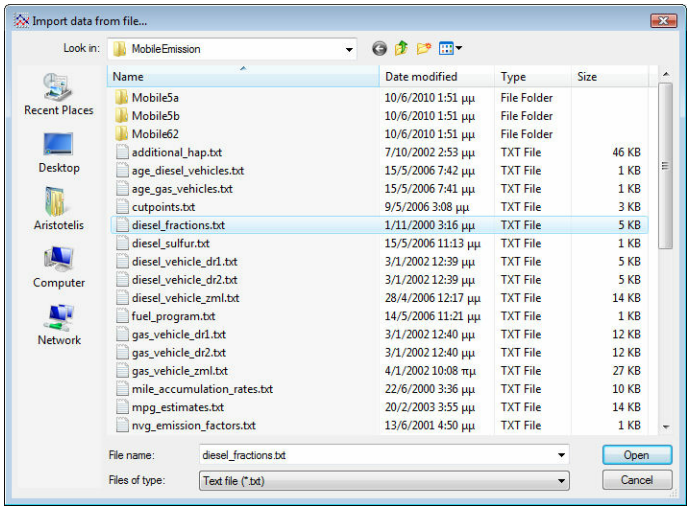
1. Select a run or a scenario.
2. From the **Fleet** menu select **Diesel Fractions**.
3. Type in the desired values directly in the table. A value equal to 0 means that there are no diesel vehicles in the category that corresponds to the column where this value belongs and for the age that corresponds to the row where this value belongs.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Year	LDV	LDT1	LDT2	LDT3	LDT4	HDV2b	HDV3	HDV4	HDV5	HDV6	HDV7	HDV8a	HDV8b	HDBS
1972	0.0009	0.0000	0.0000	0.0126	0.0126	0.1998	0.6774	0.8606	0.4647	0.6300	0.8563	0.9992	1.0000	0.9585
1973	0.0006	0.0000	0.0000	0.0115	0.0115	0.2578	0.7715	0.8473	0.4384	0.6078	0.8443	0.9989	1.0000	0.8857
1974	0.0001	0.0000	0.0000	0.0111	0.0111	0.2515	0.7910	0.8048	0.3670	0.5246	0.7943	0.9987	1.0000	0.8525
1975	0.0003	0.0000	0.0000	0.0145	0.0145	0.3263	0.8105	0.8331	0.4125	0.5767	0.8266	0.9989	1.0000	0.8795
1976	0.0006	0.0000	0.0000	0.0115	0.0115	0.2784	0.8068	0.7901	0.3462	0.5289	0.7972	0.9977	1.0000	0.9900
1977	0.0013	0.0000	0.0000	0.0129	0.0129	0.2963	0.8280	0.7316	0.2771	0.5788	0.8279	0.9984	1.0000	0.9105
1978	0.0004	0.0000	0.0000	0.0096	0.0096	0.2384	0.8477	0.7275	0.2730	0.5617	0.8177	0.9982	1.0000	0.8760
1979	0.0004	0.0000	0.0000	0.0083	0.0083	0.2058	0.7940	0.7158	0.2616	0.4537	0.7440	0.9979	1.0000	0.7710
1980	0.0001	0.0000	0.0000	0.0072	0.0072	0.1756	0.7488	0.5647	0.1543	0.4216	0.7184	0.9969	1.0000	0.7502
1981	0.0027	0.0007	0.0007	0.0082	0.0082	0.1958	0.7789	0.3178	0.0615	0.4734	0.7588	0.9978	1.0000	0.7345
1982	0.0032	0.0033	0.0033	0.0124	0.0124	0.2726	0.7842	0.2207	0.0383	0.4705	0.7567	0.9980	1.0000	0.6733
1983	0.0097	0.0048	0.0048	0.0135	0.0135	0.2743	0.6145	0.1968	0.0333	0.4525	0.7431	0.9979	1.0000	0.5155
1984	0.0162	0.0120	0.0120	0.0169	0.0169	0.3004	0.5139	0.1570	0.0255	0.4310	0.7261	0.9976	1.0000	0.3845
1985	0.0241	0.0223	0.0223	0.0209	0.0209	0.2918	0.5032	0.0738	0.0111	0.3569	0.6602	0.9969	1.0000	0.3238
1986	0.0510	0.0656	0.0656	0.0256	0.0256	0.2859	0.4277	0.0341	0.0049	0.3690	0.6717	0.9978	1.0000	0.3260
1987	0.0706	0.0616	0.0616	0.0013	0.0013	0.0138	0.0079	0.0414	0.0060	0.4413	0.7344	0.9982	1.0000	0.2639
1988	0.0390	0.0439	0.0439	0.0006	0.0006	0.0000	0.0000	0.0003	0.0000	0.3094	0.6107	0.9974	1.0000	0.0594
1989	0.0269	0.0316	0.0316	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.1679	0.4140	0.9965	1.0000	0.0460
1990	0.0114	0.0259	0.0259	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000	0.1390	0.3610	0.9964	1.0000	0.0291
1991	0.0093	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000	0.0808	0.2353	0.9949	1.0000	0.0240
1992	0.0137	0.0187	0.0187	0.0000	0.0000	0.0000	0.0010	0.0259	0.0037	0.0476	0.1489	0.9920	1.0000	0.0086
1993	0.0155	0.1038	0.1038	0.0000	0.0000	0.0000	0.0028	0.0078	0.0011	0.0365	0.1170	0.9936	1.0000	0.0087
1994	0.0067	0.1170	0.1170	0.0001	0.0001	0.0000	0.0248	0.0004	0.0001	0.0288	0.0940	0.9819	1.0000	0.0000
1995	0.0067	0.1170	0.1170	0.0001	0.0001	0.0000	0.0000	0.0090	0.0013	0.0274	0.0897	0.9812	1.0000	0.0000

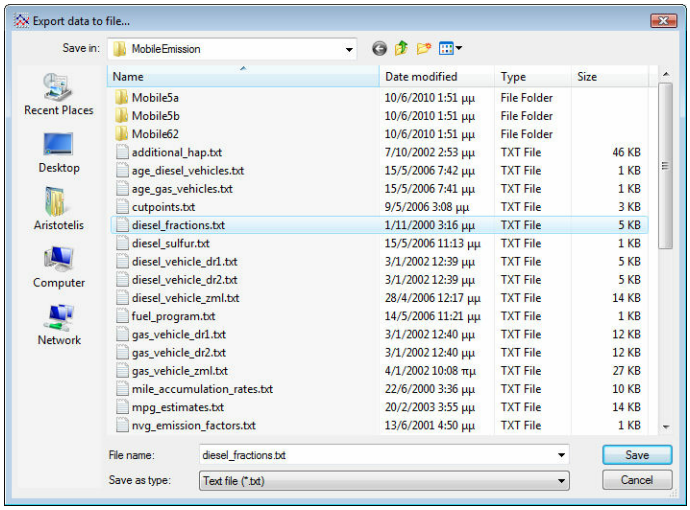
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.FLT.007, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

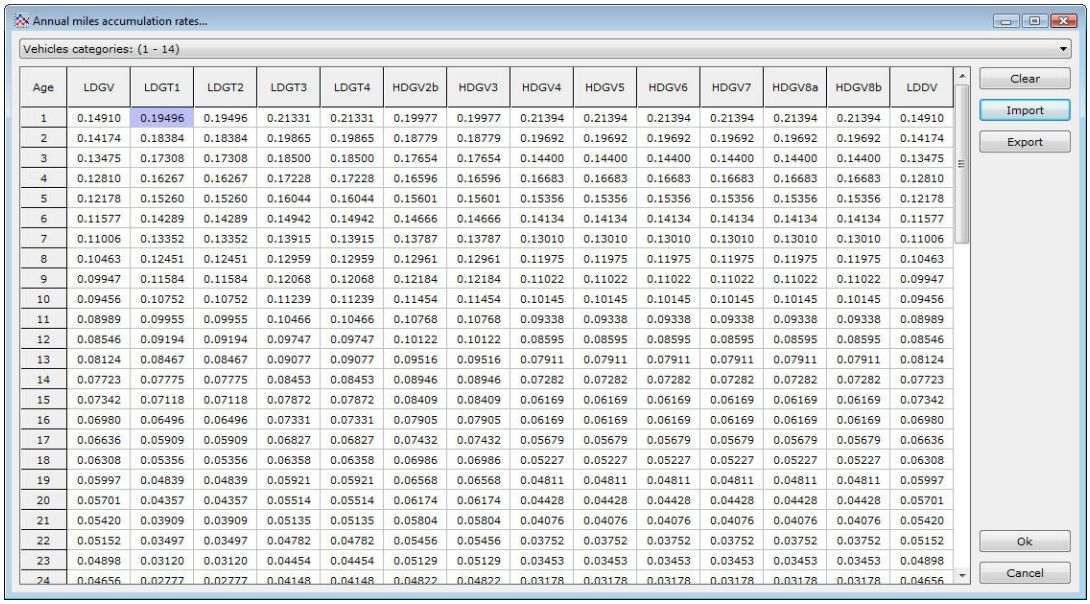
6.4 Annual kilometers accumulation rates

This command allows users to supply the annual kilometers (mileage) accumulation rates by vehicle age for any or all of the 28 individual vehicle types. The kilometers (mileage) accumulation rate represents the total annual travel accumulated per vehicle of a given age and individual vehicle category. The user does not need to enter kilometers (mileage) for all categories.

The program will apply default values for any vehicle type that the user does not specify. The value entered represents the kilometers (miles for English units) traveled by a vehicle type of a specified age divided by 100,000. For example, if the user enters 0.15 for LDGV vehicles that are 5 years old, then this means that vehicles belonging to the LDGV category and are 5 years old, traveled 0.15x100000=15000 km (or miles for English units).

To enter the annual kilometers accumulation rates:

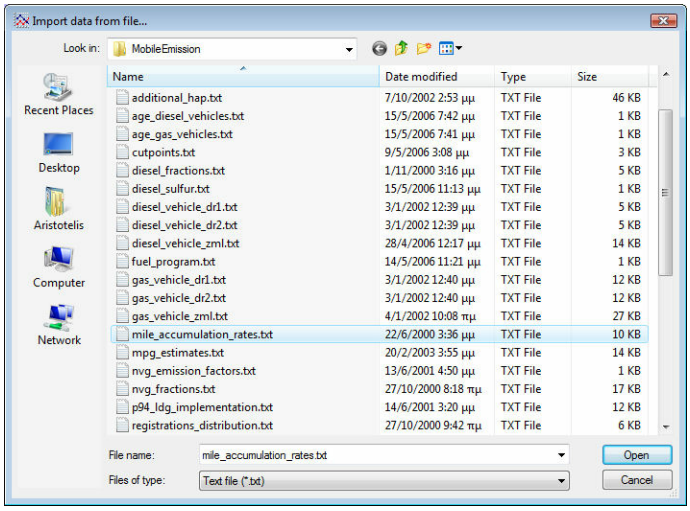
1. Select a run.
2. From the **Fleet** menu select **Annual Kilometers Accumulation Rates**.
3. Select a group of vehicles from the drop-down list.
4. Type in the desired values directly in the table. A value not entered is replaced by the default value (see note at the end of the paragraph).
5. Repeat steps 3 and 4 until all values have been entered.
6. Optionally, click on **Clear** to delete all data that are present in the table.
7. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Age	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2b	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8a	HDGV8b	LDDV
1	0.14910	0.19496	0.19496	0.21331	0.21331	0.19977	0.19977	0.21394	0.21394	0.21394	0.21394	0.21394	0.21394	0.14910
2	0.14174	0.18384	0.18384	0.19865	0.19865	0.18779	0.18779	0.19692	0.19692	0.19692	0.19692	0.19692	0.19692	0.14174
3	0.13475	0.17308	0.17308	0.18500	0.18500	0.17654	0.17654	0.14400	0.14400	0.14400	0.14400	0.14400	0.14400	0.13475
4	0.12810	0.16267	0.16267	0.17228	0.17228	0.16596	0.16596	0.16683	0.16683	0.16683	0.16683	0.16683	0.16683	0.12810
5	0.12178	0.15260	0.15260	0.16044	0.16044	0.15601	0.15601	0.15356	0.15356	0.15356	0.15356	0.15356	0.15356	0.12178
6	0.11577	0.14289	0.14289	0.14942	0.14942	0.14666	0.14666	0.14134	0.14134	0.14134	0.14134	0.14134	0.14134	0.11577
7	0.11006	0.13352	0.13352	0.13915	0.13915	0.13787	0.13787	0.13010	0.13010	0.13010	0.13010	0.13010	0.13010	0.11006
8	0.10463	0.12451	0.12451	0.12959	0.12959	0.12961	0.12961	0.11975	0.11975	0.11975	0.11975	0.11975	0.11975	0.10463
9	0.09947	0.11584	0.11584	0.12068	0.12068	0.12184	0.12184	0.11022	0.11022	0.11022	0.11022	0.11022	0.11022	0.09947
10	0.09456	0.10752	0.10752	0.11239	0.11239	0.11454	0.11454	0.10145	0.10145	0.10145	0.10145	0.10145	0.10145	0.09456
11	0.08989	0.09955	0.09955	0.10466	0.10466	0.10768	0.10768	0.09338	0.09338	0.09338	0.09338	0.09338	0.09338	0.08989
12	0.08546	0.09194	0.09194	0.09747	0.09747	0.10122	0.10122	0.08595	0.08595	0.08595	0.08595	0.08595	0.08595	0.08546
13	0.08124	0.08467	0.08467	0.09077	0.09077	0.09516	0.09516	0.07911	0.07911	0.07911	0.07911	0.07911	0.07911	0.08124
14	0.07723	0.07775	0.07775	0.08453	0.08453	0.08946	0.08946	0.07282	0.07282	0.07282	0.07282	0.07282	0.07282	0.07723
15	0.07342	0.07118	0.07118	0.07872	0.07872	0.08409	0.08409	0.06169	0.06169	0.06169	0.06169	0.06169	0.06169	0.07342
16	0.06980	0.06496	0.06496	0.07331	0.07331	0.07905	0.07905	0.06169	0.06169	0.06169	0.06169	0.06169	0.06169	0.06980
17	0.06636	0.05909	0.05909	0.06827	0.06827	0.07432	0.07432	0.05679	0.05679	0.05679	0.05679	0.05679	0.05679	0.06636
18	0.06308	0.05356	0.05356	0.06358	0.06358	0.06986	0.06986	0.05227	0.05227	0.05227	0.05227	0.05227	0.05227	0.06308
19	0.05997	0.04839	0.04839	0.05921	0.05921	0.06568	0.06568	0.04811	0.04811	0.04811	0.04811	0.04811	0.04811	0.05997
20	0.05701	0.04357	0.04357	0.05514	0.05514	0.06174	0.06174	0.04428	0.04428	0.04428	0.04428	0.04428	0.04428	0.05701
21	0.05420	0.03909	0.03909	0.05135	0.05135	0.05804	0.05804	0.04076	0.04076	0.04076	0.04076	0.04076	0.04076	0.05420
22	0.05152	0.03497	0.03497	0.04782	0.04782	0.05456	0.05456	0.03752	0.03752	0.03752	0.03752	0.03752	0.03752	0.05152
23	0.04898	0.03120	0.03120	0.04454	0.04454	0.05129	0.05129	0.03453	0.03453	0.03453	0.03453	0.03453	0.03453	0.04898
24	0.04656	0.02777	0.02777	0.04148	0.04148	0.04822	0.04822	0.03178	0.03178	0.03178	0.03178	0.03178	0.03178	0.04656

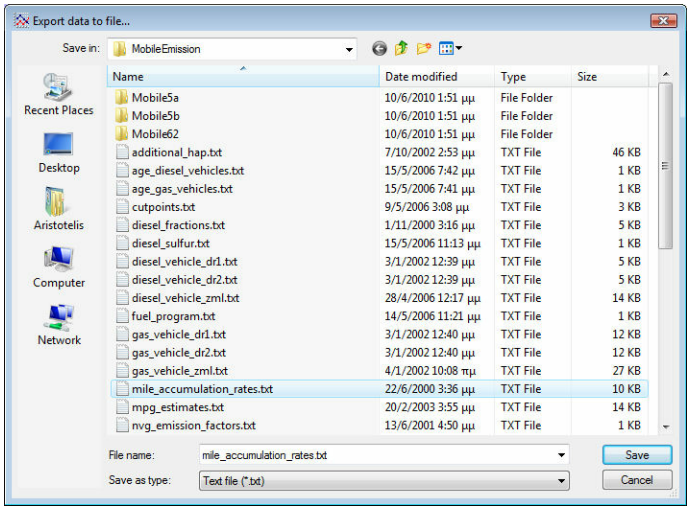
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.FLT.007, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.5 Vehicle kilometers traveled

6.5.1 Fractions

This command and the three that follow, along with the mileage accumulation rate option, allow users to supply vehicle travel data specific to the geographical location they wish to model. The command allows users to allocate VMT (Vehicle Kilometers or Miles Traveled) to specific vehicle types. The VMT fractions are used to weight together

the emissions of the various vehicle types into the average emissions for groupings of vehicle classes, such as the HDGV and All Vehicles categories in the descriptive output.

The VMT FRACTIONS command should be used to properly model any situation in which the local mix of the 16 combined vehicle types differs from the national (U.S.) average.

By default, the program calculates a default VMT mileage distribution from national United States average data and/or user-supplied information, specifically:

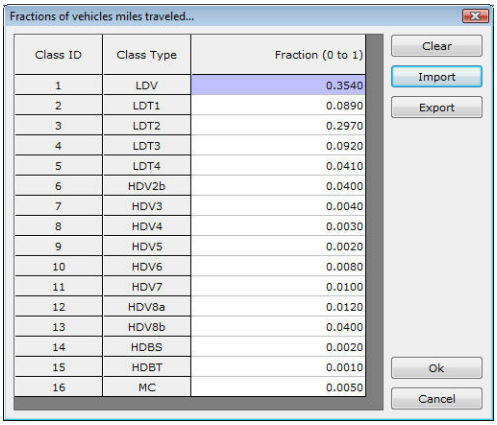
1. The calendar year of evaluation.
2. Default vehicle population data for the 16 composite vehicle classes.
3. Default or user-supplied vehicle registration by age distribution data.
4. Default or user-supplied diesel fractions.
5. Default or user-supplied mileage accumulation data.

The default data for items 2 through 5 are described in technical report, M6.FLT.007 (see bottom note). Note that the model users are not allowed to change data item 2 as such; this command is provided instead. Note also that the total vehicle population, per se, is not significant in the model because all emission results are expressed on a per-vehicle-mile basis. Therefore, only the fraction of vehicles of each age and class actually affects the results.

The VMT mix specifies the fraction of total highway VMT that is accumulated by each of the 16 composite vehicle types. Each VMT mix supplied as input must consist of a set of 16 fractional values, representing the fraction of total highway VMT accumulated by each of 16 combined vehicle types. All values must be between 0 and 1, and the 16 values must add up to 1.0. The program automatically normalizes the values so that they add up to 1.

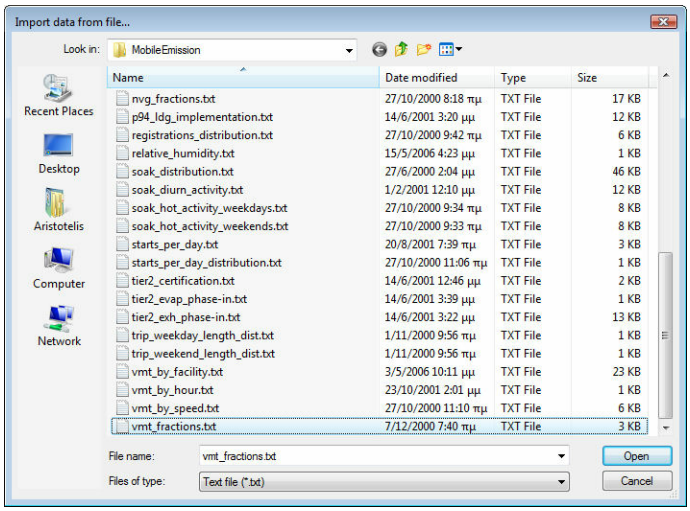
To enter the fractions of vehicle kilometers traveled:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Vehicle Kilometers Traveled** menu.
3. From the new pop-up menu select **Fractions**.
4. Enter the desired values directly in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



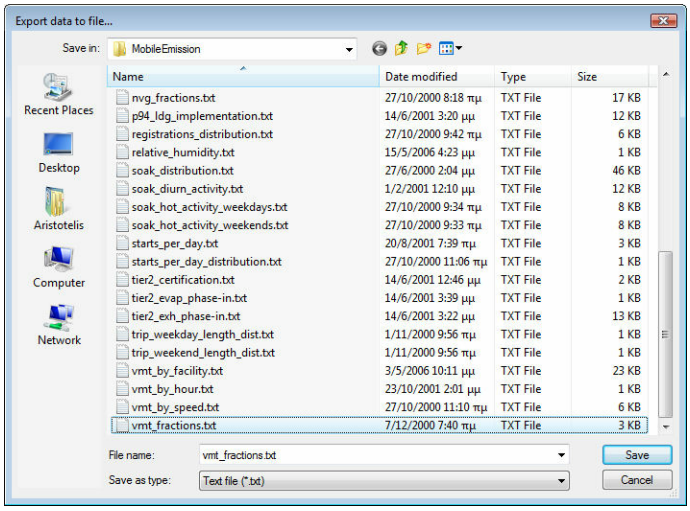
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is used along with the annual kilometers accumulation rates to calculate the distribution of the vehicles categories per traveled kilometers.

NOTE: This data is optional. If not supplied, technical report M6.FLT.007, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.5.2 By facility

This command allows users to allocate VMT to various roadway or facility types by vehicle class. By default, the program uses national (U.S.) estimates of the distribution of VMT by facility type. The default values are the same for every vehicle type. The technical
report, M6.SPD.003, provides an explanation of the methodology used to generate these default values (see bottom note).

The VMT by facility command allows users to enter VMT distributions for each of the 28 vehicle classes across four roadway types for each of the 24 hours of the day. The user must enter the 96 VMT fractions representing the fraction of travel on each roadway type at each hour of the day for that vehicle class. The user is permitted to enter VMT fractions (in blocks of 96 VMT fractions) for any
individual vehicle class, or for any number of vehicle classes up to 28 classes. If the user chooses to enter VMT fractions for less than all of the 28 vehicle classes, the program will use default VMT fractions for the vehicle classes unspecified by the user.

For a given vehicle class, the VMT fractions must be entered as 24 values for each successive hour of the day starting with 6 a.m. There must be four sets of 24 values corresponding to the four facility types, and the four sets must be entered in the following order: freeway, arterial, local, and ramp.

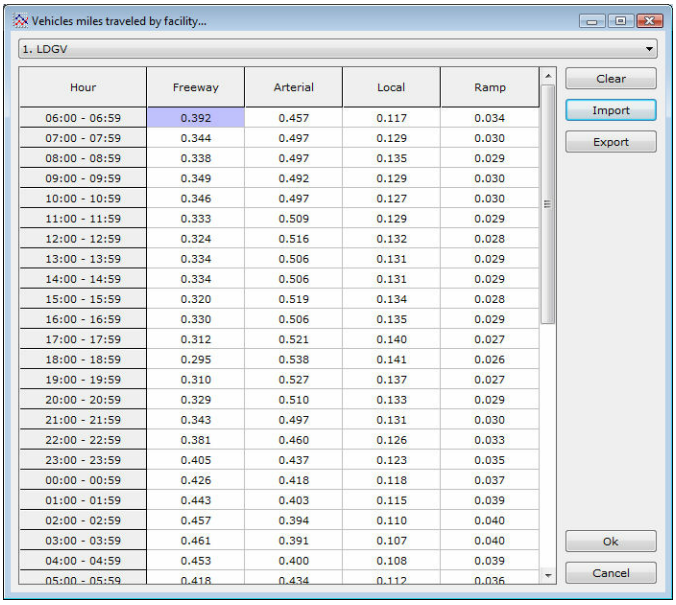
The distributions for each hour must add up to 1. If they do not, the program will automatically normalize them. The program's default for this input is the same for every vehicle type. For example, in default runs, heavy-duty trucks have the same VMT distribution by
roadway as passenger cars. If VMT by roadway distribution data is available by vehicle class, this command allows the user to supply the appropriate VMT fractions.

Also, the name used for this command and the two that follow could lead to a misinterpretation of their function. This command requires the user to provide fractional values for the four roadway types at each of the 24 hours of the day for a given vehicle class. Because the total VMT within each hour varies across the day, the input fractions will not add up to the fraction of daily VMT on each roadway type.

The data in this command and the VMT BY HOUR command can be multiplied (outside of the program) to obtain the distribution of VMT during the 24 hours of the day and for each facility type.

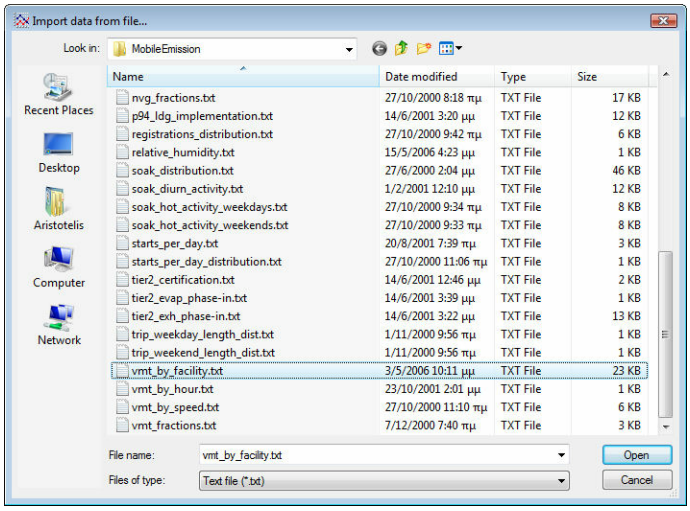
To enter the vehicle kilometers traveled by facility:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Vehicle Kilometers Traveled** menu.
3. From the new pop-up menu select **By Facility**.
4. Select a vehicle category from the drop-down list.
5. Enter the desired values directly in the table.
6. Repeat steps 4 and 5 until all values have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



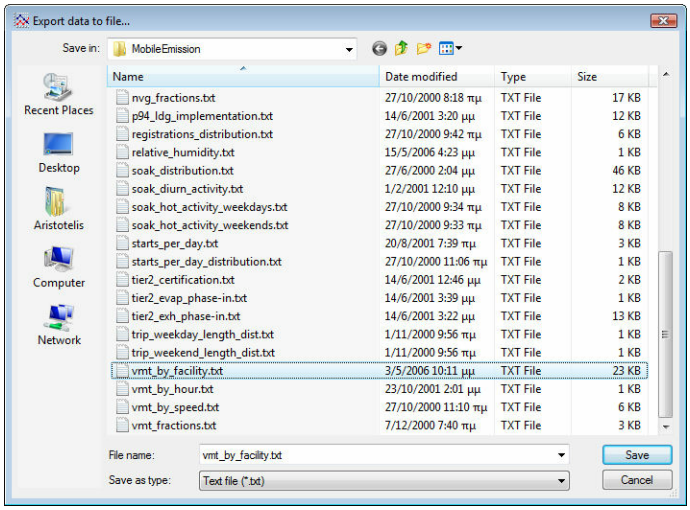
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.5.3 By hour

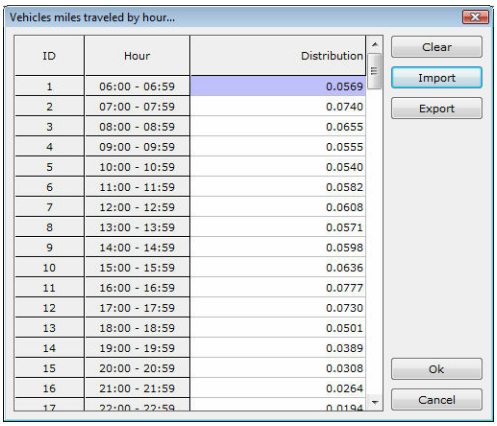
This command allows users to allocate the fraction of VMT that occurs at each hour of the day. By default the program uses national data (U.S.) for the default distribution of VMT by hour, as described in technical report, M6.SPD.003 (see bottom note).

This command permits the user to allocate total VMT among the 24 hours of each day. The values for the command are independent of facility type, that is, the VMT fraction covers all facility types. The 24 values must add up to 1. If they do not, the program

will automatically normalize them. Values are entered with four decimal digits.

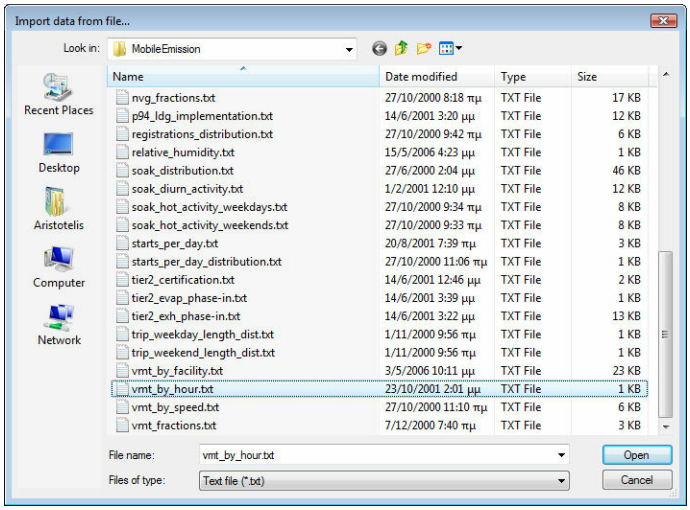
To enter the vehicle kilometers traveled by hour:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Vehicle Kilometers Traveled** menu.
3. From the new pop-up menu select **By Hour**.
4. Enter the desired values directly in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



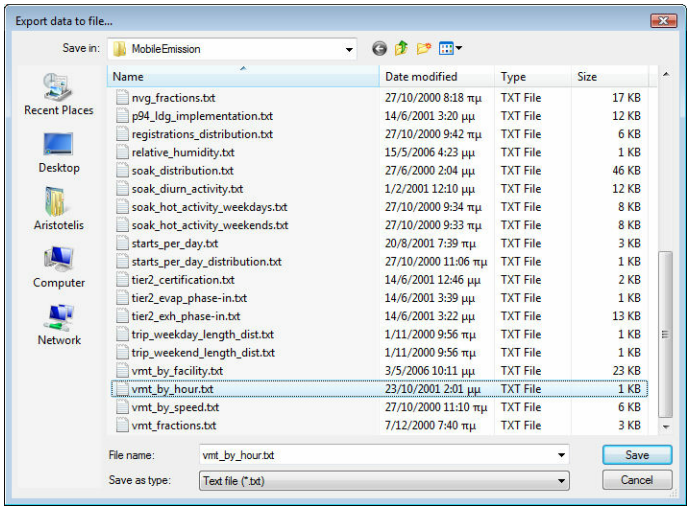
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.5.4 By speed

This command allows users to allocate VMT by average speed on freeways and arterial roads. By default the program uses national fleet data (U.S.) for the default distribution of VMT by average speed for freeways and arterial roadways, as described in technical report, M6.SPD.003 (see bottom note).

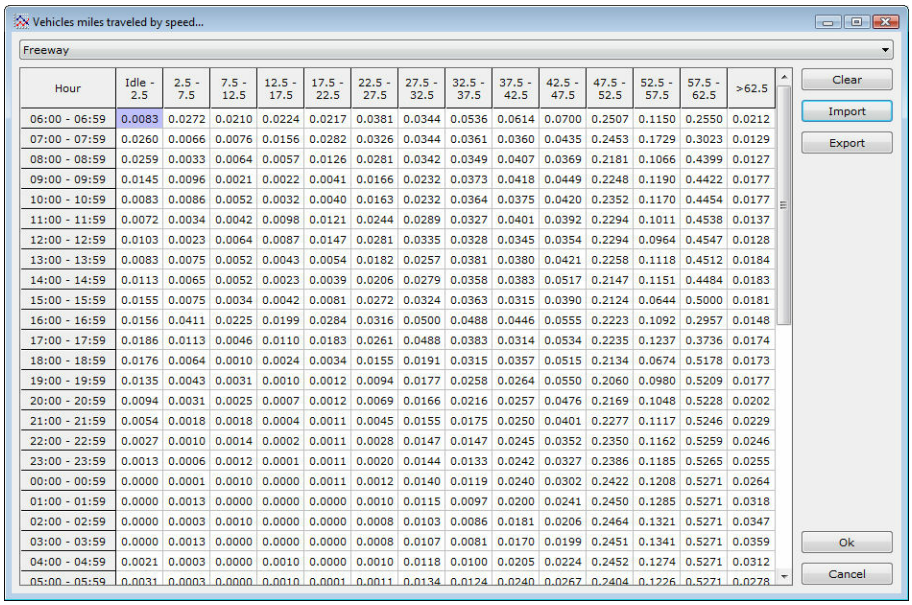
The SPEED VMT command name permits the user to enter the VMT distribution over preselected average speed ranges. The program calculates these distributions for each of the 24 hours of the day and for freeways and arterials (producing 48 separate distributions, each containing 14 fractions). The data in this array are not sufficient to estimate either hourly VMT distribution or the VMT distributions by facility type.

The 14 average speed fractions (0.0000 through 1.0000) must add up to 1. The first of the 14 preset speeds is 'idle,' and the other 13 average speeds range from 4 to 100.6 km/m in 8 km/h increments or 5 mph to 65 mph in 5 mph increments. This pattern must be repeated for each combination of roadway type (arterial and freeway) and time of day. Distributions must be entered for all facility types and hours.

To enter the vehicle kilometers traveled by speed:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Vehicle Kilometers Traveled** menu.
3. From the new pop-up menu select **By Speed**.
4. Select a category from the drop-down list.
5. Enter the desired values directly in the table.
6. Repeat steps 4 and 5 until all values have been entered.

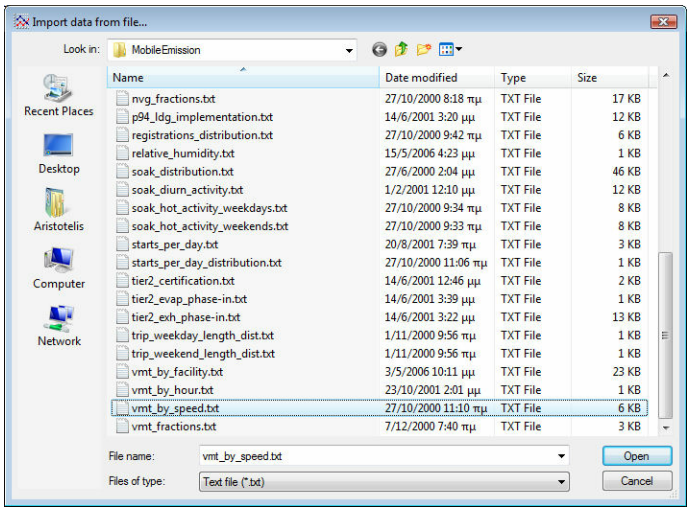
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Hour	Idle - 2.5	2.5 - 7.5	7.5 - 12.5	12.5 - 17.5	17.5 - 22.5	22.5 - 27.5	27.5 - 32.5	32.5 - 37.5	37.5 - 42.5	42.5 - 47.5	47.5 - 52.5	52.5 - 57.5	57.5 - 62.5	>62.5
06:00 - 06:59	0.0083	0.0272	0.0210	0.0224	0.0217	0.0381	0.0344	0.0536	0.0614	0.0700	0.2507	0.1150	0.2550	0.0212
07:00 - 07:59	0.0260	0.0066	0.0076	0.0156	0.0282	0.0326	0.0344	0.0361	0.0360	0.0435	0.2453	0.1729	0.3023	0.0129
08:00 - 08:59	0.0259	0.0033	0.0064	0.0057	0.0126	0.0281	0.0342	0.0349	0.0407	0.0369	0.2181	0.1066	0.4399	0.0127
09:00 - 09:59	0.0145	0.0096	0.0021	0.0022	0.0041	0.0166	0.0232	0.0373	0.0418	0.0449	0.2248	0.1190	0.4422	0.0177
10:00 - 10:59	0.0083	0.0086	0.0052	0.0032	0.0040	0.0163	0.0232	0.0364	0.0375	0.0420	0.2352	0.1170	0.4454	0.0177
11:00 - 11:59	0.0072	0.0034	0.0042	0.0098	0.0121	0.0244	0.0289	0.0327	0.0401	0.0392	0.2294	0.1011	0.4538	0.0137
12:00 - 12:59	0.0103	0.0023	0.0064	0.0087	0.0147	0.0281	0.0335	0.0328	0.0345	0.0354	0.2294	0.0964	0.4547	0.0128
13:00 - 13:59	0.0083	0.0075	0.0052	0.0043	0.0054	0.0182	0.0257	0.0381	0.0380	0.0421	0.2258	0.1118	0.4512	0.0184
14:00 - 14:59	0.0113	0.0065	0.0052	0.0023	0.0039	0.0206	0.0279	0.0358	0.0383	0.0517	0.2147	0.1151	0.4484	0.0183
15:00 - 15:59	0.0155	0.0075	0.0034	0.0042	0.0081	0.0272	0.0324	0.0363	0.0315	0.0390	0.2124	0.0644	0.5000	0.0181
16:00 - 16:59	0.0156	0.0411	0.0225	0.0199	0.0284	0.0316	0.0500	0.0488	0.0446	0.0555	0.2223	0.1092	0.2957	0.0148
17:00 - 17:59	0.0186	0.0113	0.0046	0.0110	0.0183	0.0261	0.0488	0.0383	0.0314	0.0534	0.2235	0.1237	0.3736	0.0174
18:00 - 18:59	0.0176	0.0064	0.0010	0.0024	0.0034	0.0155	0.0191	0.0315	0.0357	0.0515	0.2134	0.0674	0.5178	0.0173
19:00 - 19:59	0.0135	0.0043	0.0031	0.0010	0.0012	0.0094	0.0177	0.0258	0.0264	0.0550	0.2060	0.0980	0.5209	0.0177
20:00 - 20:59	0.0094	0.0031	0.0025	0.0007	0.0012	0.0069	0.0166	0.0216	0.0257	0.0476	0.2169	0.1048	0.5228	0.0202
21:00 - 21:59	0.0054	0.0018	0.0018	0.0004	0.0011	0.0045	0.0155	0.0175	0.0250	0.0401	0.2277	0.1117	0.5246	0.0229
22:00 - 22:59	0.0027	0.0010	0.0014	0.0002	0.0011	0.0028	0.0147	0.0147	0.0245	0.0352	0.2350	0.1162	0.5259	0.0246
23:00 - 23:59	0.0013	0.0006	0.0012	0.0001	0.0011	0.0020	0.0144	0.0133	0.0242	0.0327	0.2386	0.1185	0.5265	0.0255
00:00 - 00:59	0.0000	0.0001	0.0010	0.0000	0.0011	0.0012	0.0140	0.0119	0.0240	0.0302	0.2422	0.1208	0.5271	0.0264
01:00 - 01:59	0.0000	0.0013	0.0000	0.0000	0.0000	0.0010	0.0115	0.0097	0.0200	0.0241	0.2450	0.1285	0.5271	0.0318
02:00 - 02:59	0.0000	0.0003	0.0010	0.0000	0.0000	0.0008	0.0103	0.0086	0.0181	0.0206	0.2464	0.1321	0.5271	0.0347
03:00 - 03:59	0.0000	0.0013	0.0000	0.0000	0.0000	0.0008	0.0107	0.0081	0.0170	0.0199	0.2451	0.1341	0.5271	0.0359
04:00 - 04:59	0.0021	0.0003	0.0000	0.0010	0.0000	0.0010	0.0118	0.0100	0.0205	0.0224	0.2452	0.1274	0.5271	0.0312
05:00 - 05:59	0.0031	0.0003	0.0000	0.0010	0.0001	0.0011	0.0134	0.0124	0.0240	0.0267	0.2404	0.1226	0.5271	0.0278

To import data from an external file:

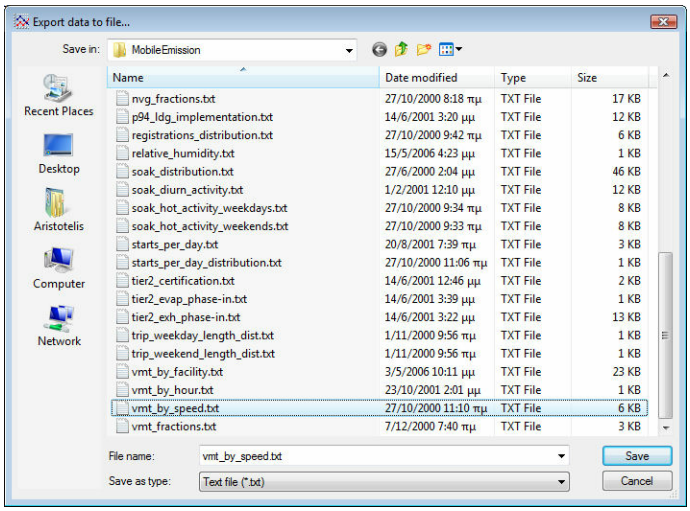
1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.

3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.5.5 By average speed

This command allows users to designate a single average speed to use for all freeways and/or arterial/collectors for the entire day. By default the program uses national fleet data (U.S.) for the default distribution of VMT by average speed for freeways and arterial roadways, as described in technical report, M6.SPD.003 (see bottom note), or a user supplied VMT by average speed distribution provided using the VMT by speed command.

The VMT by speed command permits the user to replace the default values with a VMT distribution over fourteen average speed bins. However, in some modeling situations the user may wish to enter a single value instead of a distribution. For example, the user may need to model roadway links separately, or may not have the VMT distribution information. In these cases, the program can be used to calculate results for a single specified average speed. The By average speed command automatically replaces the VMT by speed and VMT by facility data files with the appropriate average speed and facility type information for a single average speed. (All of the functions of the By average speed command can be duplicated using the VMT by speed and VMT by facility commands, if desired.

The By average speed command includes up to six data elements. The first two of the data elements are required. The elements must be entered on the command line. The data elements are:

- Average speed
- Roadway scenario
- Distribution of VMT by facility (4 values)

Each element is described in detail below.

Average speed value (4.1 to 104.6 km/h or 2.5 to 65 mph for English units).

As with all average speed inputs to the model, the allowed user supplied average speed value may range from 4.1 to 104.6 km/h 2.5 through 65 miles per hour for English units. Any integer or decimal value in that range may be used.

Indication of the roadway scenario the user wishes to model

- *Non-Ramp* All VMT occurs on freeways, not including freeway ramps,
- *Freeway* All VMT occurs on freeways, including freeway ramps
- *Arterial* All VMT occurs on arterial/collector roadways, or
- *Areawide* VMT occurs on all roadway types as determined by the VMT by facility command or the using national average (U.S.) defaults.

The roadway scenario indicates the type of driving that the user intends for the average speed input to model. (Note: the average speed used for local roadways and freeway ramps cannot be changed by the user.)

Non-Ramp
The "Non-Ramp" roadway scenario assigns all VMT to the freeway roadway type, with the VMT automatically distributed among two average speed bins which average to the single average speed indicated by the user. No freeway ramp driving is included in the estimate. The VMT from freeway ramps and all the other roadway types is set to zero for all hours of the day.

Freeway
The "Freeway" roadway scenario assigns all VMT to either the freeway or the freeway ramp roadway types. If the user does not specify the distribution of VMT by facility, the national average fraction of freeway ramp activity (8% freeway ramp and 92% non-ramp freeway) is used. Freeway ramps have a constant speed of 55.7 km/h or 34.6 mph, which cannot be changed by the user. A single average speed for the non-ramp freeway VMT is calculated using the fixed freeway ramp average speed and the freeway ramp VMT fraction such that the combined ramp and non-ramp average speed matches the average speed value entered by the user. All of the non-ramp freeway VMT is then automatically distributed among two average speed bins which average to the calculated average non-ramp freeway speed.

Arterial
The "Arterial" roadway scenario assigns all VMT to the arterial/collector roadway type with a single average speed as indicated by the user. The VMT from the other roadway types is set to zero for all hours of the day.

Areawide
When the user indicated the 'Areawide' roadway scenario, the program selects a single average speed for the freeway roadway type and a single average speed for the arterial/collector roadway type such that the combined average speed for all roadway types (including local roadways and freeway ramps) will match the average speed value entered by the user. If the user does not specify the distribution of VMT by facility (described below), the national (U.S.) default distribution (34.2% freeway,49.8% arterial/collector, 13% local, 3% freeway ramp) is used. This same distribution of VMT by facility is used for all hours of the day for all vehicle types.

Since the freeway ramp and local roadway speeds are fixed, the program may not be able to model the average speed indicated by the user if the average speed desired is too high or too low. In these cases a calculated maximum speed or a calculated minimum speed is substituted for the user supplied average speed and a warning, indicating the actual average speed used, is written to the descriptive output.

Distribution of VMT by facility to be used (optional, four values)

- Fraction of VMT which occurs on freeways (non-ramp),
- Fraction of VMT which occurs on arterial/collector roadways,
- Fraction of VMT which occurs on local roadways, and
- Fraction of VMT which occurs on freeway ramps.

The effect of entering an areawide average speed or an average speed on freeways, including ramps, will depend on the distribution of VMT by facility (roadway type). If the user does not specify the distribution of VMT by facility, the national average distribution (U.S.) is used to calculate the appropriate VMT by facility:

- 34.2% (freeway)
- 49.8% (arterial/collector)
- 13.0% (local)
- 3.0% (freeway ramp)

The user may override these values by entering four new values in the order indicated above. The sum of the four values must equal 1.0 or 100(%). All four values must be entered. The entry of any distribution of VMT by facility values, either using the VMT by facility command or as part of the By average speed command, has no effect when the user selects either a "freeway" or an "arterial" roadway scenario, since in these cases, all VMT is assigned to either the freeway roadway type or the arterial/collector roadway type, respectively.

Be aware that using the By average speed command will override the default and user supplied distribution of VMT by facility values used to calculate the results. The same distribution of VMT by facility values is used for all hours of the day for all vehicle classes. Similarly, the same average speed is used for every hour of the day. Since other factors, such as temperature, vary across the
day, the composite results shown in the descriptive output is the VMT weighted daily average emission rate at that average speed.

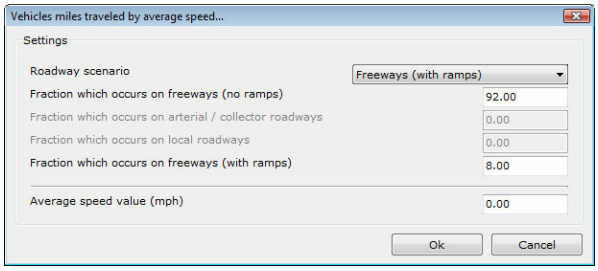
Since the effects of speed on emissions is not linear, using a single average speed will not produce the same emission result as the weighted results of a number of separate model runs with different average speeds. If the composite emissions of multiple roadways with different speeds are to be calculated, a model run using a distribution of average speeds should be used. However, it is appropriate to use the By average speed command to generate a single average speed result to represent similar roadways with similar average speeds (i.e., a lookup table).

The By average speed command does not bypass the model's average speed bins. Instead, the model calculates an appropriate distribution of average speeds across two average speed bins to match the user-specified average speed.

To enter the vehicle kilometers traveled by average speed:

1. Select a scenario.
2. From the **Fleet** menu select **Vehicle Kilometers Traveled** menu.
3. From the new pop-up menu select **By Average Speed**.
4. Select a scenario:
- None - disables this function.
- Freeway (no ramps)
- Freeway (with ramps) - enter the fractions which occur on freeways and ramps
- Arterial
- Areawide - enter the fractions which occur on all four categories

5. Enter the average speed.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.6 Natural gas vehicles

6.6.1 Fractions

This command is used to indicate the percent of vehicles in the fleet certified to operate on (not retrofitted for) either compressed or liquefied natural gas. By default, the fraction of NGV vehicles in the fleet is zero.

This command allows the user to specify the percent of NGVs in each of the 28 individual vehicle classes beginning with the 1994 model year. If the user enters 100% NGV, the model will report the basic NGV emission rate. Any other percentage will specify a fleet that is part NGV, with gasoline and diesel vehicles comprising the remaining part of the fleet.

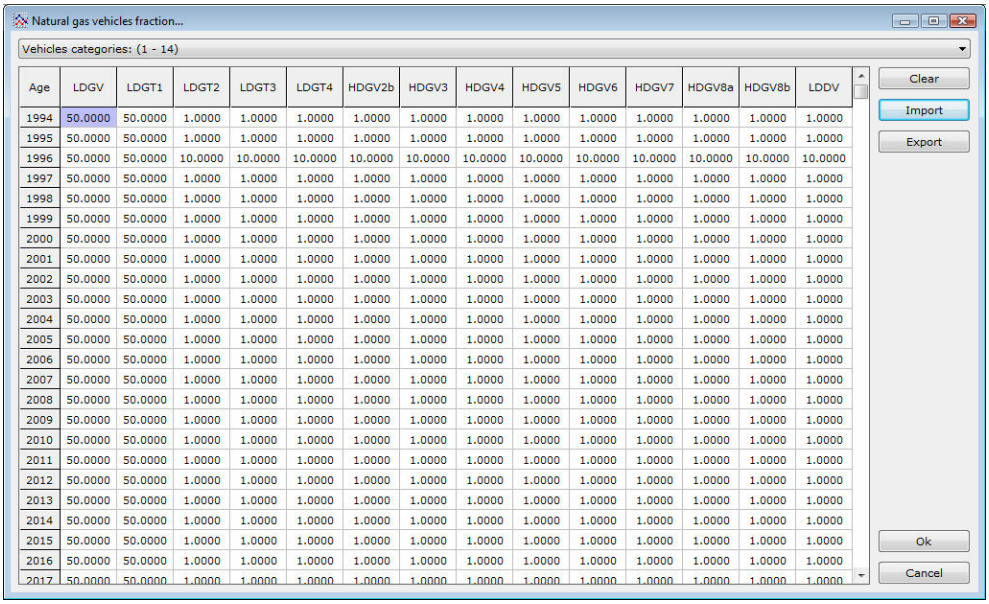
The NGV FRACTION command also affects evaporative emissions, which the model assumes are zero for NGVs. Thus, if the user enters 5 percent for the NGV penetration of a particular gasoline vehicle class, the model will assume that 5 percent of that class will have zero evaporative emissions.

The values can range from 0.0000 to 100.0000. The percentage of NGVs in the fleet is very small. The program provides this option for special cases in which it is necessary to model the effects of NGVs on a small percentage of the fleet, or to generate the basic NGV emission factors by entering 100 percent penetration.

To enter the fractions of natural gas vehicles in the fleet:

1. Select a run.

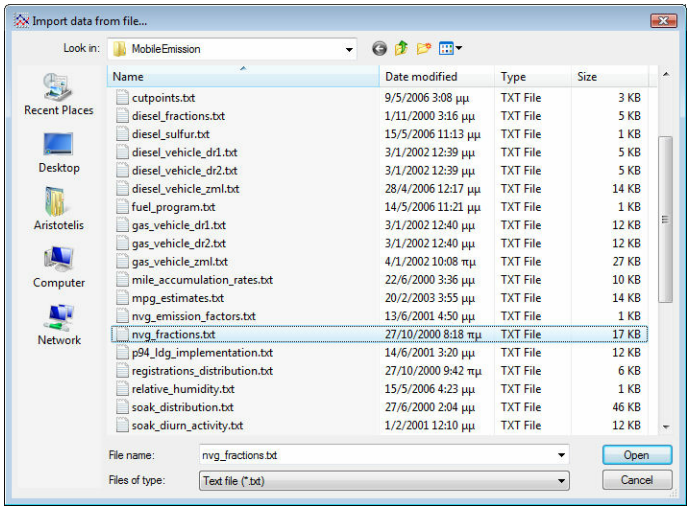
2. From the **Fleet** menu select **Natural Gas Vehicles**.
3. From the new pop-up menu select **Fractions**.
4. Select a category from the drop-down list.
5. Enter the desired values directly in the table.
6. Repeat steps 4 and 5 until all values have been entered.
7. Optionally, click on **Clear** to delete all data that are present in the table.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Age	LDGV	LDGT1	LDGT2	LDGT3	LDGT4	HDGV2b	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8a	HDGV8b	LDDV
1994	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1995	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1996	50.0000	50.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
1997	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1998	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1999	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2000	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2001	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2002	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2003	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2004	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2005	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2006	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2007	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2008	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2009	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2010	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2011	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2012	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2013	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2014	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2015	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2016	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2017	50.0000	50.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

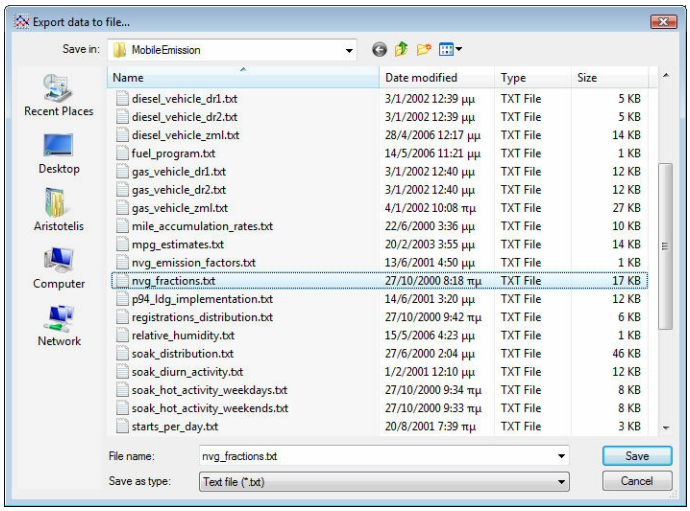
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional.

6.6.2 Alternate emission factors

6.6.2.1 Alternate emission factors

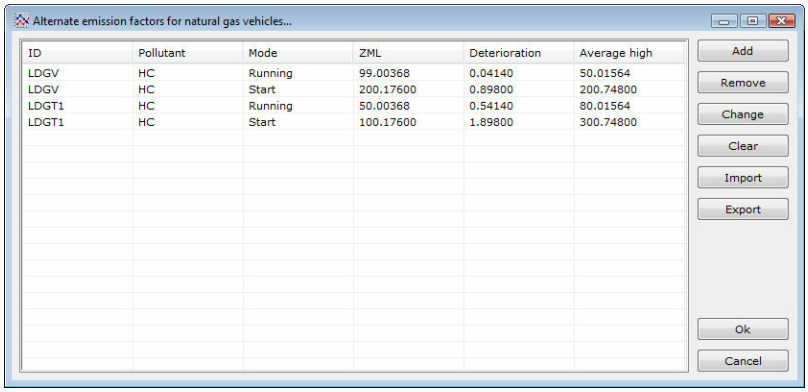
This command allows the user to enter alternate NGV emission factors for each of the 28 vehicle types, for HC, CO, and Nox. Where applicable this is done in terms of both running and start emissions. This label can only be entered if the corresponding NGV fraction command has also been entered to signal to the model that the user wants to model the effects of NGV. Note that the PM emissions of NGVs are calculated based on those of gasoline-fueled vehicles, so no provision, apart from the particulates command, is made to enter
alternative PM emission factors for NGVs.

The Alternate Emission Factors command allows the user to enter separate NGV emission factors for each of the 28 vehicle types, for HC, CO, and Nox. Where applicable this is done in terms of both running and start emissions. It does NOT allow the user to specify an NGV emission factor for a particular model year. The NGV emission factor specified by the user for a particular vehicle class and pollutant will be applied to all 1994 and later model years that are specified to contain natural gas vehicles. Model year specification is accomplished through the use of the NGV fraction command.

To manage the alternate emission factors for natural gas vehicles:

1. Select a run.
2. From the **Fleet** menu select **Natural Gas Vehicles**.
3. From the new pop-up menu select **Alternate Emission Factors**.

4. Manage alternate emission factors data.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

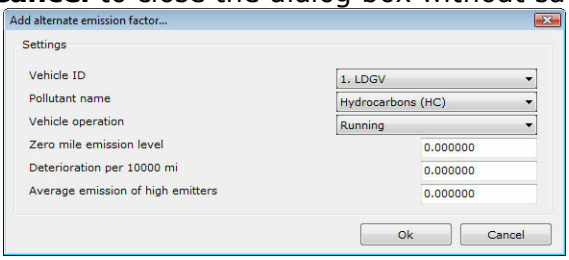


NOTE: This data is optional.

6.6.2.2 Add alternate emission factor

To add a new alternate emission factor:

1. Press the Add button on the alternate emission factor management form.
2. Select one of the 28 vehicle **categories**.
3. Select the **pollutant name** from the drop-down list.
4. Select the vehicle operation status (**running** or **start**) where the pollutant is emitted.
5. Enter the **zero kilometer emission level** that corresponds to emitted pollutant from brand new vehicles.
6. Enter the **deterioration per 10000 km**, which corresponds to the increase of the concentration of emitted pollutant per 10000 km.
7. Enter the average emission of high emitters. For the 20 heavy-duty classes this must be zero.
8. Select **Ok** to add the new alternate emission factor to the end of the list and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



6.6.2.3 Delete alternate emission factor

The selected from the list alternate emission factor is removed.

To delete an existing alternate emission factor:

1. Select from the list of alternate emission factors the record which is about to be removed.
2. When the user clicks **Remove** it is asked whether he confirms the removal of the selected record, if the confirmation option has been activated in the general

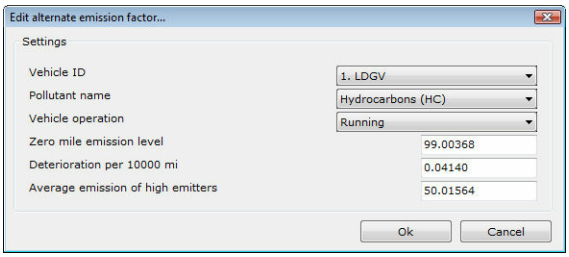
preferences.
3. The selected record is removed.

6.6.2.4 Change alternate emission factor

The user may change the properties of an existing alternate emission factor.

To change the properties of an existing alternate emission factor:

1. Select from the list of alternate emission factor the record which is about to be changed.
2. Click on **Change** to open the form used to commit changes to an existing record.
3. Make the changes.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



6.6.2.5 Clear all records

All existing records are removed from the list.

To remove all existing records:

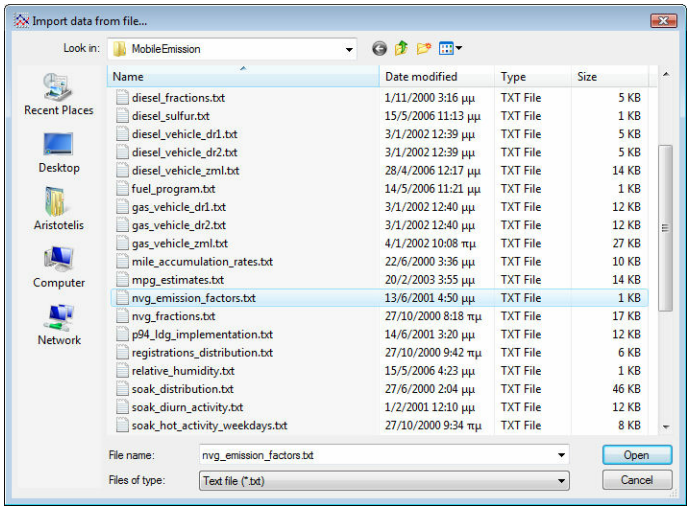
1. Click **Clear**. The user will be asked to confirm the global removal.
2. Select **Yes** to remove all records.

6.6.2.6 Import from file

Additional alternate emission factor records may be imported from an external file. The existing records will be kept and the new records will be appended to the existing ones.

To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.

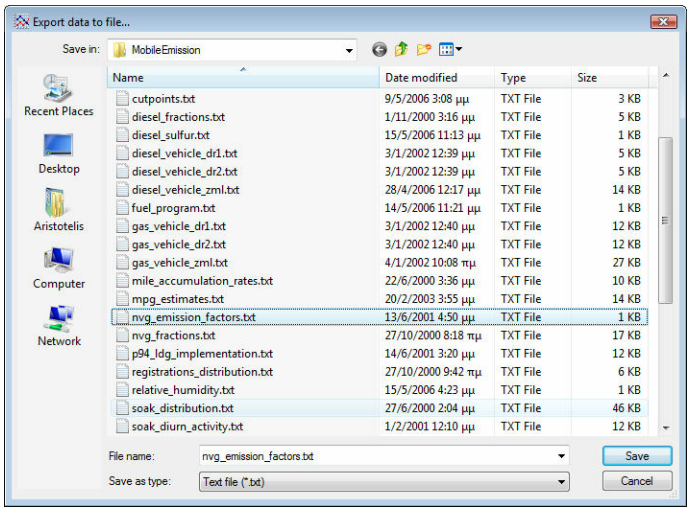


6.6.2.7 Export to file

The current recordset of alternate emission factors is exported to an external file.

To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



6.7 Starts per day

This command allows users to specify the average number of engine starts (trips) per vehicle per day for specific vehicle classes and ages for weekend days and/or weekdays. By default, the program assigns each of the 28 individual vehicle classes at each of 25 ages a
separate default for number of engine starts per day.

The defaults differ for weekdays and weekends. Light duty passenger vehicles use

7.28 starts per day for weekdays and 5.41 starts per day for weekend days. Light trucks use 8.06 starts per day for weekdays and 5.68 starts per day for weekend days. Motorcycles use 1.35 starts per day for both weekend and weekdays. Heavy duty gasoline vehicles and buses use 6.88 starts per day for both weekend and weekdays. Heavy duty diesel vehicles and buses use 6.65 starts per day for both weekend and weekdays. The same default value is used for vehicles of all ages within a vehicle class. Please see the technical report, M6.FLT.003 for more details (see bottom node).

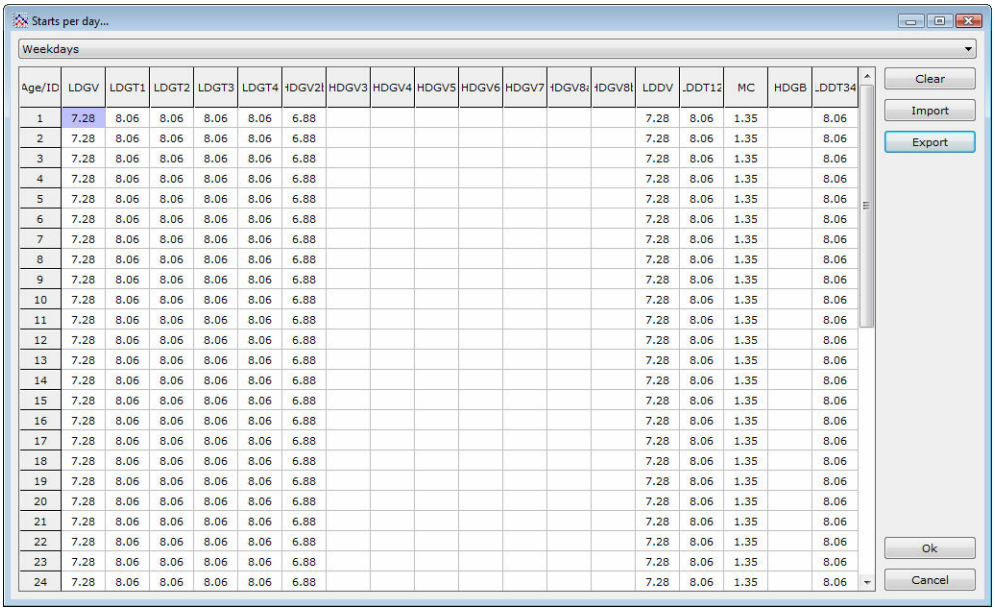
The number of starts per day affects engine exhaust start emission estimates for light duty gasoline and diesel passenger cars and trucks and motorcycles. It will also affect the evaporative hot soak losses on all gasoline fueled vehicles, including heavy duty vehicles and buses, which occur at trip ends. The number of trips per day and trip ends per day is calculated from the number of starts per day.

Emission estimates for heavy duty diesel fueled vehicles and buses are not affected by the number of starts per day in MOBILE6. We recommend that users not include engine starts per day values for heavy duty diesel vehicles and busses in their external data files. The following table indicates the vehicle classes affected by the number of engine starts per day and the appropriate vehicle class
number. Only these vehicle classes are affected by use of the Starts Per Day command.

The user may replace values for as few or as many of these vehicle classes as needed. No value for the number of engine starts
per day may be less than zero or greater than 100.

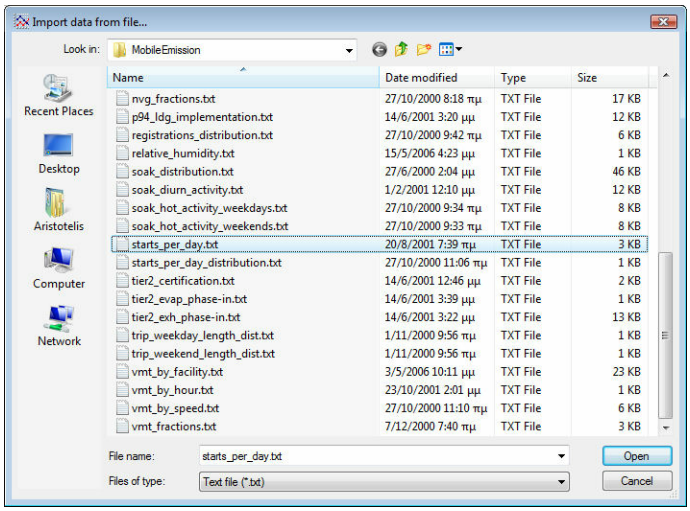
To enter starts per day data:

1. Select a run.
2. From the **Fleet** menu select **Starts Per Day**.
3. Select weekdays or weekends from the drop-down list.
4. Enter the desired values directly in the table.
5. Repeat steps 3 and 4 until all values have been entered.
6. Optionally, click on **Clear** to delete all data that are present in the table.
7. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



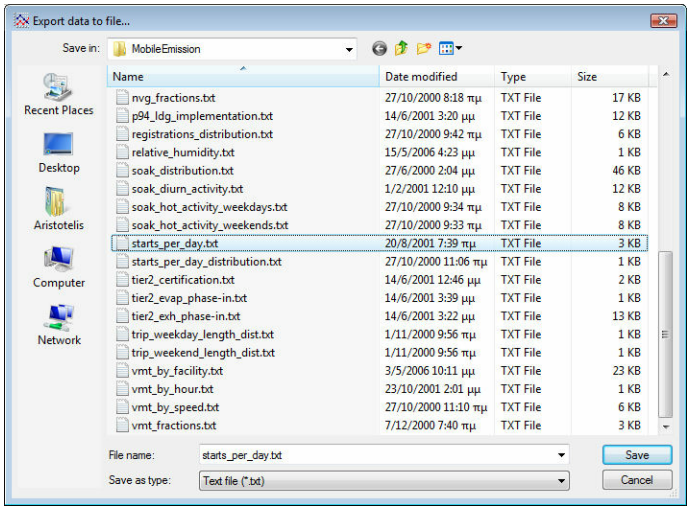
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

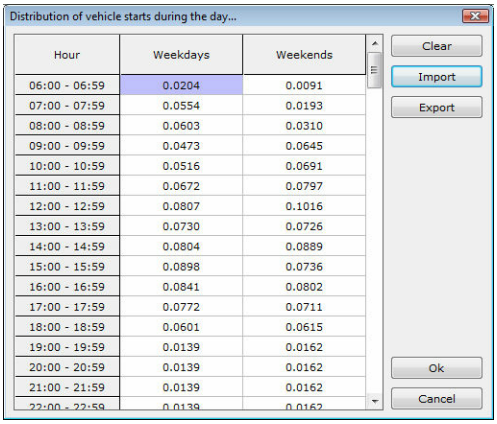
6.8 Distribution of vehicle starts during the day

This command allows users to allocate engine starts by hour of the day. By default, values in technical report, M6.FLT.003 are used (see bottom node). The Distribution of Vehicle Starts command allows users to change the default values for the hourly distribution of engine starts (trips) across the day. Users must supply 48 values to replace the model defaults.

Each value represents the average fraction of all engine starts that occur in each hour of a 24 hour day, for both weekdays and weekends. All values must be less than or equal to 1 and greater than or equal to zero. The sum of all of the 24 values for a day must equal 1. If they do not, the program will normalize the values to 1 automatically.

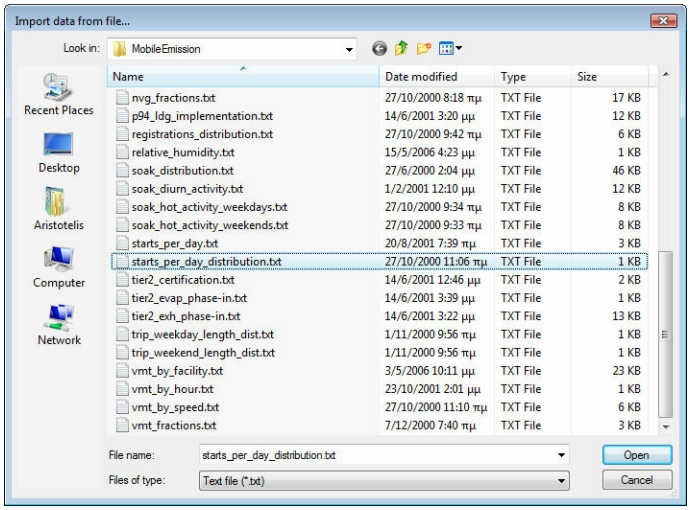
To enter the distribution of vehicle starts during the day:

1. Select a run.
2. From the **Fleet** menu select **Distribution Of Vehicle Starts During The Day**.
3. Enter the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



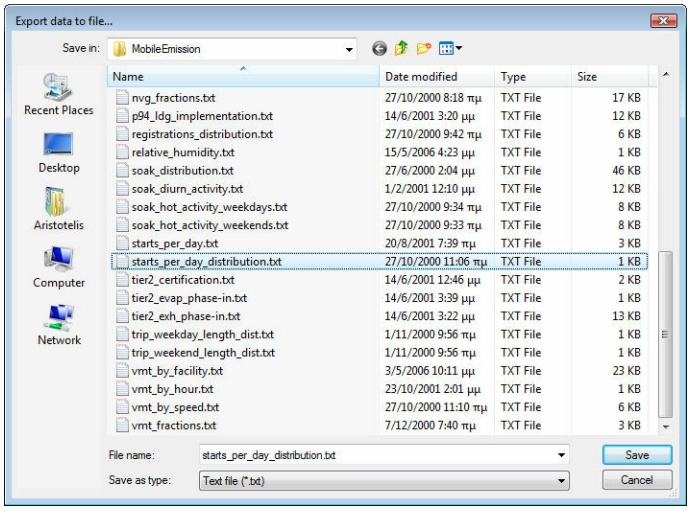
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.SPD.003, contains the default values used by the model. This report is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.9 Soak distribution

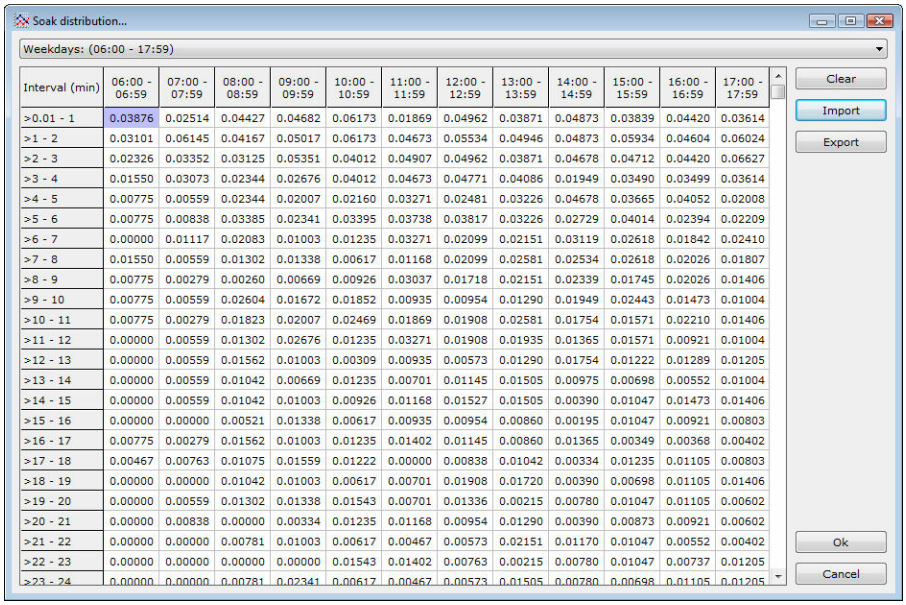
This command allows users to enter vehicle soak duration distributions that override the model's defaults. The soak time affects exhaust start emissions. Default information is provided in technical reports, M6.FLT.003 and M6.FLT.004 (see bottom node).

A vehicle is considered to be "soaking" if its engine is not running. Soak time is the length of time between when an engine is turned off and the next time it is started. The model uses soak time data to determine, for each hour of the day, the percentage of vehicles that have been soaking for a given amount of time prior to an engine start. This, in turn, affects start emissions, which depend on the length of soak time. The same soak time distributions are applied to all vehicle classes and all vehicle ages.

The Soak Distribution command name requires the user to enter values for each of the 70 soak durations for each of the 24 hours of the day for week and weekend days (3,360 values). The 70 soak duration values correspond to specific soak length intervals as defined in the table below. The 70 values for each hour must add up to 1, if not, the program automatically normalizes the values.

To enter the soak distribution:

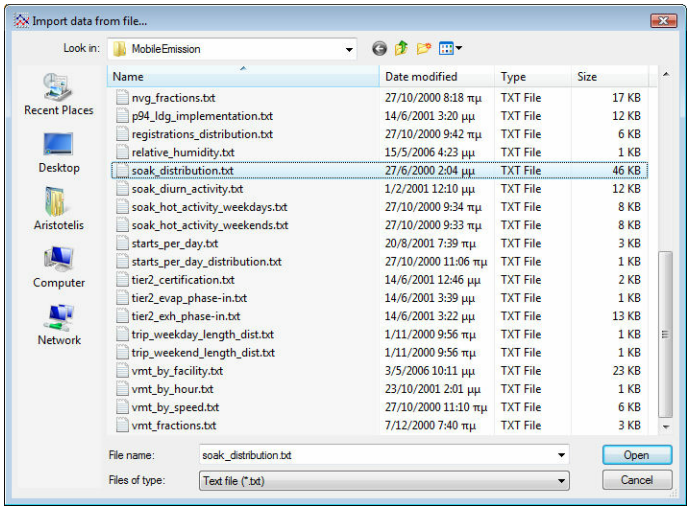
1. Select a run.
2. From the **Fleet** menu select **Distribution Of Vehicle Starts During The Day**.
3. Select a category from the drop-down list.
4. Enter the desired values directly in the table.
5. Repeat steps 3 and 4 until all values have been entered.
6. Optionally, click on **Clear** to delete all data that are present in the table.
7. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Interval (min)	06:00 - 06:59	07:00 - 07:59	08:00 - 08:59	09:00 - 09:59	10:00 - 10:59	11:00 - 11:59	12:00 - 12:59	13:00 - 13:59	14:00 - 14:59	15:00 - 15:59	16:00 - 16:59	17:00 - 17:59
>0.01 - 1	0.03876	0.02514	0.04427	0.04682	0.06173	0.01869	0.04962	0.03871	0.04873	0.03839	0.04420	0.03614
>1 - 2	0.03101	0.06145	0.04167	0.05017	0.06173	0.04673	0.05534	0.04946	0.04873	0.05934	0.04604	0.06024
>2 - 3	0.02326	0.03352	0.03125	0.05351	0.04012	0.04907	0.04962	0.03871	0.04678	0.04712	0.04420	0.06627
>3 - 4	0.01550	0.03073	0.02344	0.02676	0.04012	0.04673	0.04771	0.04086	0.01949	0.03490	0.03499	0.03614
>4 - 5	0.00775	0.00559	0.02344	0.02007	0.02160	0.03271	0.02481	0.03226	0.04678	0.03665	0.04052	0.02008
>5 - 6	0.00775	0.00838	0.03385	0.02341	0.03395	0.03738	0.03817	0.03226	0.02729	0.04014	0.02394	0.02209
>6 - 7	0.00000	0.01117	0.02083	0.01003	0.01235	0.03271	0.02099	0.02151	0.03119	0.02618	0.01842	0.02410
>7 - 8	0.01550	0.00559	0.01302	0.01338	0.00617	0.01168	0.02099	0.02581	0.02534	0.02618	0.02026	0.01807
>8 - 9	0.00775	0.00279	0.00260	0.00669	0.00926	0.03037	0.01718	0.02151	0.02339	0.01745	0.02026	0.01406
>9 - 10	0.00775	0.00559	0.02604	0.01672	0.01852	0.00935	0.00954	0.01290	0.01949	0.02443	0.01473	0.01004
>10 - 11	0.00775	0.00279	0.01823	0.02007	0.02469	0.01869	0.01908	0.02581	0.01754	0.01571	0.02210	0.01406
>11 - 12	0.00000	0.00559	0.01302	0.02676	0.01235	0.03271	0.01908	0.01935	0.01365	0.01571	0.00921	0.01004
>12 - 13	0.00000	0.00559	0.01562	0.01003	0.00309	0.00935	0.00573	0.01290	0.01754	0.01222	0.01289	0.01205
>13 - 14	0.00000	0.00559	0.01042	0.00669	0.01235	0.00701	0.01145	0.01505	0.00975	0.00698	0.00552	0.01004
>14 - 15	0.00000	0.00559	0.01042	0.01003	0.00926	0.01168	0.01527	0.01505	0.00390	0.01047	0.01473	0.01406
>15 - 16	0.00000	0.00000	0.00521	0.01338	0.00617	0.00935	0.00954	0.00860	0.00195	0.01047	0.00921	0.00803
>16 - 17	0.00775	0.00279	0.01562	0.01003	0.01235	0.01402	0.01145	0.00860	0.01365	0.00349	0.00368	0.00402
>17 - 18	0.00467	0.00763	0.01075	0.01559	0.01222	0.00000	0.00838	0.01042	0.00334	0.01235	0.01105	0.00803
>18 - 19	0.00000	0.00000	0.01042	0.01003	0.00617	0.00701	0.01908	0.01720	0.00390	0.00698	0.01105	0.01406
>19 - 20	0.00000	0.00559	0.01302	0.01338	0.01543	0.00701	0.01336	0.00215	0.00780	0.01047	0.01105	0.00602
>20 - 21	0.00000	0.00838	0.00000	0.00334	0.01235	0.01168	0.00954	0.01290	0.00390	0.00873	0.00921	0.00602
>21 - 22	0.00000	0.00000	0.00781	0.01003	0.00617	0.00467	0.00573	0.02151	0.01170	0.01047	0.00552	0.00402
>22 - 23	0.00000	0.00000	0.00000	0.00000	0.01543	0.01402	0.00763	0.00215	0.00780	0.01047	0.00737	0.01205
>23 - 24	0.00000	0.00000	0.00781	0.02341	0.00617	0.00467	0.00573	0.01505	0.00780	0.00698	0.01105	0.01205

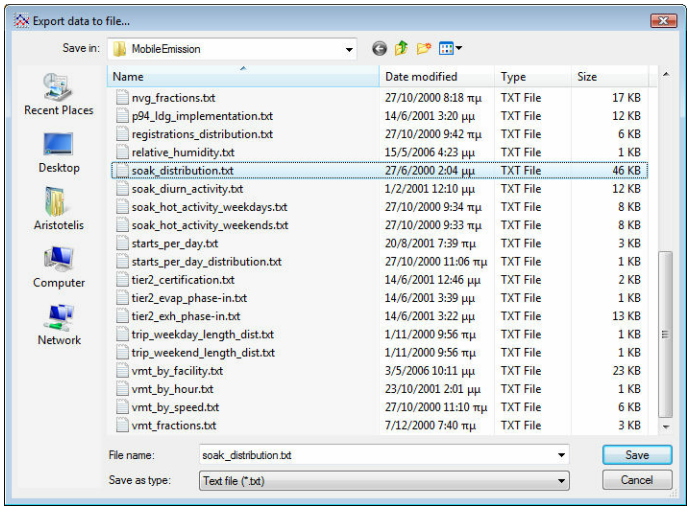
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical reports M6.FLT.003 and M6.FLT.004, contain the default values used by the model. These reports are located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.10 Hot soak activity

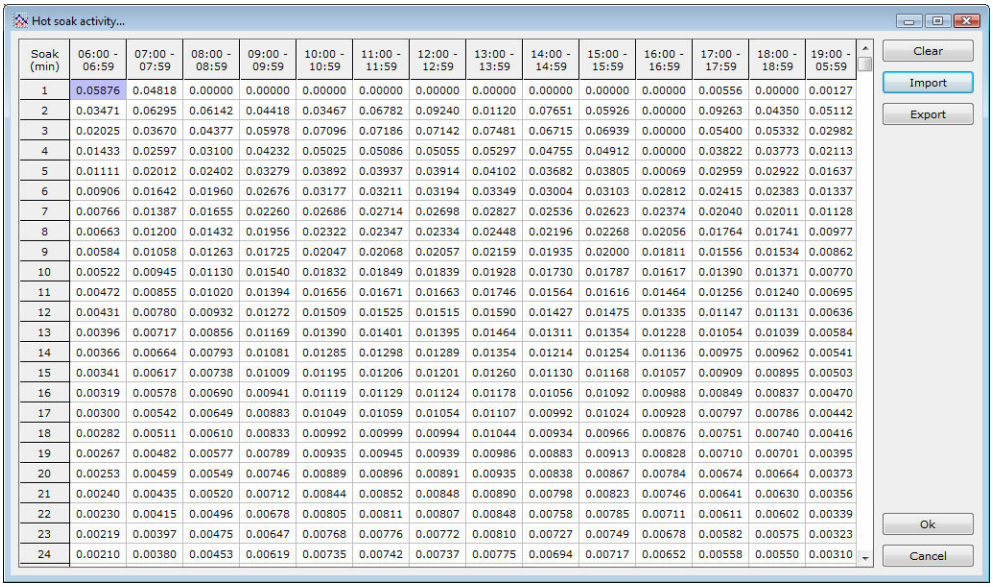
This command allows users to specify a hot soak duration distribution for each of 14 daily time periods. Please see technical reports, M6.FLT.003, and M6.FLT.004, for further information (see bottom note).

Hot soak emissions occur when fuel vapors escape from a hot vehicle that has just been turned off. The emissions are highest immediately after the engine is shut down and decrease over time, reaching a baseline level in about an hour. Hot soak emissions are truncated if the engine is turned on again before the baseline has been reached (before an hour has elapsed). The model assumes that hot soak durations range from 1 minute at minimum to a maximum of 60 minutes.

The hot soak time distributions reflect the number of vehicles experiencing a hot soak of a given duration (1 to 60 minutes) at each hour of the day. The model divides the day into 14 time periods: one for each hour between 6 a.m. and 7 p.m., plus one for the hours from 7 p.m. through 5 a.m. the next day. The model computes hot soak emissions for each minute of each hour, and weights these emissions by the fraction of vehicles experiencing a hot soak at that time. If this command is used, 840 values must be entered representing the fraction of vehicles experiencing a hot soak of each duration (1 to 60 minutes) at each time period of the day (14).

To enter hot soak activity:

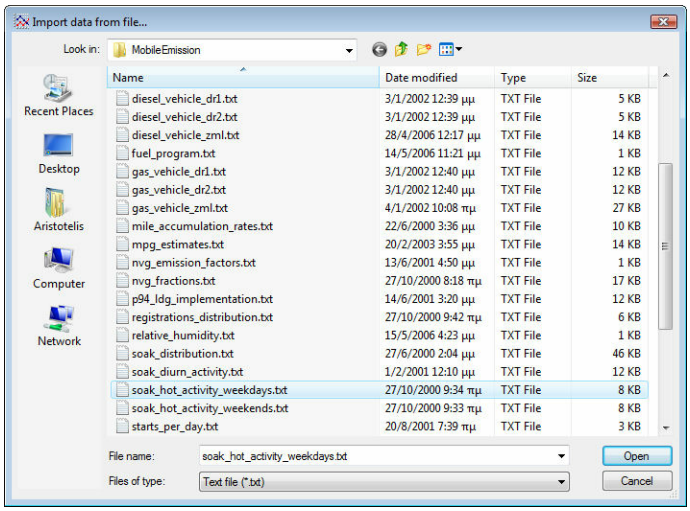
1. Select a run.
2. From the **Fleet** menu select **Hot Soak Activity**.
3. Type in the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Soak (min)	06:00 - 06:59	07:00 - 07:59	08:00 - 08:59	09:00 - 09:59	10:00 - 10:59	11:00 - 11:59	12:00 - 12:59	13:00 - 13:59	14:00 - 14:59	15:00 - 15:59	16:00 - 16:59	17:00 - 17:59	18:00 - 18:59	19:00 - 05:59
1	0.05876	0.04818	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00556	0.00000	0.00127
2	0.03471	0.06295	0.06142	0.04418	0.03467	0.06782	0.09240	0.01120	0.07651	0.05926	0.00000	0.09263	0.04350	0.05112
3	0.02025	0.03670	0.04377	0.05978	0.07096	0.07186	0.07142	0.07481	0.06715	0.06939	0.00000	0.05400	0.05332	0.02982
4	0.01433	0.02597	0.03100	0.04232	0.05025	0.05086	0.05055	0.05297	0.04755	0.04912	0.00000	0.03822	0.03773	0.02113
5	0.01111	0.02012	0.02402	0.03279	0.03892	0.03937	0.03914	0.04102	0.03682	0.03805	0.00069	0.02959	0.02922	0.01637
6	0.00906	0.01642	0.01960	0.02676	0.03177	0.03211	0.03194	0.03349	0.03004	0.03103	0.02812	0.02415	0.02383	0.01337
7	0.00766	0.01387	0.01655	0.02260	0.02686	0.02714	0.02698	0.02827	0.02536	0.02623	0.02374	0.02040	0.02011	0.01128
8	0.00663	0.01200	0.01432	0.01956	0.02322	0.02347	0.02334	0.02448	0.02196	0.02268	0.02056	0.01764	0.01741	0.00977
9	0.00584	0.01058	0.01263	0.01725	0.02047	0.02068	0.02057	0.02159	0.01935	0.02000	0.01811	0.01556	0.01534	0.00862
10	0.00522	0.00945	0.01130	0.01540	0.01832	0.01849	0.01839	0.01928	0.01730	0.01787	0.01617	0.01390	0.01371	0.00770
11	0.00472	0.00855	0.01020	0.01394	0.01656	0.01671	0.01663	0.01746	0.01564	0.01616	0.01464	0.01256	0.01240	0.00695
12	0.00431	0.00780	0.00932	0.01272	0.01509	0.01525	0.01515	0.01590	0.01427	0.01475	0.01335	0.01147	0.01131	0.00636
13	0.00396	0.00717	0.00856	0.01169	0.01390	0.01401	0.01395	0.01464	0.01311	0.01354	0.01228	0.01054	0.01039	0.00584
14	0.00366	0.00664	0.00793	0.01081	0.01285	0.01298	0.01289	0.01354	0.01214	0.01254	0.01136	0.00975	0.00962	0.00541
15	0.00341	0.00617	0.00738	0.01009	0.01195	0.01206	0.01201	0.01260	0.01130	0.01168	0.01057	0.00909	0.00895	0.00503
16	0.00319	0.00578	0.00690	0.00941	0.01119	0.01129	0.01124	0.01178	0.01056	0.01092	0.00988	0.00849	0.00837	0.00470
17	0.00300	0.00542	0.00649	0.00883	0.01049	0.01059	0.01054	0.01107	0.00992	0.01024	0.00928	0.00797	0.00786	0.00442
18	0.00282	0.00511	0.00610	0.00833	0.00992	0.00999	0.00994	0.01044	0.00934	0.00966	0.00876	0.00751	0.00740	0.00416
19	0.00267	0.00482	0.00577	0.00789	0.00935	0.00945	0.00939	0.00986	0.00883	0.00913	0.00828	0.00710	0.00701	0.00395
20	0.00253	0.00459	0.00549	0.00746	0.00889	0.00896	0.00891	0.00935	0.00838	0.00867	0.00784	0.00674	0.00664	0.00373
21	0.00240	0.00435	0.00520	0.00712	0.00844	0.00852	0.00848	0.00890	0.00798	0.00823	0.00746	0.00641	0.00630	0.00356
22	0.00230	0.00415	0.00496	0.00678	0.00805	0.00811	0.00807	0.00848	0.00758	0.00785	0.00711	0.00611	0.00602	0.00339
23	0.00219	0.00397	0.00475	0.00647	0.00768	0.00776	0.00772	0.00810	0.00727	0.00749	0.00678	0.00582	0.00575	0.00323
24	0.00210	0.00380	0.00453	0.00619	0.00735	0.00742	0.00737	0.00775	0.00694	0.00717	0.00652	0.00558	0.00550	0.00310

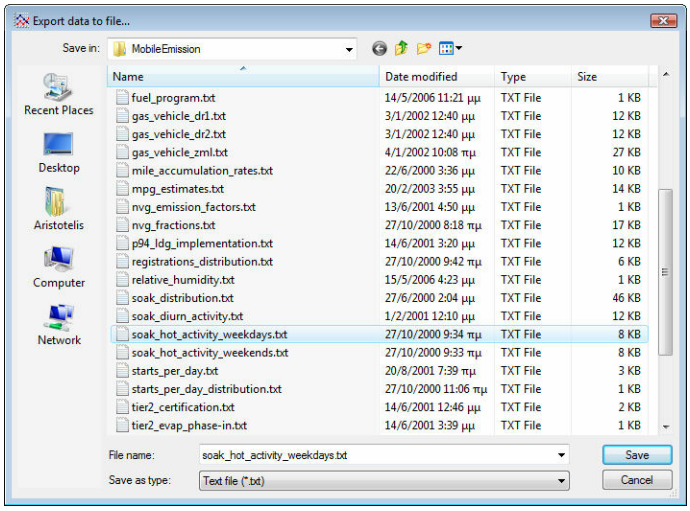
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical reports M6.FLT.003 and M6.FLT.004, contain the default values used by the model. These reports are located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.11 Diurn soak activity

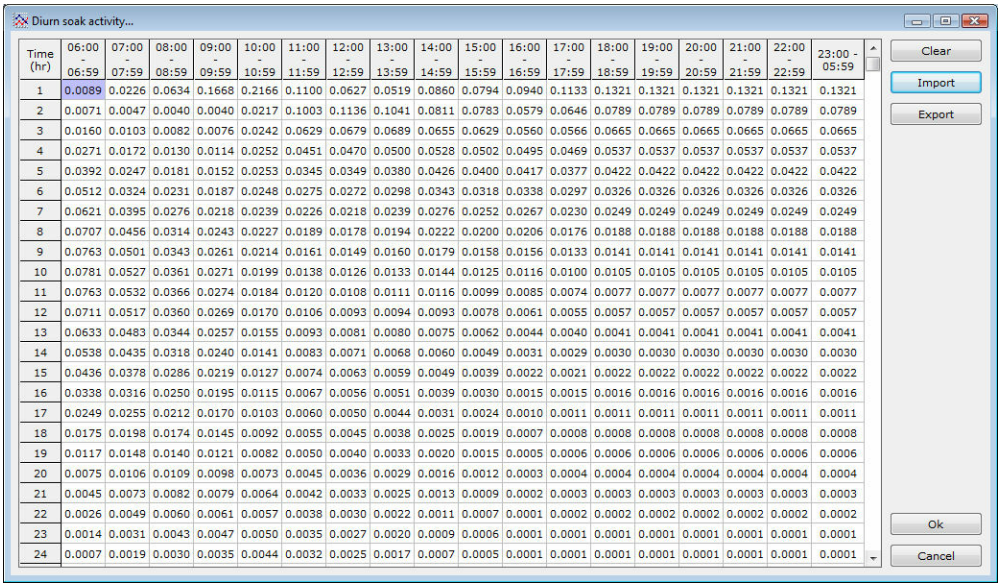
This command allows users to specify a diurnal soak time distribution for each of 18 daily time periods. Please see technical report, M6.FLT.006. Diurnal emissions vary with the length of time a vehicle has been soaking (the length of time it has been parked). The diurnal ends with the start of a new trip. The program assumes that diurnal soak times range from one hour at a minimum to a maximum of 72 hours.

Diurnal soak time distributions represent the distribution of the length of time that vehicles have been soaking during each of the 24 hours for which emissions are to be calculated. However, the seven hours from 11 PM through 6 AM are treated as having a common soak time distribution, reducing the number of required distributions that represent the day from 24 to 18. Since temperatures fall during the night, diurnal emissions will be calculated to be zero from 12 AM to 6 AM, regardless of the soak time distribution.

For each hour of the day, the model computes emissions separately for the 72 different soak distributions and weighs them by the fraction of vehicles experiencing a diurnal of that duration. If the user chooses this command, 1,296 values must be entered representing the fraction of vehicles experiencing a diurnal of each duration (72) at each time period of the day (18).

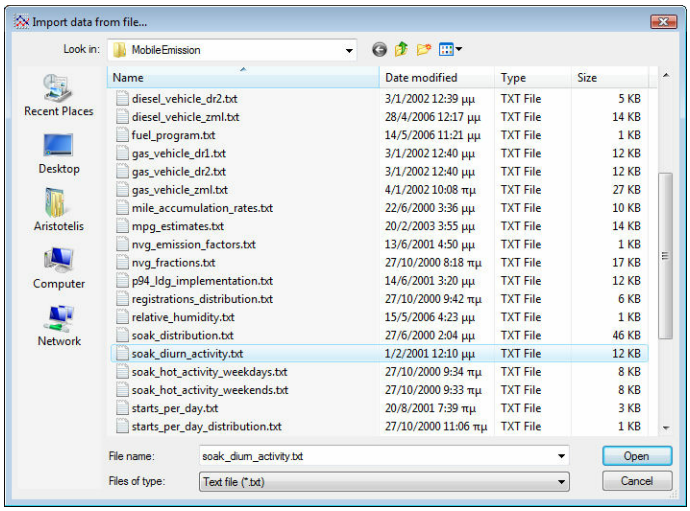
To enter diurn soak activity:

1. Select a run.
2. From the **Fleet** menu select **Diurn Soak Activity**.
3. Type in the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



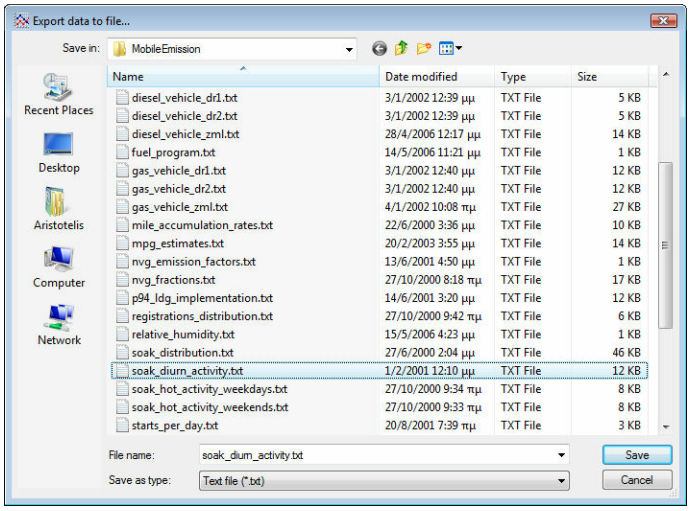
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.FLT.006, contains the default values used by the model. This reports is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

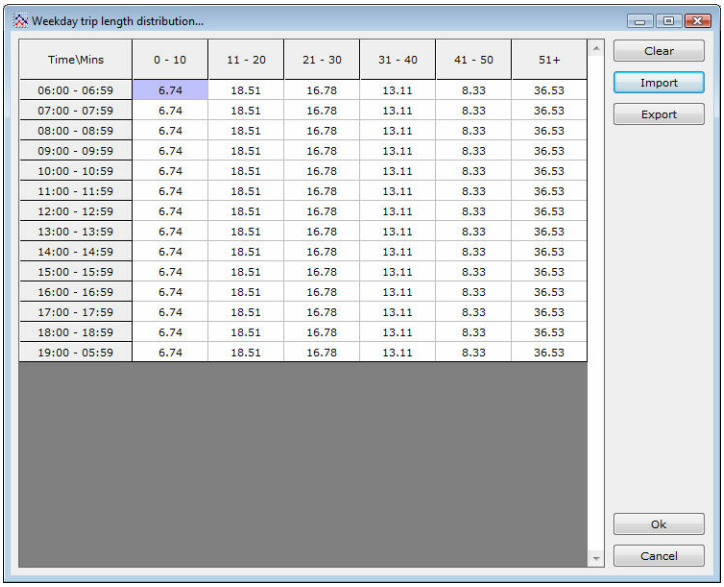
6.12 Weekday trip length distribution

This command allows users to specify the fraction of weekday VMT that occurs during trips of various durations at each hour of the day. The duration of a vehicle trip affects running loss evaporative emissions, which depend on the amount of time the vehicle has been running. This command is used to change the default values for the distributions of VMT by trip duration (in time) for weekdays. The model uses these distributions to calculate running loss emissions. There is a separate distribution of VMT by trip duration for each hour
of the day.

If the user chooses to use this command, percentages must be entered for six trip length ranges and 14 hourly groups, resulting in a total of 84 values. The trip length ranges are 10 minutes or less; 11 to 20 minutes; 21 to 30 minutes; 31 to 40 minutes; 41 to 50 minutes; 51 or more minutes. The percent of VMT in each of these six trip length ranges is required for each hour of the day from 6 a.m. to 7 p.m., plus an average distribution for the 11-hour block from 7 p.m. to 6 a.m.

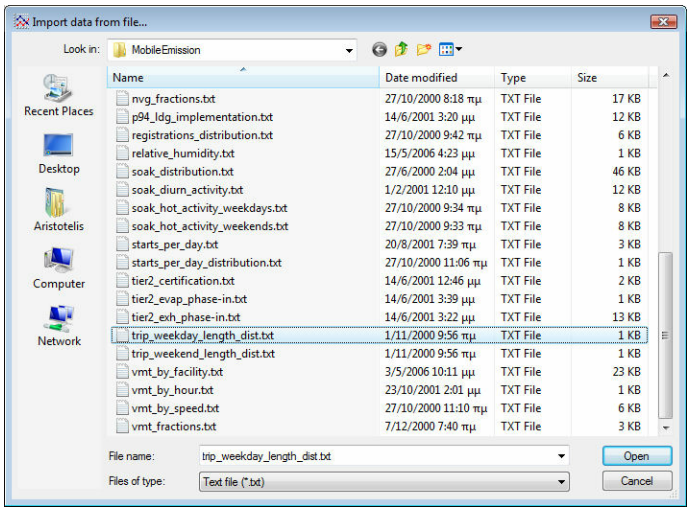
To enter the weekday trip length distribution:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Weekday Trip Length Distribution**.
3. Type in the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



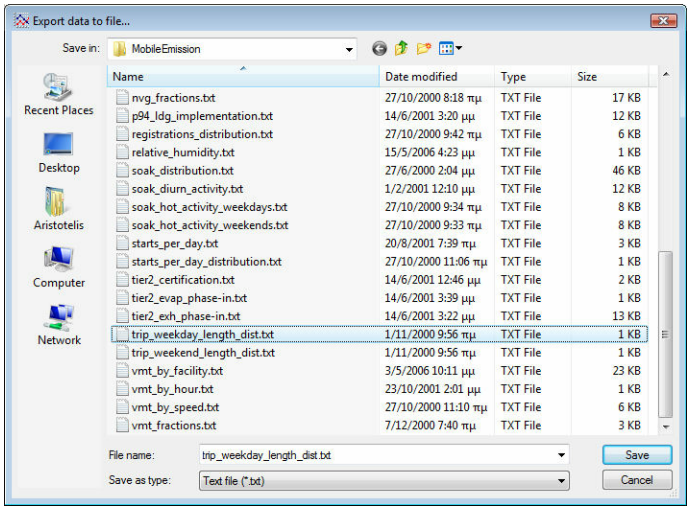
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional. If not supplied, technical report M6.FLT.005, contains the default values used by the model. This reports is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

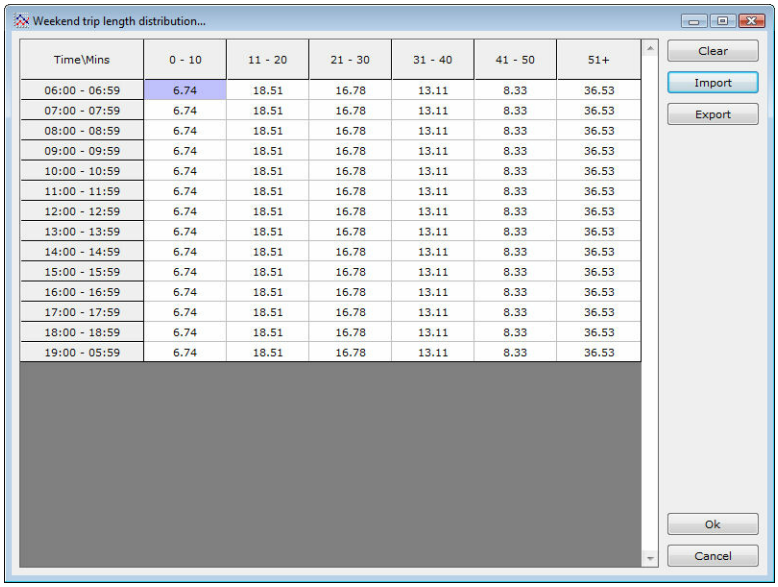
6.13 Weekend trip length distribution

This command allows users to specify the fraction of weekend VMT that occurs during trips of various durations at each hour of the day. The duration of a vehicle trip affects running loss evaporative emissions, which depend on the amount of time the vehicle has been running. This command is used to change the default values for the distributions of VMT by trip duration (in time) for weekend. The model uses these distributions to calculate running loss emissions. There is a separate distribution of VMT by trip duration for each hour
of the day.

If the user chooses to use this command, percentages must be entered for six trip length ranges and 14 hourly groups, resulting in a total of 84 values. The trip length ranges are 10 minutes or less; 11 to 20 minutes; 21 to 30 minutes; 31 to 40 minutes; 41 to 50 minutes; 51 or more minutes. The percent of VMT in each of these six trip length ranges is required for each hour of the day from 6 a.m. to 7 p.m., plus an average distribution for the 11-hour block from 7 p.m. to 6 a.m.

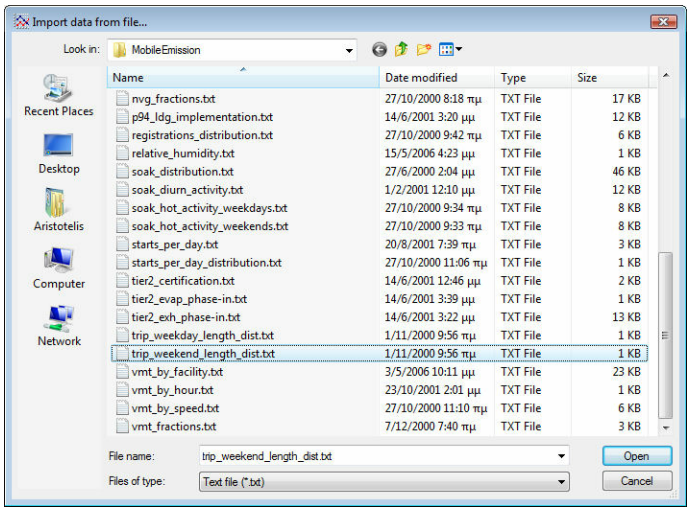
To enter the weekend trip length distribution:

1. Select a run or a scenario.
2. From the **Fleet** menu select **Weekend Trip Length Distribution**.
3. Type in the desired values directly in the table.
4. Optionally, click on **Clear** to delete all data that are present in the table.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



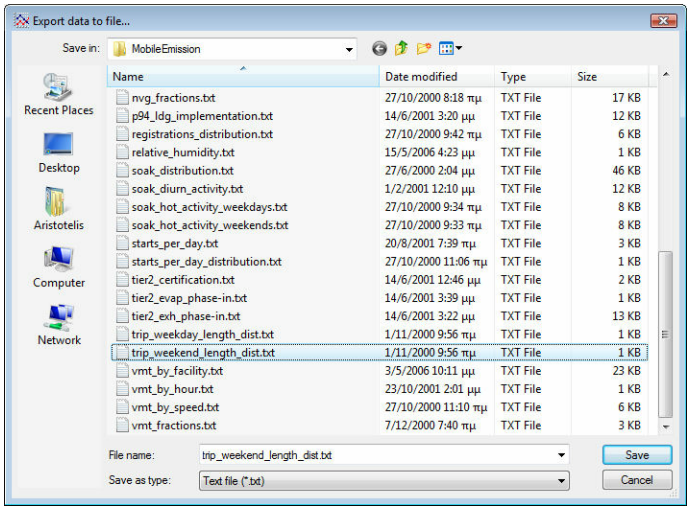
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



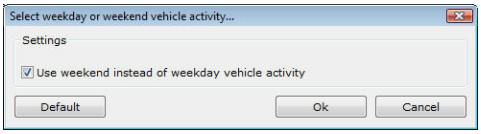
NOTE: This data is optional. If not supplied, technical report M6.FLT.005, contains the default values used by the model. This reports is located at C:\Program Files\TechnoLogismiki\TLW2011\Documentation\Supplemental\B35\.

6.14 Select weekday or weekend

The user can select if the weekday or the weekend trip length distribution will be used.

To select weekday or weekend:

1. Select a run.
2. From the **Fleet** menu choose **Select Weekday Or Weekend**.
3. Select the appropriate option.
4. Optionally, press the **Default** button to enter the default value of the parameter which is equal to 0% (no cloud cover).
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not supplied, the model will use the weekday trip length distribution.

Chapter

7 Regulations

7.1 Regulations menu

Regulations and state program commands allow users to model the impact of state-specific emission control programs such as inspection and maintenance (I/M). In particular, the following options are offered via this menu:

- Stage II refueling
- Anti-tampering programs
- Inspection / Maintenance programs
  - Add program
  - Delete program
  - Change Program
- 1990 Clean air act requirements
- Heavy duty diesel vehicle emission effects
- Tier2 emission standards and fuel requirements
  - Disable Tier2
  - Tier2 evaporative emissions phase-in
  - Tier2 exhaust emissions phase-in
  - Alternative Tier2 certification standards
- Post 1994 model vehicle standards
- 2007 heavy duty vehicle emissions requirements

7.2 Stage II refueling

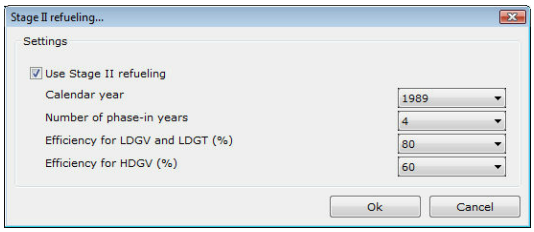
This command allows users to model the impact of a Stage II ('at-the-pump') vapor recovery system requirement on refueling emissions (also referred to as Stage II emissions) from gasoline-fueled vehicles. If the user does not use this command, then program does not calculate impact of a Stage II program.

Stage II systems reduce HC and associated air toxics emissions by reducing the amount of gasoline vapor that escapes to the atmosphere during refueling and fuel spillage. The amount of reduction depends on whether the vehicle has an onboard recovery system and the level of uncontrolled emissions. The uncontrolled emissions are calculated in MOBILE6 from inputs such as fuel RVP, fuel economy, and various fuel temperature parameters.

The model applies a 95 percent reduction in refueling emissions from uncontrolled levels from Onboard Refueling Vapor Recovery (ORVR) equipped vehicles. The effects of ORVR technology is phased in over several model years. For passenger cars, 40, 80, and 100 percent of 1998, 1999, and 2000 and newer model year cars respectively will have ORVR. For light duty trucks up to 6000 pounds gross vehicle weight, 40, 80, and 100 percent of 2001, 2002, and 2003 and newer model year trucks will have ORVR. For light duty trucks between 6001 and 8500 pounds gross vehicle weight, 40, 80, and 100 percent of 2004, 2005, and 2006 and newer model year trucks will have ORVR. Stage II programs will have no additional emission reduction effect on these vehicles.

To enter Stage II refueling data:

1. Select a run.
2. From the **Regulations** menu select **Stage II Refueling**.
3. Activate **Use Stage II Refueling** option.
4. Select the **calendar year** in which the Stage II program began or will begin. The eligible calendar years are 1989 through 2050, inclusive.
5. Select the number of **number of phase-in years** of the program. This value can range from 1 through 9. This value, in combination with the calendar year in which the Stage II program began, will determine the fraction of vehicle refueling affected by Stage II controls. The fraction is determined linearly, beginning at zero at the starting date and with full effect at the final year of the phase-in period.
6. Select **the percent efficiency** for the LDGVs and LDGTs in the program. This value can range from 0 through 100.
7. Select **the percent efficiency** for the HDGVs in the program. This value can range from 0 through 100.
8. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not entered, then the program will not use stage II refueling.

7.3 Anti-tampering programs

This command allows users to model the impact of an anti-tampering program (ATP) and should be used only if the area being modeled has or expects to have such a program. By default, the program assumes there is no anti-tampering program present.

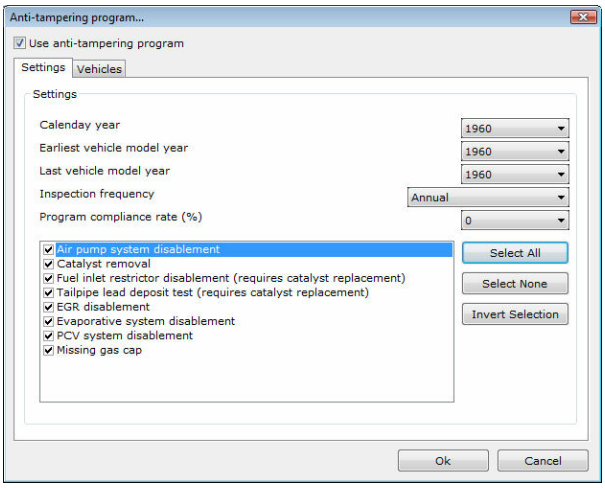
Some countries or parts of them have implemented ATPs to reduce the frequency and emissions impact of emission control system tampering, such as misfueling, removal, or disablement of catalytic converters. This command allows users to include the effects of such a program on calculated emission factors.

Selecting this command requires basic information about the anti-tampering program to be modeled. The required information includes the calendar year that the program began (start year), the earliest model year that is covered by the program, the latest model year covered by the program, on/off toggle values that determine if a particular vehicle class is included in the program, the frequency of inspection, the compliance rate for the anti-tampering program, and on/off toggle values that determine which vehicle components will be inspected.

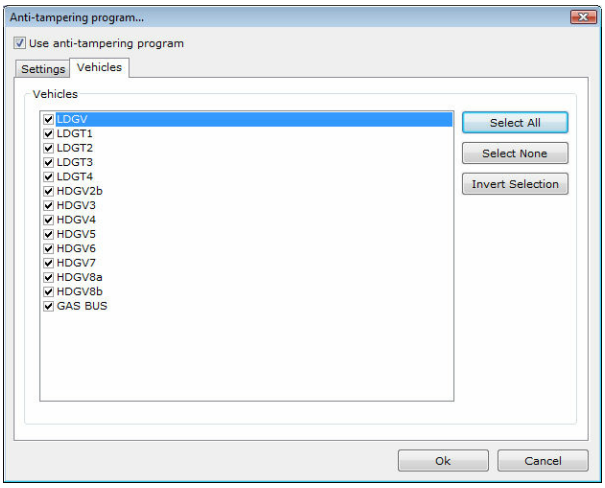
The mere presence of an I/M program is expected to act as a deterrent to tampering. Therefore, if the 'IM PROGRAM' command is present, the model will reduce the tampering rates even if there is no anti-tampering program. All 1996 and newer model year vehicles are assumed to have negligible tampering effects. As a result, there is no tampering reduction benefit associated with the 1996 and newer vehicles.

To configure anti-tampering programs:

1. Select a run.
2. From the **Regulations** menu select **Anti-Tampering Programs**.
3. Activate the **Use anti-tampering program** option.
4. Click the **Settings** tab.



5. Select the **calendar year** in which the anti-tampering program began or will begin. The calendar year input can range from 1960 to 2050.
6. Select the **earliest model year** to be covered by the program. This input is the last two digits of the model year. The model year range can be from 1960 to 2050.
7. Select the **final model year** covered by the program. The model year range can be from 1960 to 2050.
8. Select the **inspection frequency**: every year or every other year**.**
9. Select the program compliance rate. This value must be from 0 percent to 100 percent, inclusive.
10. Select the **inspections** from the list of available inspections. Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all inspections, select no inspections and select the unselected inspections and vice versa respectively.
11. Click the **Vehicles** tab.



12. Select the **vehicle categories** that will be included in the anti-tampering program . Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all vehicle categories, select no vehicle categories and select the unselected vehicle categories and vice versa respectively.
13. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

NOTE: This data is optional. If not entered, the program assumes there is no anti-tampering program present.

7.4 Inspection / Maintenance programs

7.4.1 Inspection / Maintenance programs

Many areas of the world have implemented inspection and maintenance (I/M) programs to further reduce mobile source air pollution. (Note: MOBILE6 does not model the impact of I/M on particulate emissions. The impact on air toxics is modeled through a change in base
hydrocarbon emissions.) The model has the capability of modeling the impact of up to seven different exhaust and evaporative emission I/M programs on calculated emission factors. By defining multiple I/M programs, the user can model different requirements on different types and ages of vehicles or different requirements in different calendar years.

The model also allows users to enter a number of I/M program parameters to better model specific I/M program features. These parameters include:

- Ability to model annual or biennial I/M programs.
- Ability to model Idle, 2500/Idle, ASM, IM240, and onboard diagnostic (OBD) exhaust I/M programs.
- Ability to model gas cap (GC), fill-pipe pressure test (FP), and OBD check evaporative I/M programs.
- Ability to control model year coverage.
- Ability to control vehicle class coverage (only gasoline-fueled vehicles can be modeled for I/M).
- Ability to vary the failure rate of the exhaust I/M program for pre-1981 model year vehicles.
- Ability to vary the compliance rate of the I/M program.
- Ability to vary the waiver rate of the I/M program.
- Ability to vary the cutpoints used in an IM240 program.
- Ability to account for the effect of exempting old vehicles from program requirements.
- Ability to account for the effect of exempting new vehicles from program requirements (referred to here as a 'grace period').
- Ability to eliminate the effects of technician training on exhaust I/M performance.
- Ability to assemble all of the I/M program parameters into a single external input file.

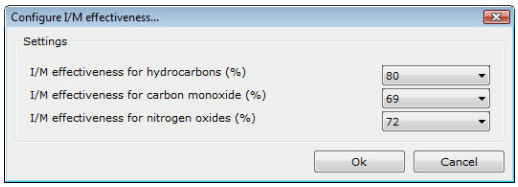
For an exhaust I/M program, all program parameters are derived from that program's user-input parameters or from the program's default parameters. The program is not affected by user-input parameters for other I/M programs (exhaust or evaporative).

However, an evaporative I/M program that runs simultaneously and on the same

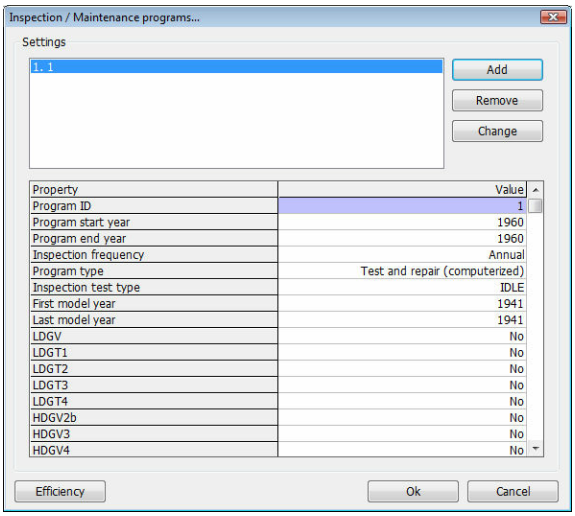
model years as an exhaust program may be affected by the exhaust program. An evaporative program will use its own user-input parameters, but if those are not provided, the evaporative program will use the simultaneous exhaust program's user-input parameters; if those are not provided, the evaporative program will use model default parameters. To make sure that the parameters governing an evaporative I/M program do not change when other I/M program commands are modified, always specify the evaporative I/M parameters explicitly.

To manage inspection / maintenance programs:

1. Select a run.
2. From the **Regulations** menu select **Inspection / Maintenance Programs**.
3. Manage the inspection / maintenance programs.
4. Click the **Efficiency** button to enter correction factors that reduce the exhaust I/M credit for test and repair programs by specified input percentages.
4.1. Select the I/M effectiveness for hydrocarbons from 0 to 100% inclusive.
4.2. Select the I/M effectiveness for carbon monoxide from 0 to 100% inclusive.
4.3. Select the I/M effectiveness for nitrogen oxides from 0 to 100% inclusive.
4.4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



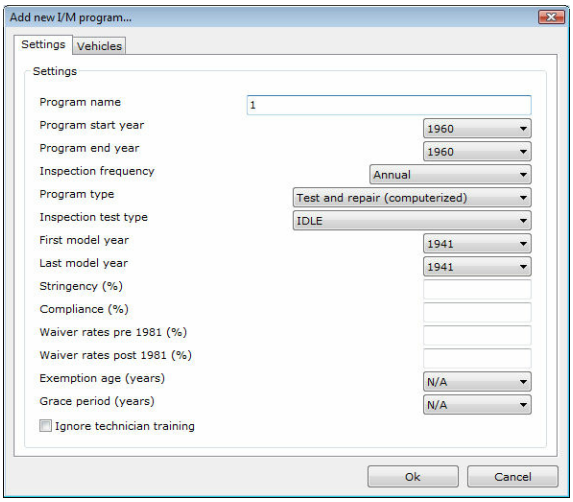
NOTE: This data is optional. By default, the program does not use any inspection or maintenance programs.

7.4.2 Add program

Adds a new inspection / maintenance program. Up to 7 different programs can be simultaneously used in a project.

To add a new inspection / maintenance program:

1. By pressing the **Add** button, the add new program form shows up.
2. Click the **Settings** tab.

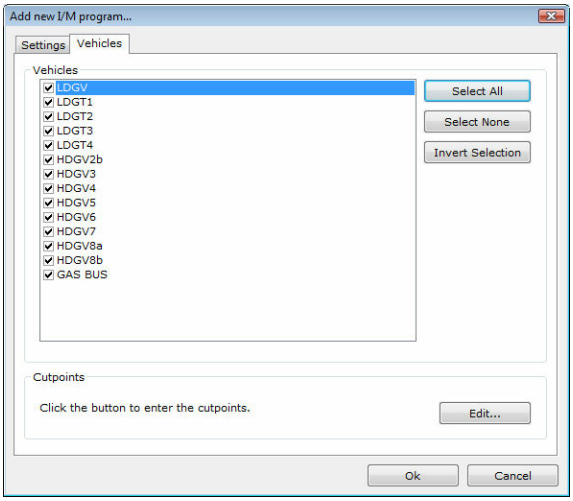


3. Enter the **name** of the program.
4. Select the **program start year** from the drop-down list. This parameter can range from calendar year 1960 through calendar year
2051. The start year represents the year in which a particular group of vehicle types and model years were first tested within an evaporative or exhaust I/M program. If a program changes over time for a particular model year & vehicle type, the subsequent program changes should be modeled in separate model runs with separate I/M program descriptions that cover the relevant evaluation years, such that each program for a vehicle type/model year group is listed with the original I/M start year. This assures that the model will model the uninterrupted testing of these vehicles, rather than modeling each program change as a completely new program.
5. Select the **program end year** from the drop-down list. This parameter can range from calendar year 1960 through calendar year
2051.
6. Select the **frequency** of the inspections from the drop-down list. Inspections may occur every year or every other year.
7. Select the **program type** from the drop-down list:

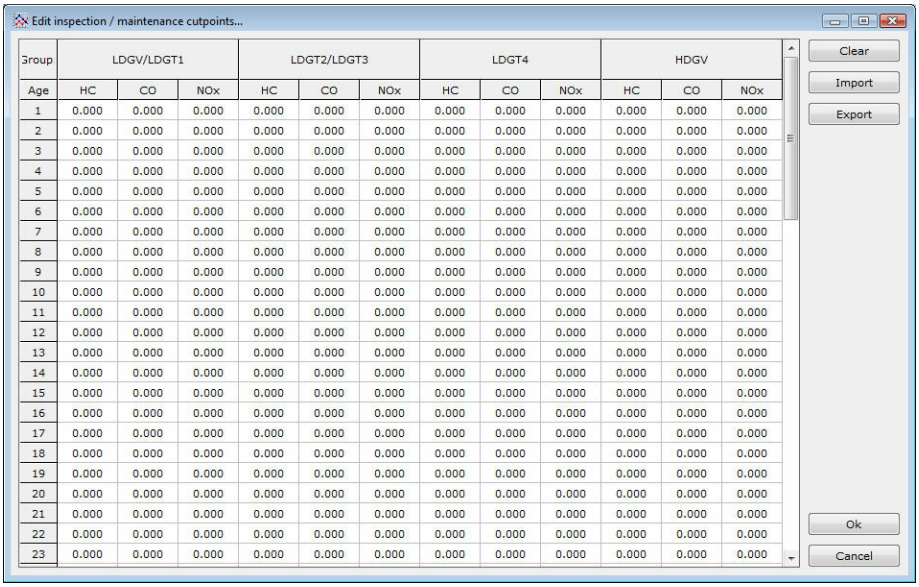
- TRC for a 'Test and Repair (computerized)' program,
- TRM for a 'Test and Repair (manual)' program,
- T/O for a 'Test Only' program.

The I/M program type must be TRC or TRM if the effectiveness command is to be used.
8. Select the **I/M inspection test type** from the drop-down list.
9. Select the **first model year** that will be covered by the I/M program to be modeled. This parameter can range from 1941 to 2050 inclusive.
10. Select the **last model year** that will be covered by the I/M program to be modeled. This parameter can range from 1941 to 2050 inclusive.
11. Enter the **stringency** from 10 to 50%. This command defines the expected exhaust inspection failure rate for pre-1981
model year vehicles covered by the I/M program. Vehicles in circulation after 1981 ignore this command.

12. Enter the **compliance rate** with the particular I/M program from 50 to 100%.
13. Enter the **waiver rates pre 1981** parameter.
14. Enter the **waiver rates post 1981** parameter.
The waiver commands specifies the percentage of vehicles that fail an initial I/M test and do not pass a retest but receive a certificate of compliance. There is no default for this command for exhaust I/M programs. It is required if the user wishes to model an exhaust I/M program. If the I/M PROGRAM command describes an exhaust program and this command is not present, the model will issue an error message and the run will be aborted.
If the I/M PROGRAM command describes an evaporative program, but waiver rates are not specified for the evaporative program and an exhaust program is not in effect for a specific vehicle class and model year, MOBILE6 will use default values of 5 percent for the evaporative program. However, if waiver rates are not provided for an evaporative program but are provided for a simultaneous exhaust
program, the model will use the exhaust program waiver rates to compute evaporative benefits on the vehicles and model years covered by both the exhaust and evaporative programs.
The valid input range for waiver rate percentages are between 0 percent and 50 percent. The values are entered into the program as percentages that include a decimal. If either of the waiver rates exceed 50.0 percent, the program will issue an warning message.
15. Select the **exemption age** from the drop-down list.
This command allows users to specify the age at which vehicles become exempt from the I/M program they wish to model. This is similar in effect to setting the last model year covered by the I/M program using the first and last model year command. However, it allows vehicles over a given age to be exempted when evaluating multiple calendar years without requiring separate runs using different
values for the first and last model year parameters.
By default, the exemption age is equal to 25 years old (in effect, under a default scenario, vehicles never become exempt from I/M because of age). If an exhaust I/M program is in effect and the user enters an exemption age for the program, the exhaust program exemption age will apply to the same vehicles and model years in any simultaneous evaporative I/M program, unless a different exemption age is explicitly entered for the evaporative I/M program.
Including or exempting vehicles older than 25 years has no effect on I/M program benefits because the model does not calculate emissions for vehicles older than 25 years. Enter the exemption age for all evaporative I/M programs. If this command is not entered for an evaporative I/M program, the value used in the model may change when commands for other I/M programs are added or modified.
16. Select the **grace period** from the drop-down list.
This command allows users to specify the age at which vehicles first become subject to I/M testing (newer vehicles are exempt). By default the grace period is equal to 1 year old.
If an exhaust I/M program is in effect and the user enters a grace period for the exhaust program, the exhaust program grace period will apply to the same vehicles and model years in any simultaneous evaporative I/M program, unless a different exemption age is explicitly entered for the evaporative I/M program.
17. Activate the **ignore technician training** option to eliminate the I/M credit that the model assigns to a technician training program.
The model assigns full I/M credit for technician training. This command is appropriate only if the I/M program does not conduct or plan to conduct a technician training program.
18. Click on the **Vehicles** tab.



19. Select the vehicle categories that will be included in the program. Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all vehicles, select no vehicles and select the unselected vehicles and vice versa respectively.
20. Only if in the user selected in step 8 IM240 inspection type, then by pressing the **Edit** button the user can enter cutpoint data.
20.1. Enter the desired values directly in the table.
20.2. Optionally, click on **Clear** to delete all data that are present in the table.
20.3. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

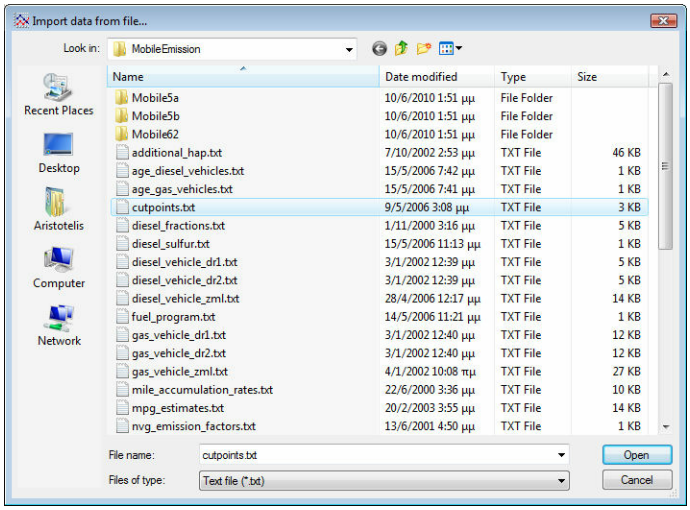


21. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

To import data from an external file:

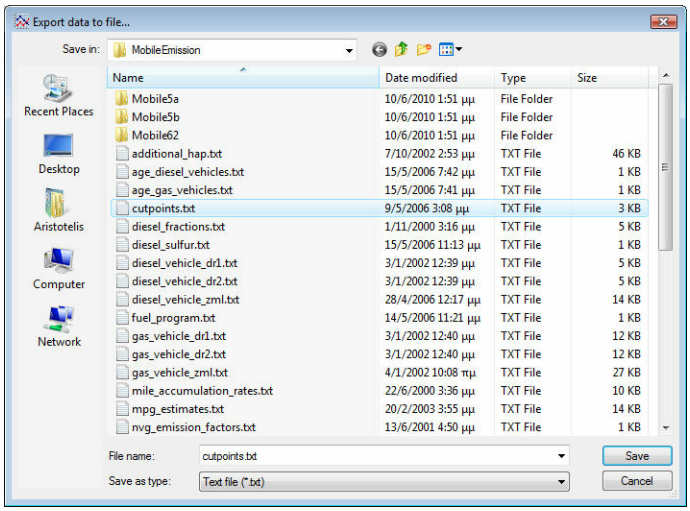
1. Click **Import** to open the file import form.
2. Select the path of the file.

3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



7.4.3 Delete program

The selected from the list I/M program is removed.

To delete an existing I/M program:

1. Select from the list of inspection / maintenance programs the record which is about to be removed.

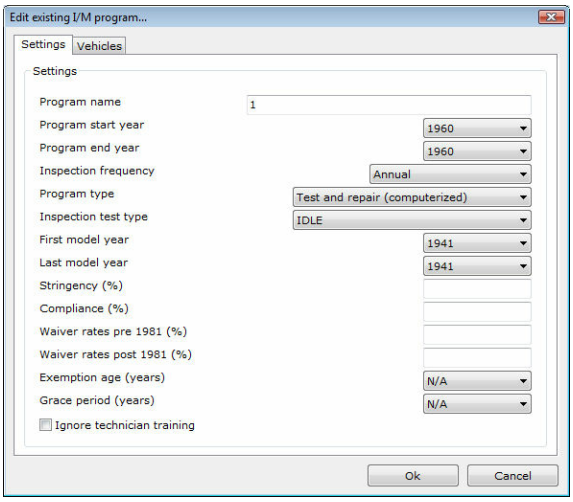
2. When the user clicks **Remove** it is asked whether he confirms the removal of the selected record, if the confirmation option has been activated in the general preferences.
3. The selected record is removed.

7.4.4 Change Program

The user can change the data of an existing inspection / maintenance program.

To change an existing inspection / maintenance program:

1. Select the record from the list of I/M programs that is about to change.
2. Press the **Change** button to view the edit form.
3. The user can make any changes.
4. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



7.5 1990 Clean air act requirements

This command allows users to model vehicle emissions as if the Federal Clean Air Act Amendments of 1990 had not been implemented. This command may be used in conjunction with the modeling of state Rate of Progress (ROP) plans. By default, the model assumes that the Clean Air Act (CAA)Amendments of 1990 did occur.

The model has been updated to include a number of vehicle and fuel requirements mandated by the 1990 Clean Air Act Amendments. These include Tier1, low emissions vehicle (LEV), and Tier2 tailpipe exhaust emission standards, and new evaporative emission test procedure requirements. Nevertheless, for some modeling purposes, emission factors for future calendar years in the absence of the requirements imposed by the 1990 CAA amendments may be needed (e.g., to support ROP plans).

By using this command, the user can disable the following effects in the model:

- The effect of all Federal exhaust tailpipe standards after Tier0 standards or the 1993 model year will be shut off. All model years subsequent to the 1993 model year will be assigned the 1993 model year emission factor. The 1993 model year was selected because it is the last year that was unaffected by the CAA

amendments.
- The evaporative emission benefits from the Enhanced Evaporative Test procedure will be eliminated. This affects running loss, diurnal, hot soak, resting loss, and refueling emission factors.
- The emission benefits from the Supplemental Federal Test Procedure for both off-cycle and air-conditioning emission effects will be eliminated if the command is issued.
- The effects of OBD will be eliminated, and an OBD I/M program will not be allowed. Evaporative OBD I/M programs are also not allowed when this command is used. Only Exhaust and Evaporative I/M programs that existed in calendar year 1990 can be modeled, and they can be modeled for model years 1996 and later.
- The fuel sulfur level is set to 300 parts per million (ppm) for all model years greater than 1993.
- The detergent gas emission effect is eliminated.
- The 1995 model year tampering rates are extended past the 1995 model year / calendar year. For these years, the rates that prevailed in the 1995 model year are used.
- Cold temperature CO effects are affected. These will be set to 1993 model year rates.

The following effects are NOT affected by the NO CLEAN AIR ACT command:

- Heavy-duty vehicle off-cycle effects (defeat device), and heavy-duty vehicle conversion factors are unaffected by this command.
- The model's correction factors for average speed are unaffected by this command.
- Facility cycle or roadway effects are unaffected by this command.
- Fleet effects such as fleet turnover, changes in VMT between classes, mileage accumulation effects, and registration distributions are unaffected by this command.

If this command is entered in conjunction with an inspection / maintenance program, the OBD I/M test type is not allowed for any model years. Only exhaust-based emission tests are allowed, such as the IDLE, 2500/IDLE , or non-OBD Evaporative test programs, such as the gas cap check. An error message will result if the user enters an OBD-based I/M program, or if the user enters an I/M240 or ASM type program.

When this command is used, the model year coverage for exhaust-based I/M emission test programs may extend to 1996 and newer model years.

To configure 1990 Clean air act requirements:

1. Select a run.
2. From the **Regulations** menu, select the **1990 Clean Air Act Requirements**.
3. Select or unselect the option **Disable the 1990 clean air act amendments**.
4. Optionally, press the **Default** button to enter the default value of the parameter which is to apply the clean air act.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

NOTE: This data is optional. If not entered, the program takes into account the amendments set forth in the clean air act. For countries other than the US, users should always disable this option.

7.6 Heavy duty diesel vehicle emission effects

The user can configure several options related to the heavy-duty diesel vehicle Nox off-cycle emission effects.

To configure the heavy-duty diesel vehicle emission effects:

1. Select a run.
2. From the **Regulations** menu select **Heavy Duty Diesel Vehicle Emission Effects** .
3.1. Enable or disable the effects of the HDDV Nox off-cycle emission effects.

This command allows users to turn off the effects of the heavy-duty diesel vehicle Nox off-cycle emission effects (defeat device emissions). It affects only Nox emissions from vehicle classes 17 through 23, and has an appreciable emission effect only on vehicle classes 22 and 23. It also only affects the Nox emission results from calendar years 1989 through 2028 by affecting model years 1988
through 2003.
By default, the model uses national (U.S.) estimates to report the effects of off-cycle Nox emissions from heavy-duty diesel vehicles. The default setting for this command is to include these effects. It is recommended that most users **do not activate this option**. EPA's best estimate for the effects of heavy-duty vehicle Nox off-cycle emissions has been programmed into MOBILE6 as the default input. Most users will not need to model the anything other than the default emission effects which include an off-cycle emission contribution. However, this command has been added to the model to allow users the ability to easily shut off the reporting of the Nox off-cycle emissions should they need the capability.

3.2. Enable or disable the effects of the pull ahead mitigation program.

This command allows the user to turn off the effects of the Pull Ahead mitigation program used to reduce heavy-duty diesel vehicle Nox off-cycle emissions. It affects only Nox emissions from vehicle classes 17 through 23, and has an appreciable emission effect only on vehicle classes 22 and 23. It also only affects the Nox emission results from model years 2002 and 2003.

By default, the model uses national (U.S.) estimates to report the effects of off-cycle Nox emissions pull ahead from heavy-duty diesel vehicles. The default setting for this command is to include these effects. It is recommended that most users **do not activate this option**. EPA's best estimate for the effects of heavy-duty vehicle Nox off-cycle emissions and the effects of the EPA Pull Ahead mitigation program have been programmed into the model as the default input. The Pull Ahead program modeled by the program is the best estimate at the time of the release of the model of what the actual program will achieve. It was assumed to have only partial compliance by the engine manufacturers in both model year 2002 and 2003, and

achieve an average Nox emission standard of 6.0 g/bhp-hr for those vehicles which comply. It does not give the user any capability to change the compliance rates, the implementation schedule or the emission level of 6.0 g/bhp-hr.

Care should be taken when using this command since it disables EPA's best estimates for the effect of the Nox off-cycle emissions mitigation strategy called Pull Ahead. The command also has interactive effects with the previous option, and should not be used in conjunction with this command.

3.3. Enable or disable the effects of the rebuild mitigation program.

This command allows the user to turn off the effects of the Rebuild mitigation program used to reduce heavy-duty diesel vehicle Nox off-cycle emissions. It affects only Nox emissions from vehicle classes 17 through 23, and has an appreciable emission effect only on vehicle classes22 and 23. It also only affects the Nox emission results from model years 1993 through 2003.

By default, the model uses national estimates to report the effects of off-cycle Nox emissions Rebuild program for heavy-duty diesel vehicles. The default setting for this command is to include these effects at an effectiveness rate of 90%. It is recommended that most users **do not activate this option**.

EPA’s best estimate for the effects of heavy-duty vehicle Nox off-cycle emissions and the effects of the EPA Rebuild mitigation program have been programmed into the model as the default input. The Rebuild program modeled by the program is the best estimate at the time of the release of the model of what the actual program will achieve. It was assumed to have an effectiveness rate of 90 percent, cover 1994 through 2003 model years, begin after five years of service for class 8a and 8b trucks and 12 years for medium duty diesel trucks, and rebuild engines to a standard of 6.00 g/bhp-hr. The command does not give the user the ability to change any of these parameters. The effective parameter (90%) can be changed with the next option.

Care should be taken when using this command since it disables EPA's best estimates for the effect of the Nox off-cycle emissions mitigation strategy called Rebuild. The command also has interactive effects with the command described in 3.1, and should not be used in conjunction with this command. This command also cannot be used in conjunction with the next option.

3.4. Enter the rebuild program effectiveness.

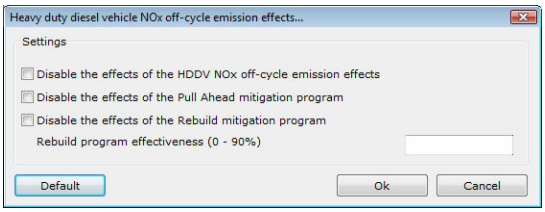
This command allows the user to change the Rebuild program effectiveness rate used to reduce heavy-duty diesel vehicle Nox off-cycle emissions. It affects only Nox emissions from vehicle classes 17 through 23, and has an appreciable emission effect only on vehicle classes 22 and 23. It also only affects the Nox emission results from model years 1993 through 2003.

The model uses national (U.S.) estimates to report the effects of off-cycle Nox emissions Rebuild program for heavy-duty diesel vehicles. The range of legal values for this input parameter are 0.01 to 0.90. The default setting for this command is to include these effects at an effectiveness rate of 90%. It is recommended that most users **do not activate this option**.

EPA’s best estimate for the effects of heavy-duty vehicle Nox off-cycle emissions and

the effects of the EPA Rebuild mitigation program have been programmed into the model as the default input. This default effectiveness level is 90 percent. This command allows the user to vary the Rebuild Effectiveness to perhaps better fit a local situation. However, it is unlikely that most users will have good local data on this parameters, and are thus, encouraged to not use it.

4. Optionally, press the **Default** button to enter the default values of the parameters.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional.

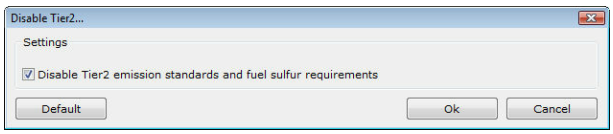
7.7 Tier2 emission standards and fuel requirements

7.7.1 Disable Tier2

This command allows the user to disable the Tier 2 emission standards and fuel sulfur requirements. By default, the model accounts for the Tier 2 emission standards and fuel requirements if the user does not use this command. Use of this command causes the model to calculate emission factors without the effects of the Tier 2 standards. The model will continue modeling the NLEV vehicle and truck program through 2050 with the default fuel sulfur levels for calendar year 2000 (300 ppm for conventional gasoline, 150 ppm for reformulated gasoline).

To disable Tier 2:

1. Select a run.
2. From the **Regulations** menu select the **Tier2 Standards And Fuel Requirements** menu.
3. From the pop-up menu select **Disable Tier2**.
4. Make the appropriate change.
5. Optionally, press the **Default** button to enter the default value of the parameter.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not entered, the program uses Tier2.

7.7.2 Tier2 evaporative emissions phase-in

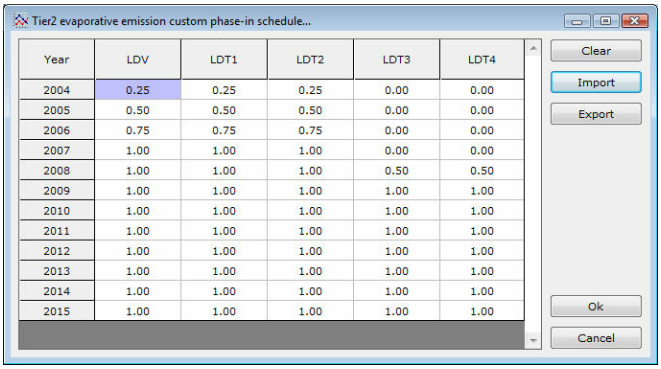
This command allows the user to replace the default phase-in fractions (by certification bin) for the Tier 2 evaporative emission standards, allowing different phase-in schedules to be modeled. This command is also necessary to model the

evaporative emission effects of California's LEV II requirement. By default, the model uses the default Tier2 certification standard phase-in schedule.

The columns reflect model years 2004 through 2015, inclusive. The rows reflect phase-in percentages by the 5 light-duty vehicle classes (LDV/LDT1/LDT2/LDT3/ LDT4). Each of the phase-in fractions must be between zero and one, inclusive. The sum of the phase-in fractions must be between 0.999 and 1.001 (inclusive) for a given vehicle, model year, and pollutant, or the input data will be rejected and the previously stored values will be used. An error message will be sent to the descriptive output when the user supplied input for the alternate Tier2 phase-in fractions has been rejected.

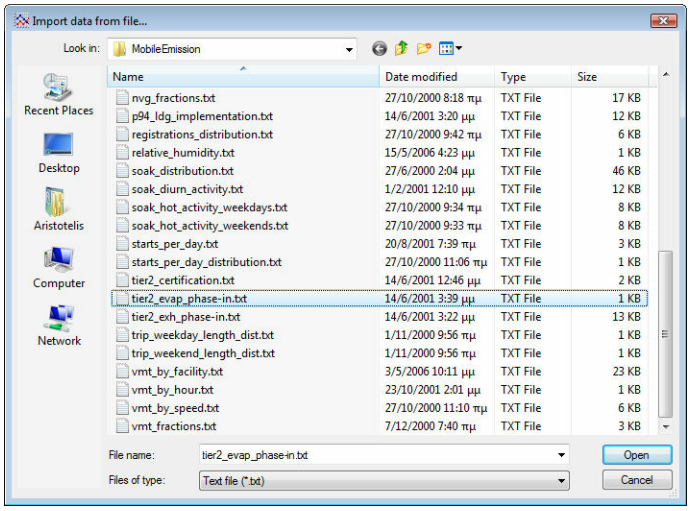
To enter the data:

1. Select a run.
2. From the **Regulations** menu select the **Tier2 Standards And Fuel Requirements** menu.
3. From the pop-up menu select **Tier2 Evaporative Emissions Phase-In**.
4. Enter the desired values directly in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



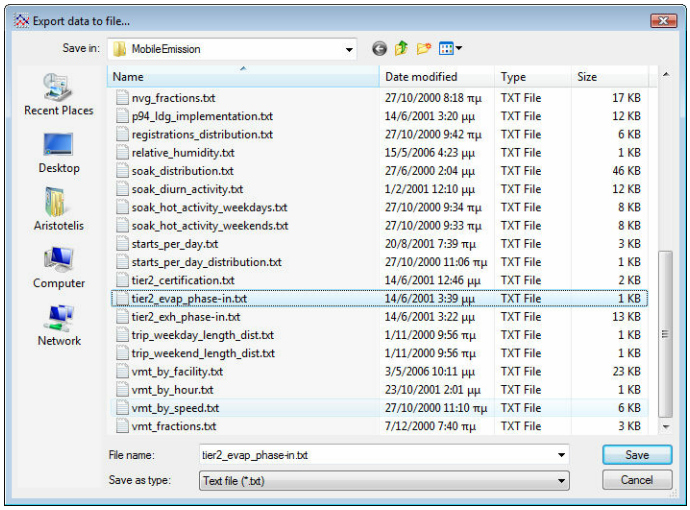
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional.

7.7.3 Tier2 exhaust emissions phase-in

This command allows the user to replace the default phase-in fractions (by certification bin) for the Tier 2 exhaust emission standards, allowing different phase-in schedules to be modeled. This command is also necessary to model the exhaust emission effects of California's LEV II requirement. By default the model uses the default Tier2 certification standard phase-in schedule.

The rows reflect phase-in percentages by a) 12 certification bins, b) 3 pollutants (HC/CO/Nox), and c) 5 light-duty vehicle classes (LDV/LDT1/LDT2/LDT3/LDT4). For example, the first 12 rows of the matrix contain bins 1-12 for LDV HC; the second 12

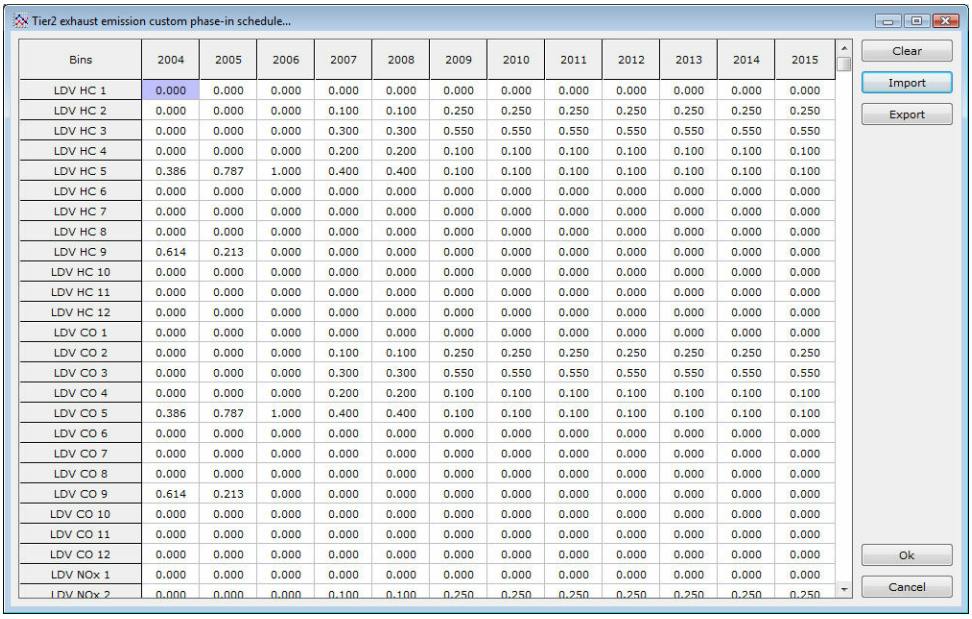
rows contain bins 1-12 for LDV CO; the third 12 rows contain bins 1-12 for LDV Nox; the fourth 12 rows contain bins 1-12 for LDT1 HC, etc.

In terms of model operation, each fraction must be between zero and one, (inclusive). The sum of the phase-in fractions must be between 0.999 and 1.001 (inclusive) for a given vehicle class, model year, and pollutant, or the input data will be rejected and the previously stored values will be used. An error message will be generated when the user-supplied input for the alternate Tier2 phase-in fractions has been rejected. Beyond model execution, the user must ensure that alternate phase-in assumptions for the Tier 2 requirement satisfy the fleet-average and minimum phase-in provisions of the Tier 2 rule; the model does not check for the latter condition. As discussed in the model's technical report M6.EXH.004, the Tier 2 requirement contains 10 actual certification bins; 8 'final', and 2 'interim'. Bins 1-8 are the final bins (lowest standard to highest), and Bins 9-10 are the interim standards. Under the default scenario of the model, Bins 11-12 are used only to account for provisions of the HC interim standards for LDT3s and LDT4s which necessitate multiple standards being assigned to one bin. The user can 'activate' these bins through the Tier2 Certification command.

Under the default condition, the certification standard for Bin 1 is 0. However, zero-emitting vehicles (ZEVs) should not be assigned to this bin, because overall emissions as calculated by the model will not be zero. Instead, the user would need to specify the percentage of ZEVs under the post 1994 alternate schedule command and use this command to apportion the non-ZEVs in Bins 2-10. In this scenario the non-ZEV phase-in fractions would have to be normalized in the input file containing the phase-in schedule so that they sum to one across vehicle class, model year, and pollutant.

To enter the data:

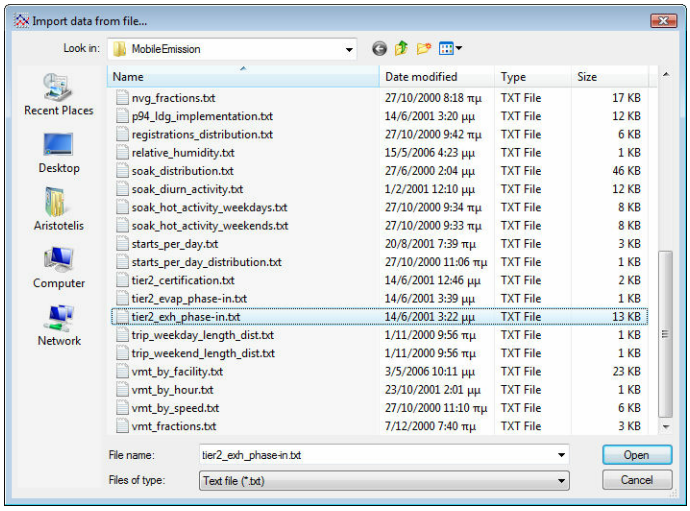
1. Select a run.
2. From the **Regulations** menu select the **Tier2 Standards And Fuel Requirements** menu.
3. From the pop-up menu select **Tier2 Exhaust Emissions Phase-In**.
4. Enter the desired values directly in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Bins	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LDV HC 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 2	0.000	0.000	0.000	0.100	0.100	0.250	0.250	0.250	0.250	0.250	0.250	0.250
LDV HC 3	0.000	0.000	0.000	0.300	0.300	0.550	0.550	0.550	0.550	0.550	0.550	0.550
LDV HC 4	0.000	0.000	0.000	0.200	0.200	0.100	0.100	0.100	0.100	0.100	0.100	0.100
LDV HC 5	0.386	0.787	1.000	0.400	0.400	0.100	0.100	0.100	0.100	0.100	0.100	0.100
LDV HC 6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 9	0.614	0.213	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV HC 12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 2	0.000	0.000	0.000	0.100	0.100	0.250	0.250	0.250	0.250	0.250	0.250	0.250
LDV CO 3	0.000	0.000	0.000	0.300	0.300	0.550	0.550	0.550	0.550	0.550	0.550	0.550
LDV CO 4	0.000	0.000	0.000	0.200	0.200	0.100	0.100	0.100	0.100	0.100	0.100	0.100
LDV CO 5	0.386	0.787	1.000	0.400	0.400	0.100	0.100	0.100	0.100	0.100	0.100	0.100
LDV CO 6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 9	0.614	0.213	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV CO 12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV NOx 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDV NOx 2	0.000	0.000	0.000	0.100	0.100	0.250	0.250	0.250	0.250	0.250	0.250	0.250

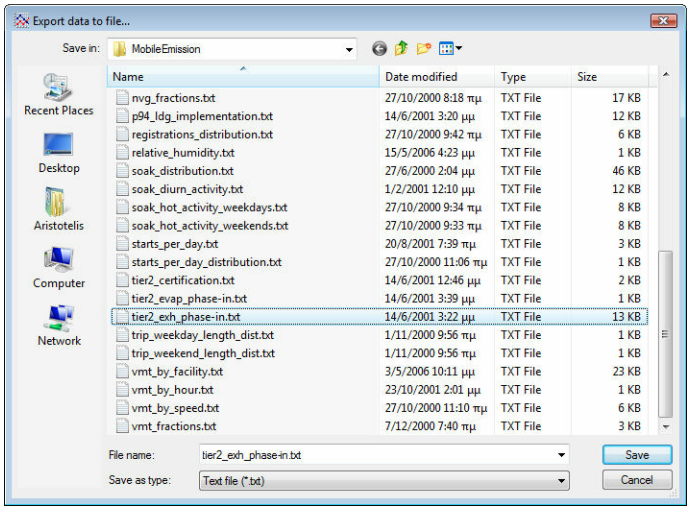
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional.

7.7.4 Alternative Tier2 certification standards

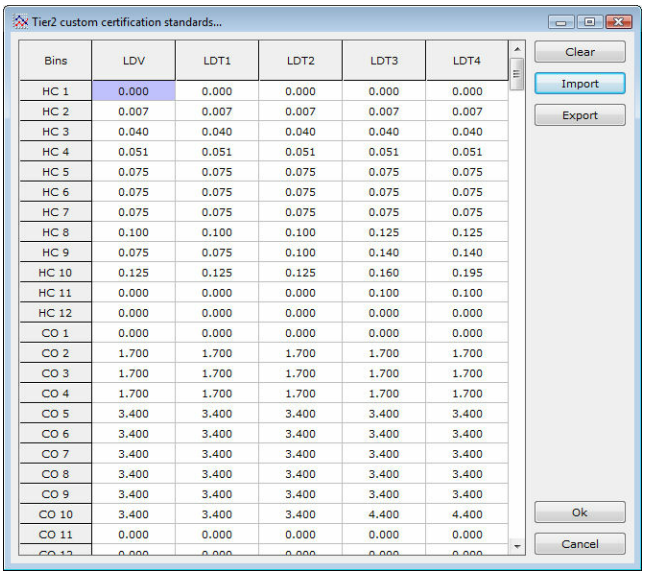
This command allows the user to specify alternative Tier 2 50,000 mile certification standards and must be used to model the effects of California's LEV II requirement. Since the standards under the Tier 2 rule are final and therefore static, the intended use of this command is to model the effects of California's LEV II program. By default, the model uses the default Tier2 certification standards.

This command is used to specify an external input file containing values that will override the default Tier 2 certification standards. The input file called by this command will read in 50,000 mile certification standards for each of the 10 certification 'bins' (interim and final) for each light-duty vehicle type (Classes 1 through 5) and pollutant (HC, CO and Nox). The Tier 2 requirement contains 10 actual certification bins; 8 'final', and 2 'interim'. Bins 1-8 are the final bins (lowest standard to highest), and Bins 9-10 are the interim standards. Under the default scenario of the program, bins 11-12 are used only to account for provisions of the HC interim standards for LDT3s and LDT4s which necessitate multiple standards being assigned to one bin. The user can 'activate' these bins through the command, a necessary step for modeling the California LEV II program.

The alternate certification standards supplied under T2 CERT are checked to ensure that they are greater than or equal to zero. Negative values or missing values result in all user supplied input values being rejected. An error message will be sent to the descriptive output when user supplied input has been rejected.

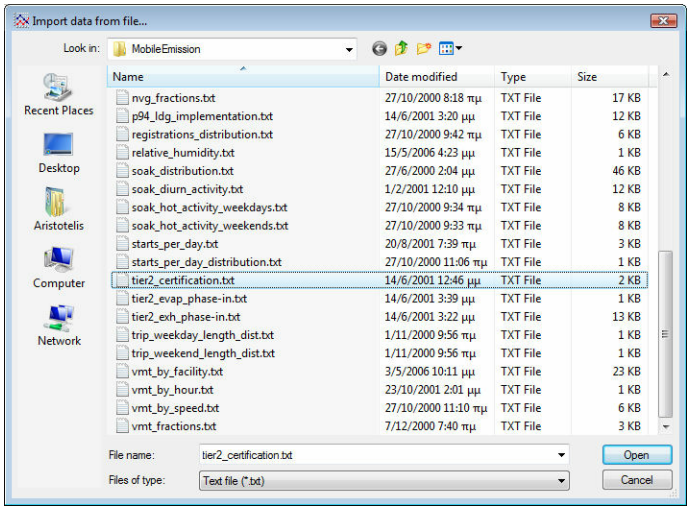
To enter the data:

1. Select a run.
2. From the **Regulations** menu select the **Tier2 Standards And Fuel Requirements** menu.
3. From the pop-up menu select **Alternative Tier2 Certification Standards**.
4. Enter the desired values directly in the table.
5. Optionally, click on **Clear** to delete all data that are present in the table.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



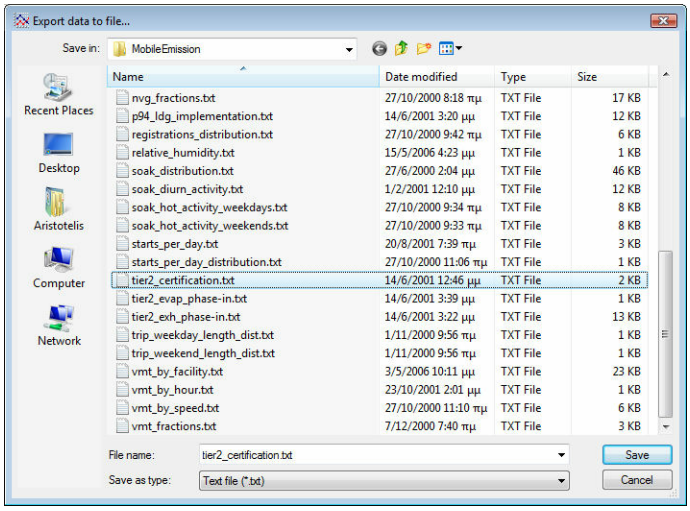
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional.

7.8 Post 1994 model vehicle standards

This command allows the user to input optional 1994 and later fleet penetration fractions for light-duty gasoline vehicles under the Tier 1, NLEV (or California LEV 1), and Tier 2 emission standard programs. By default, the model uses the default certification standard phase-in schedule for the Tier 1, NLEV and Tier 2 programs.

This command allows for optional user input of light-duty gas 1994+ model year emission standard implementation values. These values are fleet penetration fractions of the eleven vehicle certification standard categories under the Tier 1, NLEV (or California LEV I), and Tier 2 vehicle emission programs. For a given model year and light-duty gas vehicle type the eleven fractions must add up to 1.000. The standards types are:

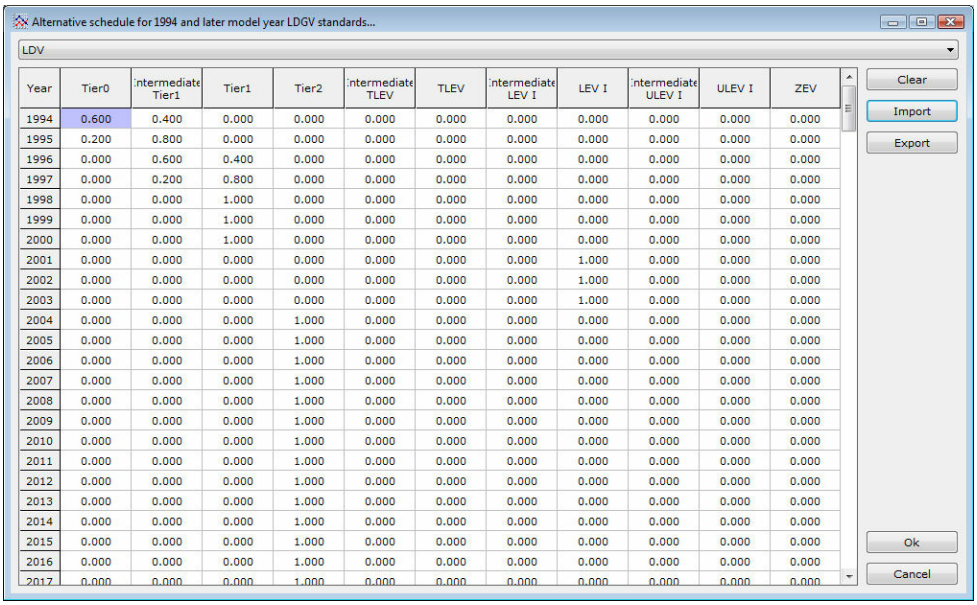
1. Tier0
2. Intermediate Tier1
3. Tier1
4. Tier2
5. Intermediate TLEV
6. TLEV
7. Intermediate LEV I
8. LEV I
9. Intermediate ULEV I
10. ULEV I
11. ZEV (zero emitting vehicle)

It should be noted that the category 'Tier 2' under this command only denotes the fraction of light-duty vehicles and trucks participating in the Tier 2 program. The full 'bin' implementation of the Tier 2 vehicle program (or LEV II program) would be modeled using the Tier 2 input commands. However, this command must be used to model the effect of zero-emitting vehicles under the LEV I or LEV II programs.

The model does not have separate emission estimates for the intermediate useful life standards. The 'intermediate' standard level categories use the emission estimates for the final category; e.g., Intermediate Tier1 type uses the Tier1 emission level.

To enter the data:

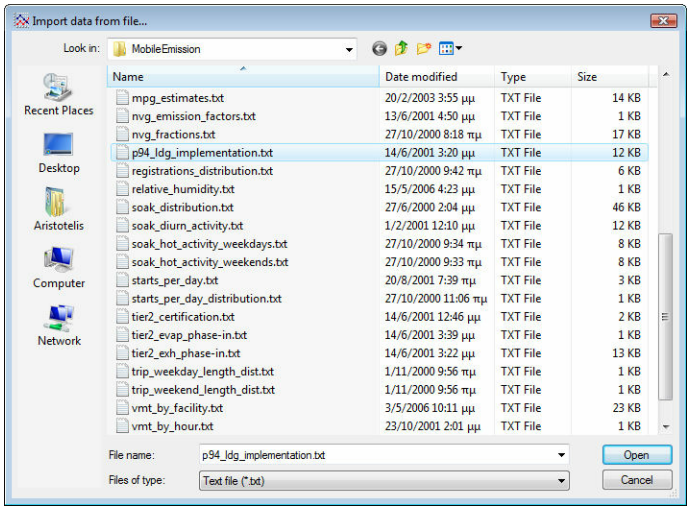
1. Select a run.
2. From the **Regulations** menu select **Post 1994 Model Vehicle Standards**.
3. Select a vehicle class from the drop-down list.
4. Enter the desired values directly in the table.
5. Repeat steps 3 and 4 until all values have been entered.
6. Optionally, click on **Clear** to delete all data that are present in the table.
7. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



Year	Tier0	Intermediate Tier1	Tier1	Tier2	Intermediate TLEV	TLEV	Intermediate LEV I	LEV I	Intermediate ULEV I	ULEV I	ZEV
1994	0.600	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1995	0.200	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1996	0.000	0.600	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1997	0.000	0.200	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1999	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
2002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
2003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
2004	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2015	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2016	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

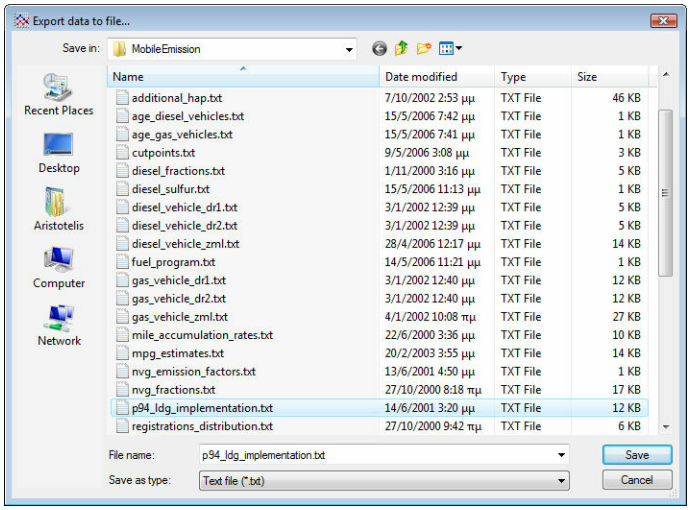
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



NOTE: This data is optional.

7.9 2007 heavy duty vehicle emissions requirements

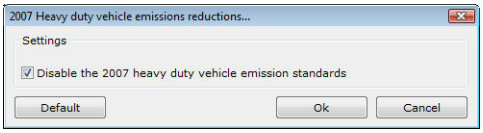
The following command overrides the default settings for the 2007 Heavy Duty Vehicle emission standards. It allows the user to disable the 2007 heavy duty vehicle emission standards. By default, the model will account for the 2007 heavy duty vehicle emission standards.

Use of this command causes the model to calculate emission factors without the effects of the 2007 heavy duty vehicle emission standards. These standards and the associated lower sulfur diesel fuels will begin effecting emissions in 2008 and will be

fully implemented in all vehicles manufactured in 2009 and subsequent years.

To disable or enable the 2007 heavy duty vehicle emissions requirements:

1. Select a run.
2. From the **Regulations** menu select **2007 Heavy Duty Vehicle Emissions Requirements**.
3. Disable or enable the given option.
4. Optionally, press the **Default** button to enter the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. By default, the model will account for the 2007 heavy duty vehicle emission standards.

Chapter VIII

8 Fuel

8.1 Fuel menu

Fuel commands allow users to model the impact of various gasoline fuel parameters. In particular, the following options are offered via this menu:

- Fuel program
  - User defined program
- Gasoline sulfur content
- Diesel sulfur content
- Oxygenated fuels
- Fuel reid vapor pressure
- Effective season
- Air toxics
  - Gas aromatic
  - Gas olefin
  - Gas benzene
  - Vapor percentage at 200F
  - Vapor percentage at 300F
  - Gasoline fuel oxygenate type
  - Oxygenated fuels RVP waiver

8.2 Fuel program

8.2.1 Fuel program

This command allows users to specify one of two Tier 2 sulfur phase-in schedules, to model the impact of a reformulated gasoline (RFG) program, or to specify sulfur content for gasoline after 1999. By default the model assumes that there is no RFG program in place and applies the standard Tier 2 gasoline sulfur phase-in schedule for calendar years after 1999. This default condition is described below as 'Conventional Gasoline East.'

This command allows four options. Users may specify one of two Tier 2 sulfur phase-in schedules, model the effect of an RFG program, or directly supply values for gasoline sulfur content after 1999. Users select the desired option by entering an integer following the command name. This data entry is in free column format. Some options also require additional input data, as described below. The options and their associated numbers are:

1. Conventional Gasoline East
2. Reformulated Gasoline
3. Conventional Gasoline West
4. User-supplied gasoline sulfur levels

Each of these options and its input requirements are described in detail below.

Conventional Gasoline East
This is the model default. It supplies post-1999 gasoline sulfur levels by year under the phase-in schedule prescribed by the Tier 2 rule for most states.

Conventional Gasoline West
This option supplies post-1999 gasoline sulfur levels by year under the phase-in schedule prescribed by the Tier 2 rule for specific western states (i.e., Alaska, Colorado, Idaho, Montana, New Mexico, North Dakota, Utah, Wyoming) and bordering counties in other states.

Reformulated Gasoline (RFG)
This option should be used to model the effects of an RFG program (Unless the user intends to model air toxics, in which case the RFG parameters must be entered explicitly. Like conventional gasoline, RFG must meet fuel volatility requirements that vary by geographic region (see 'Volatility Regulations for Gasoline and Alcohol Blends Sold in Calendar Years 1992 and Beyond,' 55 FR 23658, June 11, 1990). Because the RFG option often sets fuel volatility and overrides the FUEL RVP label, the RFG option requires the user to indicate which region (north or south) is being modeled. The exact fuel parameters modeled for RFG depend on the geographic region, the calendar year, and the season.

Notes for Reformulated Gasoline Parameter tables:

(1) The Clean Air Act defines the RFG 'Summer' as May 1 through September 15. 'Winter' is the rest of the year. The model will generally determine which fuel season to model using the value input for evaluation month (1 = January and indicates winter; 7 = July and indicates summer). However, the user can override the fuel season indicated by the evaluation month by using the season command.

(2) For most of the fuel parameters, the year listed here indicates the calendar year for which the fuel parameter is typical. However, the 'Maximum Sulfur' value represents the maximum sulfur level ever experienced by a vehicle, regardless of the fuel level in the calendar year of the model run. Thus, the 'year' in these tables is used to assign the maximum sulfur values to the appropriate vehicle model year. The maximum sulfur effect is not calculated for 1999-and-earlier vehicles, so no maximum sulfur level is needed for these years.

(3) During the winter fuel season, the user may override the default RFG parameters for oxygenated fuels if the user-supplied oxygenated fuel parameters have a combined oxygenate for ethanol and ether blends greater than 2.1 percent by weight and the combined oxygenate market share is 100 percent.

(4) The winter RFG sulfur values listed here and used in the model when the RFG option is selected are appropriate for most of the United States, but they are not correct for states with 'western' Tier 2 fuel.

(5) In the winter RFG season, user input for sulfur content will override the default average fuel sulfur for calendar years 1999-and earlier. This is not true for summer RFG.

User-supplied Gasoline Sulfur Levels
This option allows the user to directly specify the average and maximum sulfur levels for calendar years 2000 and later if these are known to differ from RFG or the conventional fuels programmed into the model. For calendar years prior to 2000, the sulfur content command must be used.

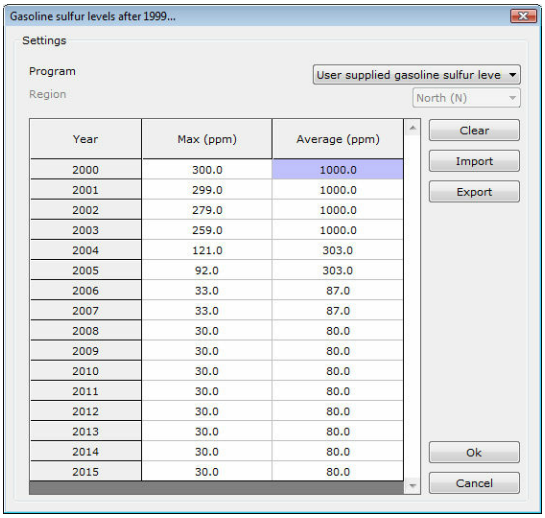
The command affects sulfur content prior to calendar year 2000 only when RFG is selected. In general, use the sulfur content command to define the sulfur content of gasoline in calendar years before 2000. The model treats the command option 4 as a conventional gasoline program with alternate sulfur levels. If an RFG program is desired with alternate sulfur levels, the command option 4 lets users enter the sulfur levels and alter the other non-sulfur fuel parameters through the fuel rvp and oxygenated fuels and/or air toxics fuel commands to approximate the non-sulfur effects of RFG.

It is not appropriate to use the command option 2 to choose a Phase 2 (calendar year 2000 or later) RFG program for western Tier 2 sulfur content phase in states (listed above). Users wishing to model western RFG will need to specify all of the fuel parameters (sulfur content, oxygen content and RVP) separately for each calendar year they wish to evaluate. In winter season scenarios, users should use the command to choose 'Conventional Gasoline West' to obtain the appropriate winter sulfur levels.

Then, using the oxygenated fuels command, users must enter either the winter RFG oxygenated fuel parameters described above or a local oxygenated fuels program that satisfies the RFG rule. The fuel rvp command is used to specify fuel volatility. Modeling western RFG in summer will require the user to specify the sulfur levels using the command option 4, because the summer average sulfur will be the same as those shown above for RFG, however, the maximum sulfur values will be those shown for the western phase in states. As with winter, the user must specify the appropriate oxygen content and fuel RVP levels shown above for RFG using the oxygenated fuels and FUEL RVP commands. To model air toxics emissions Western RFG, users should make the appropriate adjustments to the air toxics fuel command.

To enter a fuel program:

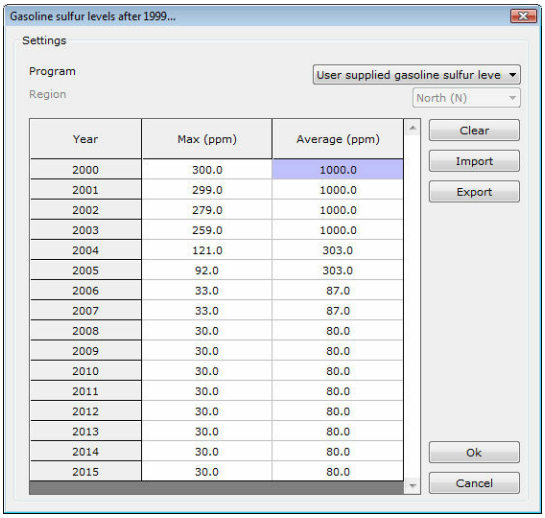
1. Select a run or a scenario.
2. From the **Fuel** menu select **Fuel Program**.
3. Select the desired **program**. If N/A is selected, then the command is deactivated and the Conventional Gasoline East default value is selected.
4. If the reformulated gasoline is selected, then the **region** must also be specified (North or South).
5. If the user supplied gasoline sulfur levels is selected, then the user must also supply the necessary data as described in the next paragraph.
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



8.2.2 User defined program

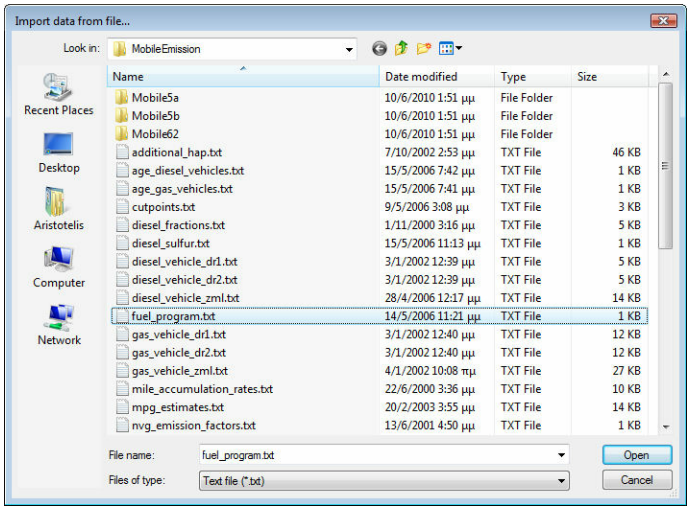
Enter the maximum and mean concentrations of sulfur in the fuel in ppm.
The values are typed directly in the table. The table is not active until the user selects **User supplied gasoline sulfur levels** from the drop-down program list. Optionally, click on **Clear** to delete all data that are present in the table.

Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



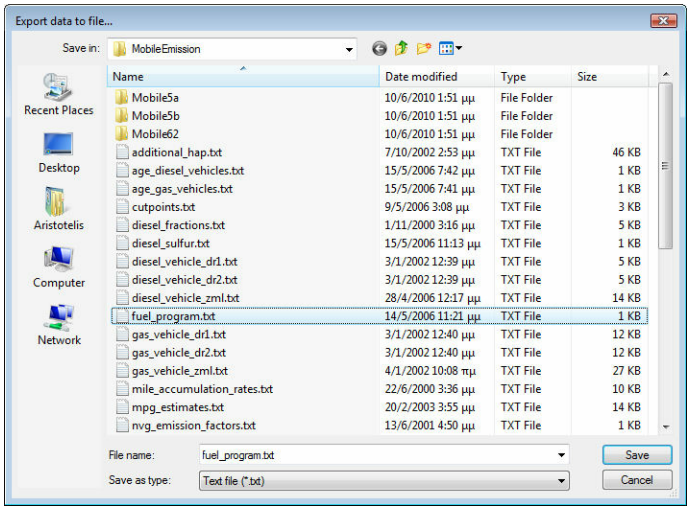
To import data from an external file:

1. Click **Import** to open the file import form.
2. Select the path of the file.
3. Select the file type from the **Files of type** drop-down list. The default option is "Text file" with the extension .txt.
4. Select the file by clicking on it.
5. Select **Open** to open the selected file. Select **Cancel** to cancel the operation.



To export data to an external file:

1. Click **Export** to open the file export form.
2. Select the path of the file.
3. Type the filename in the **File name** text box.
4. Select **Save** to save the file with the selected filename and path. Select **Cancel** to cancel the operation.



8.3 Gasoline sulfur content

This command allows the user to enter the sulfur content of gasoline fuel for calendar years through 1999. This input is valid only through the 1999 calendar year. For calendar years after 1999, the model will ignore this input.

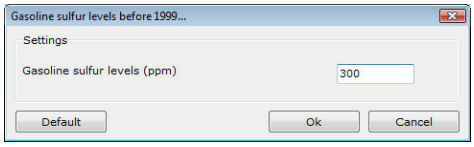
The model will accept sulfur contents for 30.0 ppm through 600.0 ppm. If a sulfur level outside that range is entered, the model will round to the (appropriate) end point (30 ppm or 600 ppm) and generate a warning message. To enter values for years after 1999, the fuel program command must be used.

Using this command will override the default fuel sulfur content (300 ppm) used for

Reformulated Gasoline in calendar years 1995 through 1999 (Phase 1) in both Regions (North and South) and in both winter and summer seasons. The user should note that this command and the diesel sulfur commands are not completely analogous. The command applies only the 1999 and earlier calendar years, while the diesel sulfur command applies to all calendar years.

To enter the gasoline sulfur content:

1. Select a scenario.
2. From the **Fuel** menu select the **Gasoline Sulfur Content**.
3. Enter the desired value between 30 and 600 ppm.
4. Optionally, press the **Default** button to enter the default value of the parameter.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not entered, the model will use the default value which is 300 ppm.

8.4 Diesel sulfur content

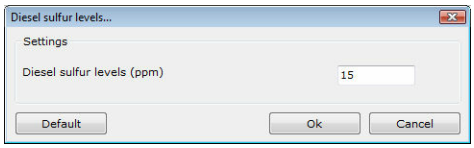
This command provides for the input of the average diesel fuel sulfur level for the scenario. The value is specified in units of parts of sulfur per million. This value can range from 0.01 ppm to 5000 ppm. The user should note that the gasoline sulfur and diesel sulfur commands are not completely analogous. The gasoline sulfur command applies only the 1999 and earlier calendar years, while the diesel sulfur command applies to all calendar years.

The diesel fuel sulfur content value does not affect the calculation of HC, CO, and NOX emissions or of air toxic compounds (except when calculated as a ratio to PM).

If particulate emissions are being estimated, increasing the amount of sulfur in the vehicle fuel has the effect of directly increasing estimated sulfate particulate emissions.

To enter the diesel sulfur content:

1. Select a scenario.
2. From the **Fuel** menu select the **Gasoline Sulfur Content**.
3. Enter the desired value between 0.01 and 5000 ppm.
4. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional.

8.5 Oxygenated fuels

This command permits users to model the effects of oxygenated gasoline on exhaust emissions for all gasoline-fueled vehicle types. If the command is not used and the fuel program command is not used to select a RFG program, the program assumes that the fuel used by gasoline-fueled vehicles does not contain an oxygenate and does not calculate an oxygenated fuels benefit.

The effect of oxygenated fuels on emissions depends on several fuel parameters that are specified by this command. These include whether the oxygenate is an alcohol or ether blend; the amount of oxygen in the fuel; and the market share of oxygenated fuels. In certain cases, the presence of oxygenate in fuel can affect fuel RVP, generating an additional emission effect.

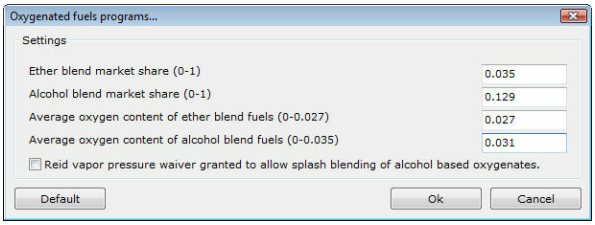
The user need to specify whether a Reid vapor pressure (RVP) waiver has been granted to allow "splash" blending of alcohol-based oxygenates. If a waiver has not been granted, then alcohol-based oxygenated fuels must meet the same RVP requirements as non-oxygenated fuels sold in the area. If a waiver has been granted, then alcohol-based oxygenated fuels are allowed to exceed the RVP requirements by up to 1 pound per square inch (psi), and the user-input RVP is increased to account for the market share of the higher RVP fuel.

If the market share of the oxygenated fuels is not 100%, then the average RVP of fuel will be increased by a commingling effect from the
mixing of oxygenated and non-oxygenated fuels, even if there is no RVP waiver for oxygenated fuels.

If the user specifies a RFG program using the fuel program command, then the oxygenated fuel parameters of that program take precedence over this command.

To enter oxygenated fuels data:

1. Select a run or a scenario.
2. From the **Fuel** menu select **Oxygenated Fuels**.
3. Enter the **ether blend market share**, expressed as a decimal fraction. The range is 0.000 to 1.000..
4. Enter the **alcohol blend market share**, expressed as a decimal fraction. The range is 0.000 to 1.000..
5. Enter the **average oxygen content of ether blend fuels**, percent weight, expressed as a decimal fraction. The range is 0.000 to
0.027.
6. Enter the **average oxygen content of alcohol blend fuels**, percent weight, expressed as a decimal fraction. The range is 0.000
to 0.035.
7. Select if Reid vapor pressure waiver is granted to allow splash blending of alcohol based oxygenates or not.
8. Optionally, press the **Default** button to enter the default value of the parameter.
9. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. This data cannot be used together with the air toxics options found in the project properties. Instead of this command the user should use the oxygenate command.

8.6 Fuel reid vapor pressure

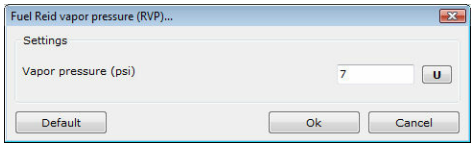
This command allows users to specify fuel RVP for the area to be modeled There is no model default for fuel RVP. Users must enter a value for all scenarios (in the Run section) or for each scenario (in the Scenario section) of each model command input file.

RVP is one measure of the volatility of gasoline. Exhaust and especially non-exhaust emissions vary with fuel volatility. The FUEL RVP command specifies the value of RVP (in psi) representing the prevailing average fuel volatility for the geographic area of interest. The RVP value entered must reflect the average in-use RVP of gasoline in the region of the country being modeled. The RVP value can be between 6.5 psi and 15.2 psi, inclusive. If the user enters a value outside this range, the model will round to the appropriate endpoint (6.5 psi or 15.2 psi) and will generate a warning message.

However, there are federal limits on fuel RVP in ozone-producing months (May through September), which began in 1989. For the calendar years 1989 to1991, the RVP limit is 10.5 psi, 9.5 psi, or 9.0 psi depending on the region of the country or summer month (see Federal Register 54 FR 11868, March 22, 1989). For calendar years 1992 and beyond, the summer RVP limit is either 9.0 psi or 7.8 psi depending on the region or month (see Federal Register 54 FR 23658, June 11, 1990).

To enter the fuel reid vapor pressure:

1. Select a run or a scenario.
2. From the **Fuel** menu select **Fuel Reid Vapor Pressure**.
3. Enter the desired value between 6.5 and 15.2 psi.
4. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is **mandatory**.

8.7 Effective season

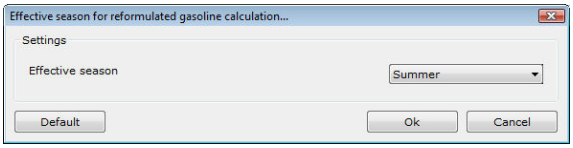
This command identifies the effective season for the RFG calculation regardless of the month being modeled. By default, the model assumes the season is winter when January is selected as the evaluation month and that the season is summer when July is selected as the evaluation month. The MOBILE6 default evaluation month is January, so winter RFG will be modeled unless the user selects July using the evaluation month command or selects summer by using this command.

The effect of RFG on emissions differs in summer and winter. The season command allows the user to override the effect of the evaluation month command on RFG calculations, either specifying that summer RFG rules be applied when the evaluation month is January or that winter RFG rules be applied when the evaluation month is July. This command affects only RFG-related emission results.

The command affects results only relating to RFG. The effective season command will have no effect on results unless the input includes a fuel program command, indicating that an RFG program is in place.

To select an effective season:

1. Select a run or a scenario.
2. From the **Fuel** menu select **Effective Season**.
3. Select the desired effective season from the drop-down list.
4. Click the **Default** button to select the default value of the parameter which is derived from the evaluation month command.
5. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not entered or if N/A is selected then its value will be taken from the evaluation month command.

8.8 Air toxics

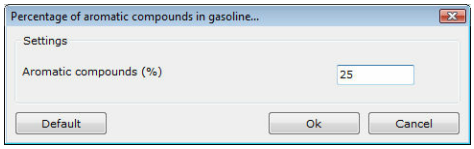
8.8.1 Gas aromatic

This command is required, if the air toxics command is used. Do not use this command without the air toxics command. This command allows users to specify the aromatic content of gasoline on a volume of fuel percentage basis.

This is the percentage of aromatic compounds in gasoline on a volume basis. An aromatic compound is one which contains a six-carbon ring configuration of the benzene series and related organic groups. The value supplied by the user should include benzene and other aromatic type compounds (i.e., toluene). The valid range of inputs is from 10% to 55%. Any values outside of this range will most likely lead to erroneous results. A typical value for this input is in the range of 20 to 30 percent Aromatic compounds by volume. Wintertime values are typically lower than summertime values.

To enter the aromatic compounds data :

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Gas Aromatic**.
4. Enter the percentage of aromatic compounds found in fuel.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties is used. It must be deactivated when the air toxics command is not used.

8.8.2 Gas olefin

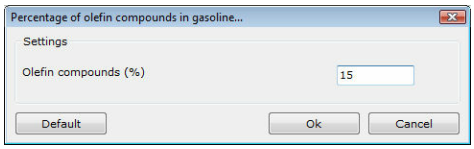
This command is required, if the air toxics command is used. Do not use this command without the air toxics command. This command allows users to specify the olefin content of gasoline on a volume of fuel percentage basis.

This is the percentage of olefin compounds in gasoline on a volume basis. An olefin is a class of unsaturated hydrocarbons, such as ethylene, having the general formula CnH2n and characterized by relatively great chemical activity. The value supplied by the user should include all varieties of olefins that can appear in the gasoline.

The valid range of inputs is from 0% to 30%. Any values outside of this range will most likely lead to erroneous results. A typical value for this input is in the range of 5 to 25 percent olefin compounds by volume. Wintertime values are typically higher than summertime values.

To enter the olefin compounds data :

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Gas Olefin**.
4. Enter the percentage of olefin compounds found in fuel.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties

is used. It must be deactivated when the air toxics command is not used.

8.8.3 Gas benzene

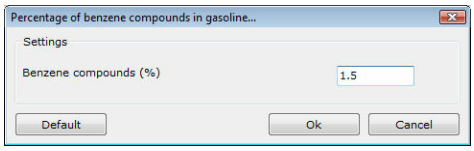
This command is required, if the air toxics command is used. Do not use the command without the air toxics command. This command allows users to specify the benzene content of gasoline on a volume of fuel percentage basis.

This is the percentage of benzene compounds in gasoline on a volume basis. The value supplied by the user should include all the benzene that can appear in the gasoline.

The valid range of inputs is from 0% to 5% for conventional gasoline and 0% to 2% for Reformulated Gasoline. Any values outside of these ranges will most likely lead to erroneous results. A typical value for this input is in the range of 0.2 to 3 percent benzene by volume.

To enter the benzene compounds data :

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Gas Benzene**.
4. Enter the percentage of benzene compounds found in fuel.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties is used. It must be deactivated when the air toxics command is not used.

8.8.4 Vapor percentage at 200F

This command is required, if the air toxics command is used. Do not use this command without the air toxics command. This command allows users to specify the percentage of vapor of a given gasoline fuel at 200 degrees F.

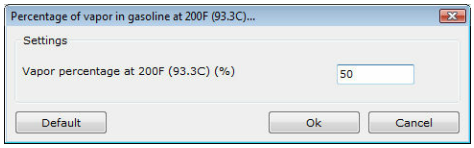
This is a gasoline fuel volatility property that identifies the percentage of vapor of a given gasoline fuel produces at 200 degrees F. This is a common parameter reported in fuel and refinery statistics. The E200 parameter is entered into the model as a percentage.

The valid range of inputs is from 30% to 70%. Any values outside of this range will most likely lead to erroneous results. A typical value for this input is in the range of 35 percent to 55 percent.

To enter the vapor percentage at 200F:

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.

3. From the pop-up menu select **Vapor Percentage At 200F**.
4. Enter the vapor percentage at 200F found in fuel.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties is used. It must be deactivated when the air toxics command is not used.

8.8.5 Vapor percentage at 300F

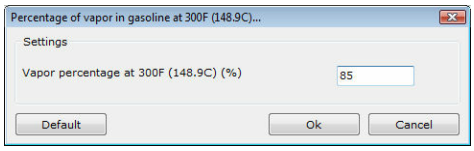
This command is required, if the air toxics command is used. Do not use this command without the air toxics command. This command allows users to specify the percentage of vapor a given gasoline fuel produces at 300 degrees F.

This is a gasoline fuel volatility property that identifies the percentage of vapor a given gasoline fuel produces at 300 degree F. This is a common parameter reported in fuel and refinery statistics. The E300 parameter is entered into the model as a percentage.

The valid range of inputs is from 70% to 100%. Any values outside of this range will most likely lead to erroneous results. A typical value for this input is in the range of 80 percent to 90 percent.

To enter the vapor percentage at 300F:

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Vapor Percentage At 200F**.
4. Enter the vapor percentage at 300F found in fuel.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties is used. It must be deactivated when the air toxics command is not used.

8.8.6 Gasoline fuel oxygenate type

This command is required, if the air toxics command is used. Do not use this command without the air toxics command. This command is used to specify the particular gasoline fuel oxygenate type, the fuel oxygenate content (in terms of

percent by volume of the oxygenate), and the market share of the particular oxygenate. Together with the oxygenated fuels RVP waiver command, it supersedes the oxygenated fuels command, if the air toxics command is used. The program will produce an error message if the both the oxygenate and oxygenated fuels commands are used in the same run. Also, the oxygenate command cannot be used in conjunction with the fuel program command equal to a value of '2' (an RFG program).

The oxygenate command requires fuel oxygenate content and market share information on four gasoline fuel oxygenates. These are MTBE, ETBE, Ethanol and TAME.

- **MTBE** is Methyl Tertiary Butyl Ether.
- **ETBE** is Ethyl Tertiary Butyl Ether.
- **ETOH** is Ethanol or Ethyl Alcohol.
- **TAME** is Tertiary Amine Methyl Ether.

If an Air Toxics run is performed, the oxygenate command supersedes the oxygenated fuels command by weighting the MTBE, ETBE and TAME oxygen levels by the market share, summing the result, and inserting it into the program for the first and third parameters in the oxygenated fuels command. Likewise, the Ethanol market share and Ethanol oxygen level in the oxygenate command are inserted for the second and fourth parameters in the oxygenated fuels command.

Note that the model cannot model a situation where a single fuel contains more than one oxygenate. For example a single fuel containing both MTBE and ETBE cannot be modeled. The 'market share' parameter allows for an area fuel supply to consist of multiple fuels, each of which may contain one oxygenate.

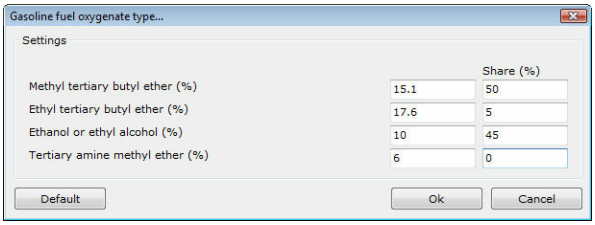
If the four market share values do not add up to unity, the model assumes that any remaining portion does not contain an oxygenate. Oxygenate concentrations are sometime expressed in terms of the percentage by weight of oxygen in the resulting fuel blend. The following factors can be used to convert such data to be expressed in terms of percent by volume of the oxygenate which is the form required for input to the model:

Volume percent MTBE = Weight Percent Oxygen / .1786
Volume percent ETBE = Weight Percent Oxygen / .1533
Volume percent ETOH = Weight Percent Oxygen / .3448
Volume percent TAME = Weight Percent Oxygen / .1636

These equations assume there is only a single oxygenate in the fuel.

To enter the gasoline fuel oxygenate type data:

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Gasoline Fuel Oxygenate Type**.
4. Enter the gasoline fuel oxygenate type data.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command since there is no default value).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is mandatory when the air toxics command in the project properties is used. It must be deactivated when the air toxics command is not used.

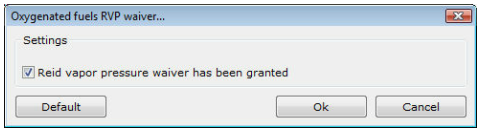
8.8.7 Oxygenated fuels RVP waiver

Do not use this command without the air toxics command. This command is used to specify whether a Reid vapor pressure (RVP) waiver has been granted to allow 'splash' blending of alcohol-based oxygenates. If a waiver has not been granted, then alcohol-based oxygenated fuels must meet the same RVP requirements as non-oxygenated fuels sold in the area. If a waiver has been granted, then alcohol-based oxygenated fuels are allowed to exceed the RVP requirements by up to 1 pound per square inch (psi), and the user-input RVP is increased to account for the market share of the higher RVP fuel.

If the market share of the oxygenated fuels is not 100%, then the average RVP of fuel will be increased by a commingling effect from the mixing of oxygenated and non-oxygenated fuels, even if there is no RVP waiver for oxygenated fuels.

To enable or disable the oxygenated fuels RVP waiver:

1. Select a scenario.
2. From the **Fuel** menu select **Air Toxics**.
3. From the pop-up menu select **Oxygenated Fuels RVP Waiver**.
4. Make the appropriate selection.
5. Optionally, press the **Default** button to enter the default value of the parameter (disables the command).
6. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.



NOTE: This data is optional. If not entered then the model will assume that reid vapor pressure waiver has not been granted.

Chapter

9 Results

9.1 Results menu

With this menu, you can perform calculations and view the results. In the **Results** menu you can select one of the following options:

- Calculations options
- Perform calculations
- Errors report
- Emission factors
  - Emission factors table
  - Emission factors graph
- Air toxic pollutants
  - Air toxic pollutants table
  - Air toxic pollutants graph
- Particulate matter
  - Particulate matter table
  - Particulate matter graph

9.2 Calculations options

The calculations options refer to the format and the type of the calculations results. It is recommended to leave the default values for these options, except for special cases.

To configure the calculations options:

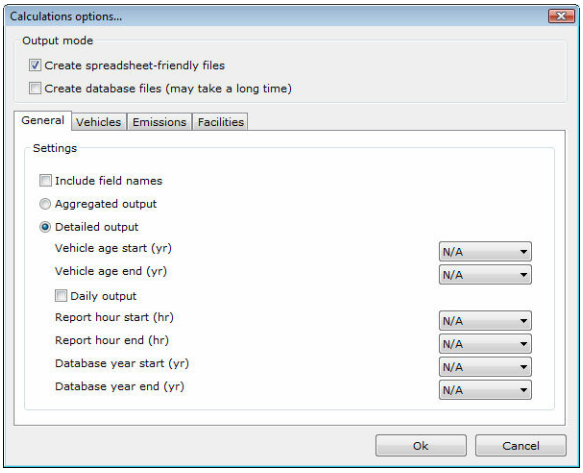
1. From the **Results** menu select **Calculations Options**.
2. Make the appropriate changes.
3. Select **Ok** to save the changes and close the dialog box. Select **Cancel** to close the dialog box without saving any changes.

Output Mode

If the option **Create spreadsheet-friendly files** is activated, then one or more .TAB files will be created in the folder C:\Program Files\TechnoLogismiki\TLW2011 \Core\Mobile62\. These files will contain the results in a special format which is suitable for importing from spreadsheet programs such as Microsoft Excel.

If the option Create database files (may take a long time) is activated, then one or more .TB1 files will be created in the folder C:\Program Files\TechnoLogismiki\TLW2011\Core\Mobile62\. These files will contain detailed calculation results, depending on the settings shown in the following four tabs. Depending on the settings, the whole procedure could last several minutes.

Tab General



If the option **Include field names** is activated, then the first record in all database files will be the names of the columns. This facilitates post-editing database files from other programs.

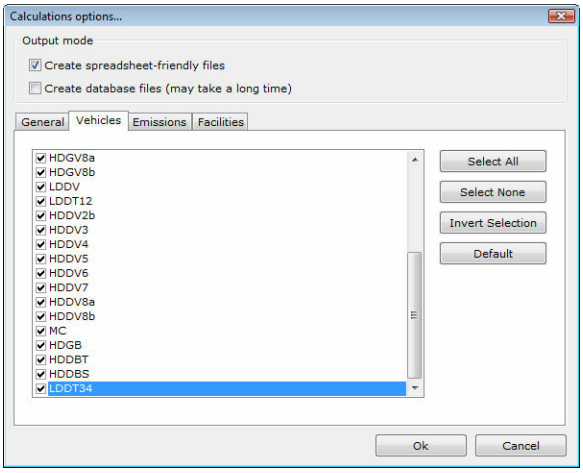
The option **Aggregated output**, when selected, causes the creation of files with summarized results. On the other hand, **Detailed output** creates files that can be customized using all following options.

If Detailed output is selected, then the user may define the **vehicle start age** and **vehicle end age**. Selecting N/A disables the vehicle start and / or end age. Valid range is from 0 to 24 years. The user can also activate the **Daily output** option, if he wishes results with daily time step resolution, otherwise all results will have hourly time steps.

The options **report hour start** and **report hour end**, may be set equal to N/A (therefore disabled) or have a value between 1 and 24. Any value other than N/A, will constrain results to the range defined by the report hour start and report hour end. Results referring to hours outside the report range will be excluded from the output files. The 1st hour represents 6 am to 7 am. For example if 2 and 4 are selected for report hour start and end respectively, the results will include values for hours 7-8, 8-9 and 9-10 am only.

Same applies to **database year start and end**. The valid range is from 1928 to 2050, while N/A disables the commands. The more database years are included, the longer the whole procedure will take.

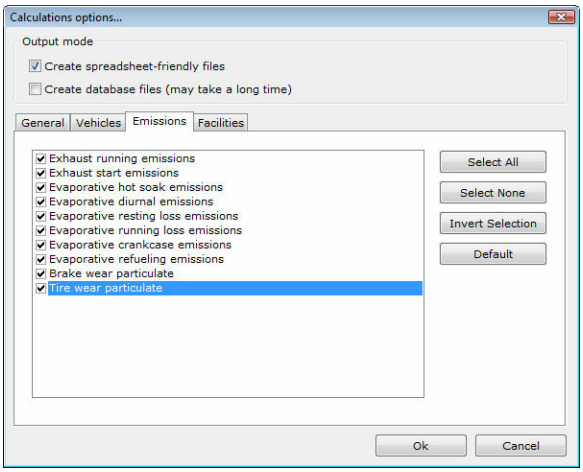
Vehicles Tab



Select which categories from the 28 vehicle categories will appear in the output files. Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all vehicles, select no vehicles and select the unselected vehicles and vice versa respectively.

Click on **Default** to select all vehicle categories, since by default the model is programmed to include results for all vehicle categories separately.

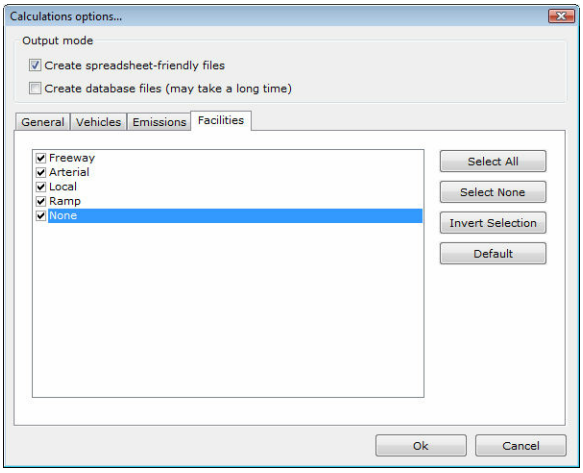
Emissions Tab



Select which emission categories will be included in the reports. There are 10 different emission categories available. Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all emission categories, select no emission categories and select the unselected emission categories and vice versa respectively.

Click on **Default** to select all emission categories, since by default the model is programmed to include results for all emission categories separately.

Facilities Tab



Select which facilities will be included in the reports. There are 5 different facilities available. Use the quick keys **Select All**, **Select None** and **Invert Selection** to select all facilities, select no facilities and select the unselected facilities and vice versa respectively.

Click on **Default** to select all facilities, since by default the model is programmed to include results for all facilities separately.

9.3 Perform calculations

The calculations are performed. The results appear in the main program form..

To perform calculations:

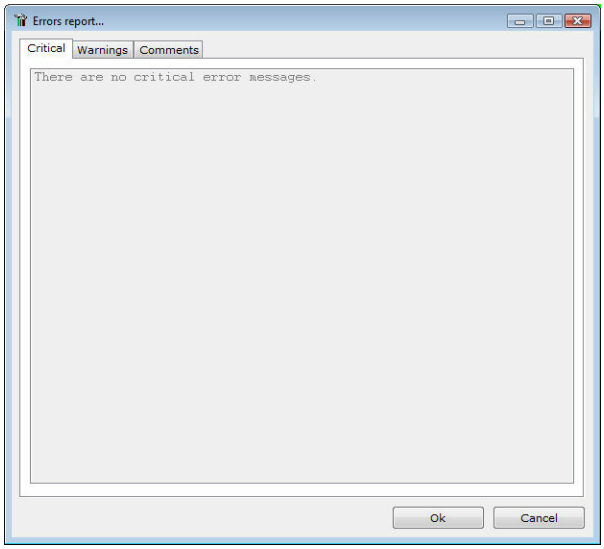
1. From the **Results** menu select **Perform calculations**.
2. The calculations take place.

9.4 Errors report

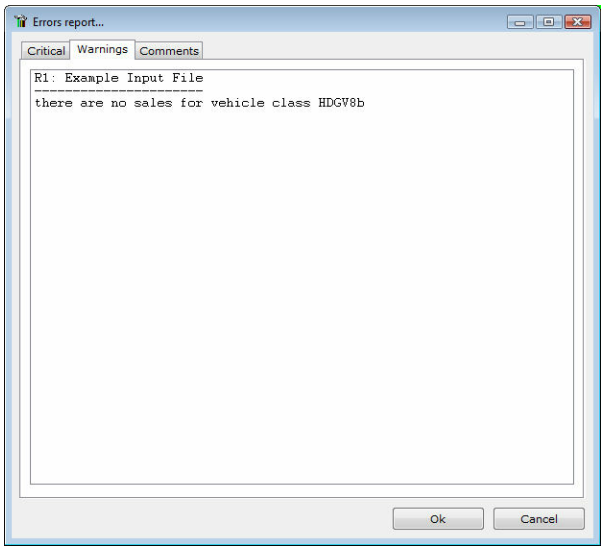
A report form shows, with all critical errors, warning messages and errors for the current project. The tabs in this form may or may not be empty.

To view the errors report:

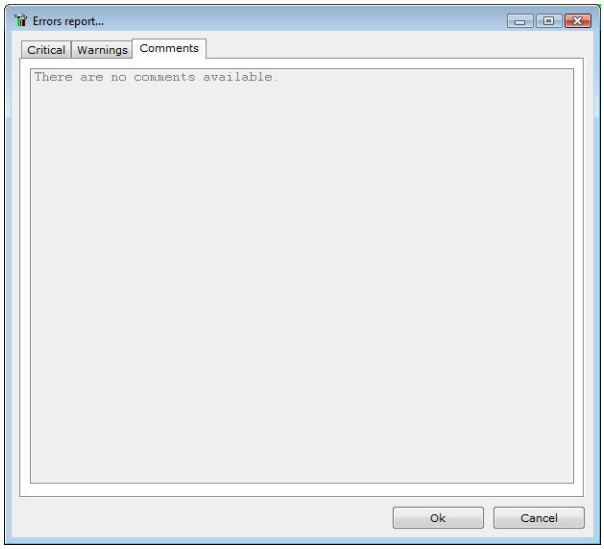
1. From the **Results** menu select **Errors Report**.
2. Click on the **Critical** Tab to view critical error messages regarding the calculations. The user is required to correct the input data in order to remove the critical errors.



3. Click on the **Warnings** Tab to view warning messages regarding the calculations. It is highly likely that user action is required for warning messages.



4. Click on the **Comments** Tab to view comment messages regarding the calculations. No user action is required for comment messages.



5. Press **Ok** or **Cancel** to hide the form.

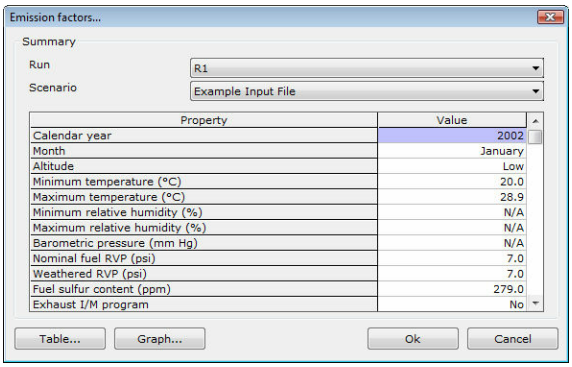
9.5 Emission factors

9.5.1 Emission factors

The user can view the emission factors results for the current project.

To view the emission factors results:

1. From the **Results** menu select **Emission Factors**.
2. A form with a results summary per run and scenario shows up.
3. Select the target run from the drop-down list.
4. Select the target scenario from the drop-down list.
5. Summarized results are refreshed every time the user selects a run or a scenario.
6. Click on **Table** to view detailed calculations results in a table form.
7. Click on **Graph** to view detailed calculations results in a graphical form.
8. Press **Ok** or **Cancel** to hide the form.



9.5.2 Emission factors table

The emission factors results are presented in a table form.

To view the emission factors results table:

1. By pressing the **Table** button, the emission factors results table appears.
2. Select one or more scenarios. If more than one scenario is selected, then the average values of the selected scenarios will be shown. From the **Data** menu, the following sub-menus are available:

- **Select All Scenarios**: all available scenarios in the list are selected.
- **Select No Scenarios**: all available scenarios in the list are unselected.
- **Select Invert Scenarios**: scenarios that are not selected are selected and vice versa.

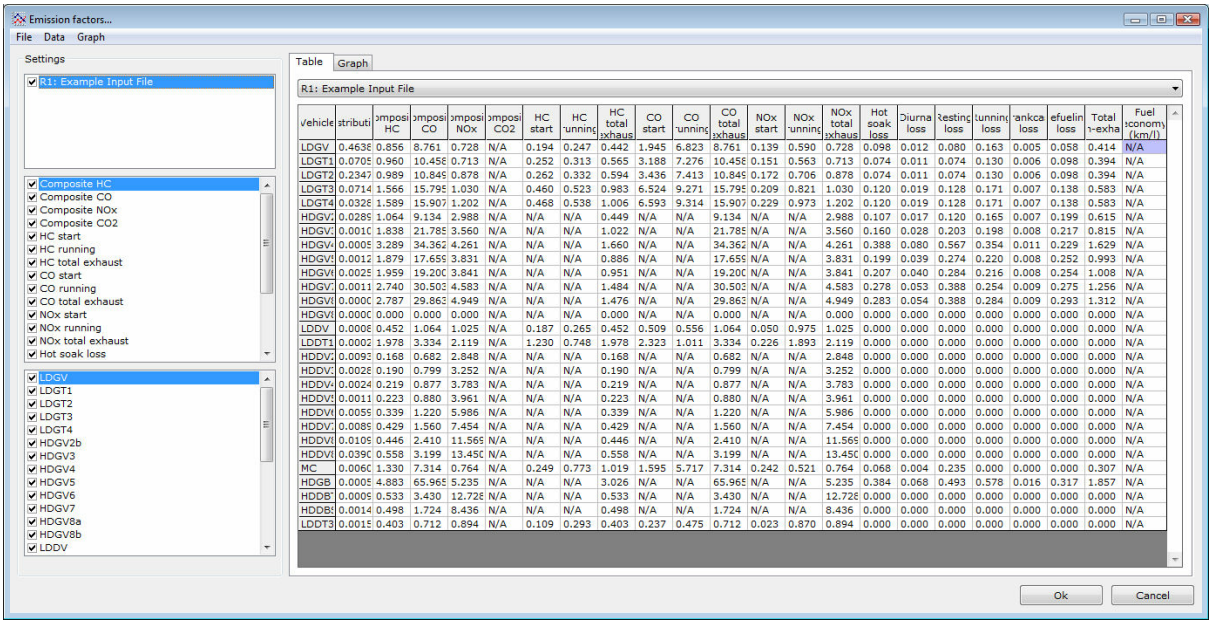
3. Select one or more emission categories. For every emission category selected, a column is added in the table. From the **Data** menu, the following sub-menus are available:

- **Select All Emissions**: all available emissions in the list are selected.
- **Select No Emissions**: all available emissions in the list are unselected.
- **Select Invert Emissions**: emissions that are not selected are selected and vice versa.

4. Select one or more vehicle categories from the third list. For every vehicle category selected, a row is added in the table. From the **Data** menu, the following sub-menus are available:

- **Select All Vehicles**: all available vehicle categories in the list are selected.
- **Select No Vehicles**: all available vehicle categories in the list are unselected.
- **Select Invert Vehicles**: vehicle categories that are not selected are selected and vice versa.

5. From the **File** menu, select **Copy** to copy the contents of the selected cells to the clipboard.
6. From the **File** menu, choose **Select All** to select all visible cells of the table.
7. From the **File** menu, select **Print** to create a preview and optionally print the table.
8. From the **File** menu, select **Export** to print table data to a file, to Microsoft Excel or to Microsoft Word.
9. Press **Ok** or **Cancel** to hide the form.



9.5.3 Emission factors graph

The emission factors results are presented in a series of graphs.

To view the emission factors graph:

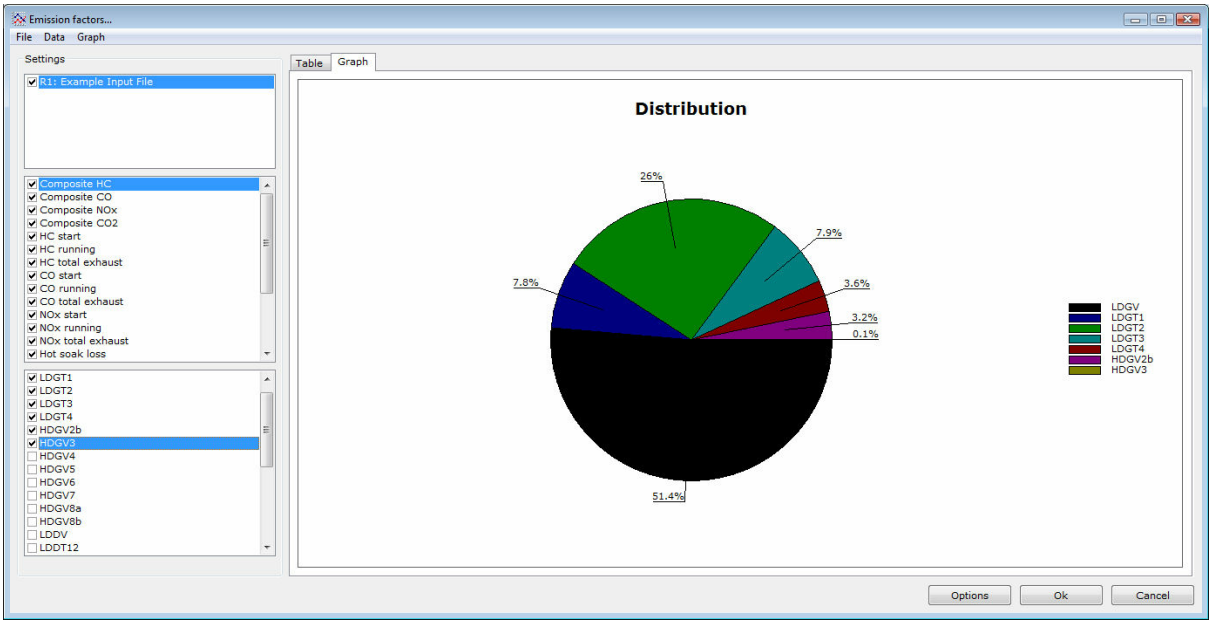
1. By pressing the **Graph** button, the emission factors results graph appears.
2. Select one or more scenarios. If more than one scenario is selected, then the average values of the selected scenarios will be shown. From the **Data** menu, the following sub-menus are available:
- **Select All Scenarios**: all available scenarios in the list are selected.
- **Select No Scenarios**: all available scenarios in the list are unselected.
- **Select Invert Scenarios**: scenarios that are not selected are selected and vice versa.

3. Select one or more emission categories. For every emission category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:
- **Select All Emissions**: all available emissions in the list are selected.
- **Select No Emissions**: all available emissions in the list are unselected.
- **Select Invert Emissions**: emissions that are not selected are selected and vice versa.

4. Select one or more vehicle categories from the third list. For every vehicle category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:
- **Select All Vehicles**: all available vehicle categories in the list are selected.
- **Select No Vehicles**: all available vehicle categories in the list are unselected.
- **Select Invert Vehicles**: vehicle categories that are not selected are selected and vice versa.

5. From the **Graph** menu, the user can select one of the following graphs:
- VMT distribution (pie chart)
- Fuel economy (bar chart)
- Composite hydrocarbon (bar chart)
- Composite carbon monoxide (bar chart)
- Composite oxides of nitrogen (bar chart)
- Composite carbon dioxide (bar chart)
- Total hydrocarbon per phase (pie chart)
- Carbon monoxide per phase (pie chart)
- Oxides of nitrogen per phase (pie chart)
- Non exhaust emissions (pie chart)

6. From the **Graph** menu, select **Copy Graph To Clipboard** to copy the bitmap to clipboard.
7. Press the **Options** button to customize the appearance of the bar chart or the pie chart (recommended only for advanced users).
8. Use the **Graph** menu to access the **Load Graph Settings** and **Save Graph Settings** to create and access external settings files.
9. Press **Ok** or **Cancel** to hide the form.



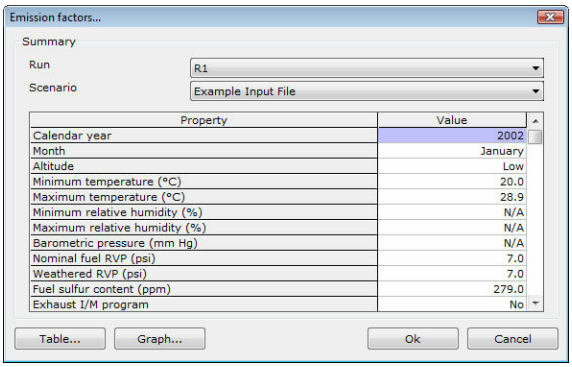
9.6 Air toxic pollutants

9.6.1 Air toxic pollutants

The user can view the air toxic pollutants results for the current project.

To view the air toxic pollutants results:

1. From the **Results** menu select **Air Toxic Pollutants**.
2. A form with a results summary per run and scenario shows up.
3. Select the target run from the drop-down list.
4. Select the target scenario from the drop-down list.
5. Summarized results are refreshed every time the user selects a run or a scenario.
6. Click on **Table** to view detailed calculations results in a table form.
7. Click on **Graph** to view detailed calculations results in a graphical form.
8. Press **Ok** or **Cancel** to hide the form.



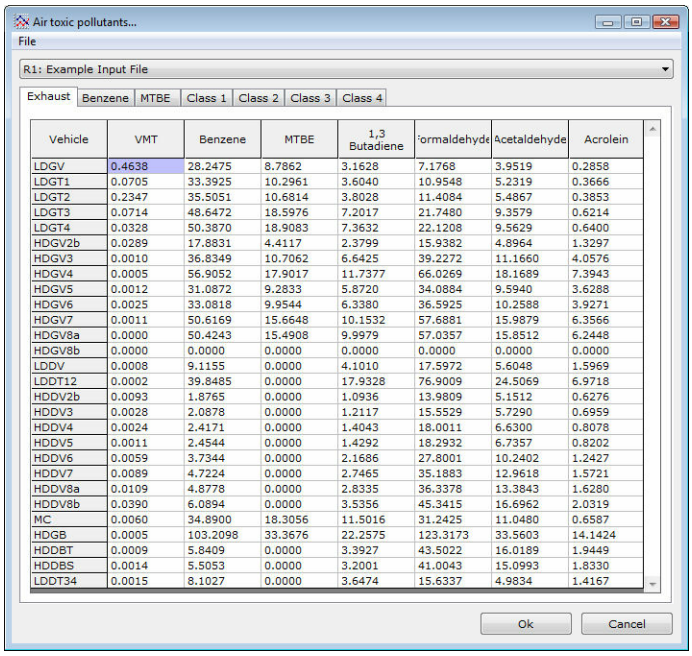
9.6.2 Air toxic pollutants table

The air toxic pollutants results are presented in a table form.

To view the air toxic pollutants results table:

1. Press the **Table** button to view the air toxic pollutants table.
2. Select the target scenario.
3. Select one of the following results tab:
- Exhaust
- Benzene
- MTBE
- Class 1
- Class 2
- Class 3
- Class 4

4. From the **File** menu select **Copy** to copy the selected cells to the clipboard.
5. From the **File** menu, choose **Select All** to select all visible cells of the table.
6. From the **File** menu, select **Print** to create a preview and optionally print the table.
7. From the **File** menu, select **Export** to print table data to a file, to Microsoft Excel or to Microsoft Word.
8. Press **Ok** or **Cancel** to hide the form.



Vehicle	VMT	Benzene	MTBE	1,3 Butadiene	ormaldehyde	Acetaldehyde	Acrolein
LDGV	0.4638	28.2475	8.7862	3.1628	7.1768	3.9519	0.2858
LDGT1	0.0705	33.3925	10.2961	3.6040	10.9548	5.2319	0.3666
LDGT2	0.2347	35.5051	10.6814	3.8028	11.4084	5.4867	0.3853
LDGT3	0.0714	48.6472	18.5976	7.2017	21.7480	9.3579	0.6214
LDGT4	0.0328	50.3870	18.9083	7.3632	22.1208	9.5629	0.6400
HDGV2b	0.0289	17.8831	4.4117	2.3799	15.9382	4.8964	1.3297
HDGV3	0.0010	36.8349	10.7062	6.6425	39.2272	11.1660	4.0576
HDGV4	0.0005	56.9052	17.9017	11.7377	66.0269	18.1689	7.3943
HDGV5	0.0012	31.0872	9.2833	5.8720	34.0884	9.5940	3.6288
HDGV6	0.0025	33.0818	9.9544	6.3380	36.5925	10.2588	3.9271
HDGV7	0.0011	50.6169	15.6648	10.1532	57.6881	15.9879	6.3566
HDGV8a	0.0000	50.4243	15.4908	9.9979	57.0357	15.8512	6.2448
HDGV8b	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LDDV	0.0008	9.1155	0.0000	4.1010	17.5972	5.6048	1.5969
LDDT12	0.0002	39.8485	0.0000	17.9328	76.9009	24.5069	6.9718
HDDV2b	0.0093	1.8765	0.0000	1.0936	13.9809	5.1512	0.6276
HDDV3	0.0028	2.0878	0.0000	1.2117	15.5529	5.7290	0.6959
HDDV4	0.0024	2.4171	0.0000	1.4043	18.0011	6.6300	0.8078
HDDV5	0.0011	2.4544	0.0000	1.4292	18.2932	6.7357	0.8202
HDDV6	0.0059	3.7344	0.0000	2.1686	27.8001	10.2402	1.2427
HDDV7	0.0089	4.7224	0.0000	2.7465	35.1883	12.9618	1.5721
HDDV8a	0.0109	4.8778	0.0000	2.8335	36.3378	13.3843	1.6280
HDDV8b	0.0390	6.0894	0.0000	3.5356	45.3415	16.6962	2.0319
MC	0.0060	34.8900	18.3056	11.5016	31.2425	11.0480	0.6587
HDGB	0.0005	103.2098	33.3676	22.2575	123.3173	33.5603	14.1424
HDDBT	0.0009	5.8409	0.0000	3.3927	43.5022	16.0189	1.9449
HDDBS	0.0014	5.5053	0.0000	3.2001	41.0043	15.0993	1.8330
LDDT34	0.0015	8.1027	0.0000	3.6474	15.6337	4.9834	1.4167

9.6.3 Air toxic pollutants graph

The air toxic pollutants results are presented in a series of graphs.

To view the air toxic pollutants graph:

1. By pressing the **Graph** button, the air toxic pollutants results graph appears.
2. Select one or more scenarios. If more than one scenario is selected, then the average values of the selected scenarios will be shown. From the **Data** menu, the following sub-menus are available:
- **Select All Scenarios**: all available scenarios in the list are selected.
- **Select No Scenarios**: all available scenarios in the list are unselected.
- **Select Invert Scenarios**: scenarios that are not selected are selected and vice versa.

3. Select one or more air toxic categories. For every air toxic category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:

- **Select All Emissions**: all available air toxics in the list are selected.
- **Select No Emissions**: all available air toxics in the list are unselected.
- **Select Invert Emissions**: air toxics that are not selected are selected and vice versa.

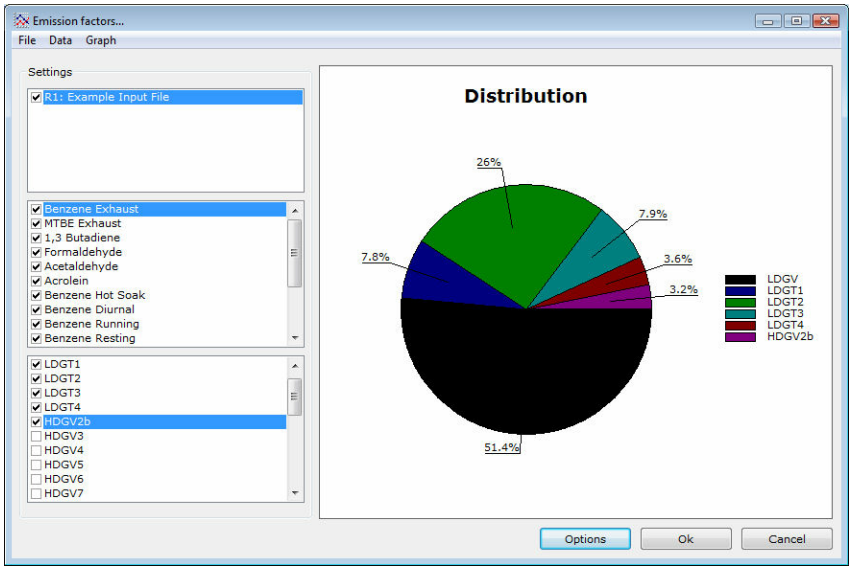
4. Select one or more vehicle categories from the third list. For every vehicle category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:

- **Select All Vehicles**: all available vehicle categories in the list are selected.
- **Select No Vehicles**: all available vehicle categories in the list are unselected.
- **Select Invert Vehicles**: vehicle categories that are not selected are selected and vice versa.

5. From the **Graph** menu, the user can select one of the following graphs:

- VMT distribution (pie chart)
- Exhaust emission factors (pie chart)
- Benzene emission factors (pie chart)
- MTBE emission factors (pie chart)

6. From the **Graph** menu, select **Copy Graph To Clipboard** to copy the bitmap to clipboard.
7. Press the **Options** button to customize the appearance of the bar chart or the pie chart (recommended only for advanced users).
8. Use the **Graph** menu to access the **Load Graph Settings** and **Save Graph Settings** to create and access external settings files.
9. Press **Ok** or **Cancel** to hide the form.



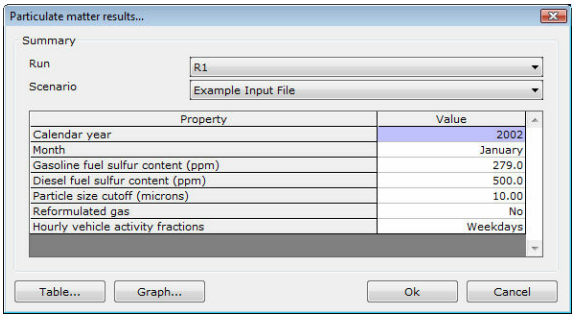
9.7 Particulate matter

9.7.1 Particulate matter

The user can view the particulate matter results for the current project.

To view the particulate matter results:

1. From the **Results** menu select **Particulate Matter**.
2. A form with a results summary per run and scenario shows up.
3. Select the target run from the drop-down list.
4. Select the target scenario from the drop-down list.
5. Summarized results are refreshed every time the user selects a run or a scenario.
6. Click on **Table** to view detailed calculations results in a table form.
7. Click on **Graph** to view detailed calculations results in a graphical form.
8. Press **Ok** or **Cancel** to hide the form.



9.7.2 Particulate matter table

The particulate matter results are presented in a table form.

To view the particulate matter results table:

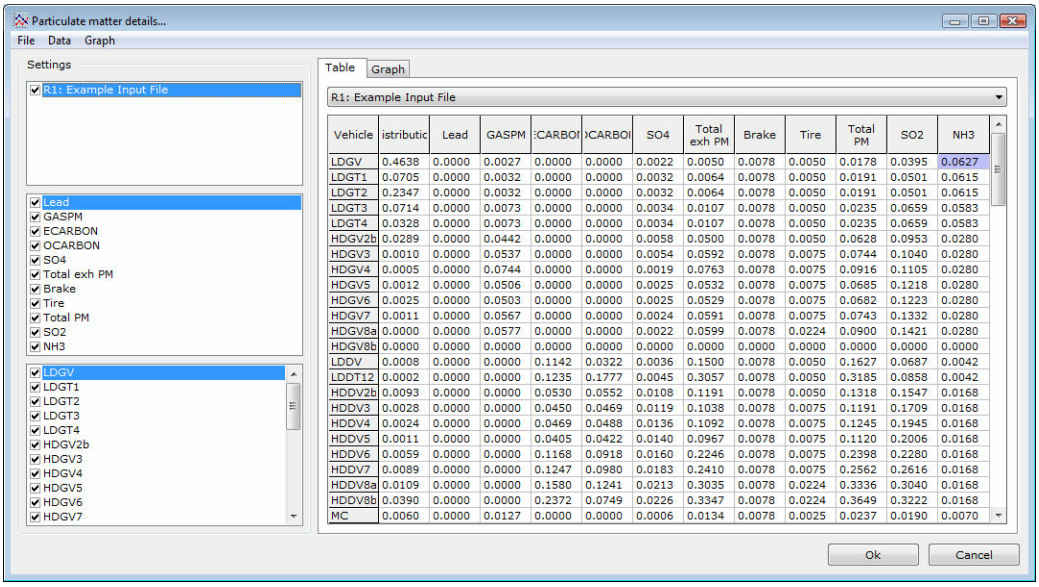
1. By pressing the **Table** button, the particulate matter results table appears.
2. Select one or more scenarios. If more than one scenario is selected, then the average values of the selected scenarios will be shown. From the **Data** menu, the following sub-menus are available:
- **Select All Scenarios**: all available scenarios in the list are selected.
- **Select No Scenarios**: all available scenarios in the list are unselected.
- **Select Invert Scenarios**: scenarios that are not selected are selected and vice versa.

3. Select one or more emission categories. For every emission category selected, a column is added in the table. From the **Data** menu, the following sub-menus are available:
- **Select All Particulate Matter**: all available particulate matter in the list are selected.
- **Select No Particulate Matter**: all available particulate matter in the list are unselected.
- **Select Invert Particulate Matter**: particulate matter that are not selected are selected and vice versa.

4. Select one or more vehicle categories from the third list. For every vehicle category selected, a row is added in the table. From the **Data** menu, the following sub-menus are available:
- **Select All Vehicles**: all available vehicle categories in the list are selected.
- **Select No Vehicles**: all available vehicle categories in the list are unselected.
- **Select Invert Vehicles**: vehicle categories that are not selected are selected and vice versa.

5. From the **File** menu, select **Copy** to copy the contents of the selected cells to the clipboard.
6. From the **File** menu, choose **Select All** to select all visible cells of the table.
7. From the **File** menu, select **Print** to create a preview and optionally print the table.

8. From the **File** menu, select **Export** to print table data to a file, to Microsoft Excel or to Microsoft Word.
9. Press **Ok** or **Cancel** to hide the form.



9.7.3 Particulate matter graph

The particulate matter results are presented in a series of graphs.

To view the particulate matter graph:

1. By pressing the **Graph** button, the particulate matter results graph appears.
2. Select one or more scenarios. If more than one scenario is selected, then the average values of the selected scenarios will be shown. From the **Data** menu, the following sub-menus are available:

- **Select All Scenarios**: all available scenarios in the list are selected.
- **Select No Scenarios**: all available scenarios in the list are unselected.
- **Select Invert Scenarios**: scenarios that are not selected are selected and vice versa.

3. Select one or more air toxic categories. For every air toxic category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:

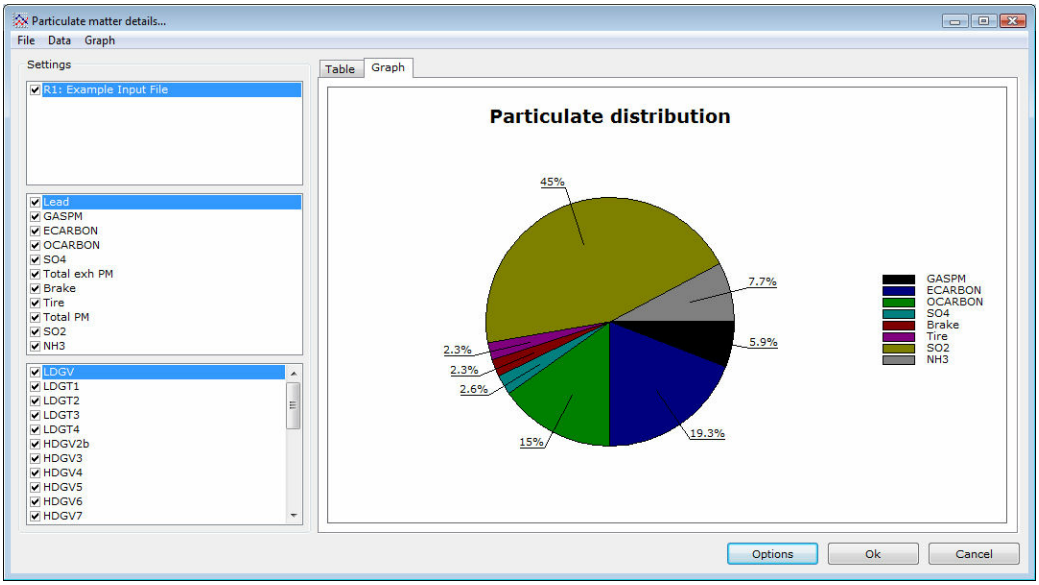
- **Select All Particulate Matter**: all available particulate matter in the list are selected.
- **Select No Particulate Matter**: all available particulate matter in the list are unselected.
- **Select Invert Particulate Matter**: particulate matter that are not selected are selected and vice versa.

4. Select one or more vehicle categories from the third list. For every vehicle category selected, the graph is refreshed automatically. From the **Data** menu, the following sub-menus are available:

- **Select All Vehicles**: all available vehicle categories in the list are selected.
- **Select No Vehicles**: all available vehicle categories in the list are unselected.
- **Select Invert Vehicles**: vehicle categories that are not selected are selected and vice versa.

5. From the **Graph** menu, the user can select one of the following graphs:
- VMT distribution (pie chart)
- Exhaust particle matter (pie chart)
- Total particle matter (pie chart)
- Particulates distribution (pie chart)
- Graph emissions of Lead, GASPM, Active carbon (ECARBON), Total carbon (OCARBON), SO4, Total exhaust particulate matter (Total Exh PM), Tire, Brake and Total particulate matter (Total PM) (bar chart)

6. From the **Graph** menu, select **Copy Graph To Clipboard** to copy the bitmap to clipboard.
7. Press the **Options** button to customize the appearance of the bar chart or the pie chart (recommended only for advanced users).
8. Use the **Graph** menu to access the **Load Graph Settings** and **Save Graph Settings** to create and access external settings files.
9. Press **Ok** or **Cancel** to hide the form.



Chapter

10 Help

10.1 Help menu

In the **Help** menu you can select one of the following options:

- Contents
- User guide
- Tutorials
- Tip of the day
- Unit conversion
- TechnoLogismiki website
- Buy products
- TechnoLogismiki NOMOS
- TechnoLogismiki Live!
- About the program

10.2 Contents

With this option, you can access the online help which contains detailed information regarding the usage of the program.

To view the online help:

1. Click **Contents** from the **Help** menu.
2. The online help appears.

NOTE: If an error message appears then the online help has not been installed. You can install the online help from the installation CD or the Internet.

10.3 User guide

With this option, you can access the user guide which contains detailed information regarding the usage of the program.

To view the user guide:

1. Click **User Guide** from the **Help** menu.
2. The user guide appears.

NOTE: If an error message appears then the online help has not been installed. You can install the online help from the installation CD or the Internet.

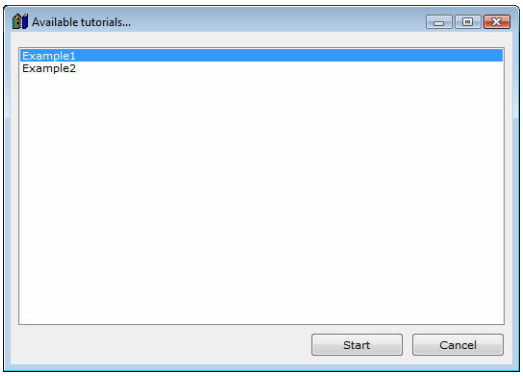
NOTE: Adobe Acrobat Reader or a similar program that can display pdf files is required in order to view or print the user guide.

10.4 Tutorials

With this option, you can access the tutorials of the program. The tutorials are step-by-step examples that allow you to decrease the learning cycle of the programs dramatically.

To access the tutorials:

1. Click **Tutorials** from the **Help** menu.
2. The tutorial selection dialog box appears.
2. Select the appropriate tutorial and click **Start** to proceed. Click **Cancel** to close the dialog box.



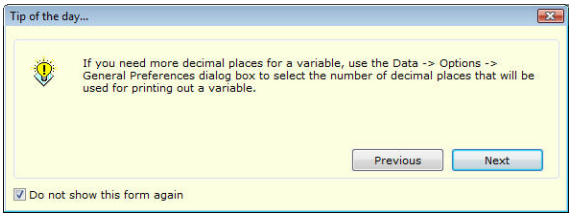
NOTE: The number and content of the tutorials is changed frequently. Use the live update system of TechnoLogismiki's products to download the latest tutorials.

10.5 Tip of the day

With this option, you can access the tip database of the program. The tips are short guidelines regarding the usage of the programs which may be of great help to the user.

To access the tips:

1. Click **Tip of the day** from the **Help** menu.
2. The tip of the day form appears.
3. Check **Do not show this form again** to prevent the program from showing the tip of the day when starting. Press the **Previous/Next** buttons to browse all available tips.
4. Press **Esc** to close the form.



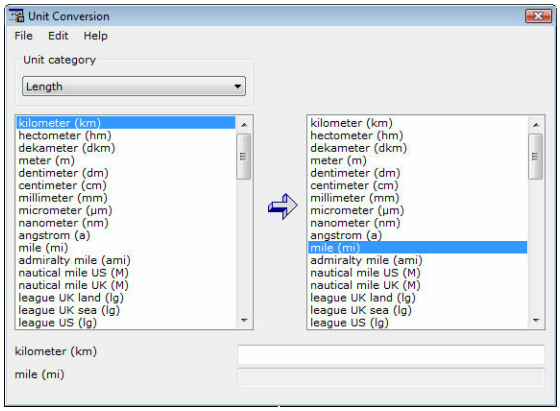
NOTE: The number and content of the tips is changed frequently. Use the live update system of TechnoLogismiki's products to download the latest tips.

10.6 Unit conversion

With this option, you can access the unit conversion tool. You can find more information about its usage in its help system.

To launch the unit conversion tool:

1. Click **Unit conversion** from the **Help** menu.
2. The unit conversion tool is launched.



NOTE: If an error message appears then the unit conversion tool has not been installed. You can install the unit conversion tool from the installation CD or the Internet.

10.7 TechnoLogismiki website

With this option, you can load on your Internet browser the website of TechnoLogismiki's.

10.8 Buy products

With this option, you can load on your Internet browser the main product page of TechnoLogismiki's website.

10.9 TechnoLogismiki NOMOS

With this option, you can load on your Internet browser the **NOMOS** service of Technologismiki.

10.10 TechnoLogismiki Live!

With this option, you can load on your Internet browser the **Live!** service of Technologismiki.

10.11 About the program

With this option, a form containing the name, version and licence information of the program appears.

To show this form:

1. From the **Help** menu, select **About the program**.
2. The form appears.
3. Click anywhere on the form or hit ESC to close the form.

Chapter

11 Tables

11.1 Vehicle categories

The 28 vehicle categories used by Mobile 6.2:

No	Abbreviation	Description
1	LDGV	Light-Duty Gasoline Vehicles (Passenger Cars)
2	LDGT1	Light-Duty Gasoline Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
3	LDGT2	Light-Duty Gasoline Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW)
4	LDGT3	Light-Duty Gasoline Trucks 3 (6,001-8,500 lbs. GVWR, 0-5750 lbs. ALVW)
5	LDGT4	Light-Duty Gasoline Trucks 4 (6,001-8,500 lbs. GVWR, 5751 lbs. and greater ALVW)
6	HDGV2B	Class 2b Heavy-Duty Gasoline Vehicles (8501-10,000 lbs. GVWR)
7	HDGV3	Class 3 Heavy-Duty Gasoline Vehicles (10,001-14,000 lbs. GVWR)
8	HDGV4	Class 4 Heavy-Duty Gasoline Vehicles (14,001-16,000 lbs. GVWR)
9	HDGV5	Class 5 Heavy-Duty Gasoline Vehicles (16,001-19,500 lbs. GVWR)
10	HDGV6	Class 6 Heavy-Duty Gasoline Vehicles (19,501-26,000 lbs. GVWR)
11	HDGV7	Class 7 Heavy-Duty Gasoline Vehicles (26,001-33,000 lbs. GVWR)
12	HDGV8A	Class 8a Heavy-Duty Gasoline Vehicles (33,001-60,000 lbs. GVWR)
13	HDGV8B	Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lbs. GVWR)
14	LDDV	Light-Duty Diesel Vehicles (Passenger Cars)
15	LDDT12	Light-Duty Diesel Trucks 1 and 2 (0-6,000 lbs. GVWR)
16	HDDV2B	Class 2b Heavy-Duty Diesel Vehicles (8501-10,000 lbs. GVWR)
17	HDDV3	Class 3 Heavy-Duty Diesel Vehicles (10,001-14,000 lbs. GVWR)
18	HDDV4	Class 4 Heavy-Duty Diesel Vehicles (14,001-16,000 lbs. GVWR)
19	HDDV5	Class 5 Heavy-Duty Diesel Vehicles (16,001-19,500 lbs. GVWR)
20	HDDV6	Class 6 Heavy-Duty Diesel Vehicles (19,501-26,000 lbs. GVWR)
21	HDDV7	Class 7 Heavy-Duty Diesel Vehicles (26,001-33,000 lbs. GVWR)
22	HDDV8A	Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs. GVWR)
23	HDDV8B	Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs. GVWR)
24	MC	Motorcycles (Gasoline)
25	HDGB	Gasoline Buses (School, Transit and Urban)
26	HDDBT	Diesel Transit and Urban Buses
27	HDDBS	Diesel School Buses
28	LDDT34	Light-Duty Diesel Trucks 3 and 4 (6,001-8,500 lbs. GVWR)

The 16 composite vehicle categories used in registration distribution and annual

kilometers accumulation rates commands:

No	Abbreviation	Description
1	LDV	Light-Duty Gasoline Vehicles (Passenger Cars)
2	LDT1	Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)
3	LDT2	Light-Duty Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)
4	LDT3	Light-Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW*)
5	LDT4	Light-Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5,751 lbs. and greater ALVW)
6	HDV2B	Class 2b Heavy-Duty Vehicles (8,501-10,000 lbs. GVWR)
7	HDV3	Class 3 Heavy-Duty Vehicles (10,001-14,000 lbs. GVWR)
8	HDV4	Class 4 Heavy-Duty Vehicles (14,001-16,000 lbs. GVWR)
9	HDV5	Class 5 Heavy-Duty Vehicles (16,001-19,500 lbs. GVWR)
10	HDV6	Class 6 Heavy-Duty Vehicles (19,501-26,000 lbs. GVWR)
11	HDV7	Class 7 Heavy-Duty Vehicles (26,001-33,000 lbs. GVWR)
12	HDV8A	Class 8a Heavy-Duty Vehicles (33,001-60,000 lbs. GVWR)
13	HDV8B	Class 8b Heavy-Duty Vehicles (>60,000 lbs. GVWR)
14	HDBS	School Buses
15	HDBT	Transit and Urban Buses
16	MC	Motorcycles (All)

The 14 composite vehicle categories used in diesel fractions command:

No	Abbreviation	Description
1	LDV	Light-Duty Vehicles (Passenger Cars)
2	LDT1	Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
3	LDT2	Light-Duty Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW)
4	LDT3	Light-Duty Trucks 3 (6,001-8,500 lbs. GVWR, 0-5750 lbs. ALVW)
5	LDT4	Light-Duty Trucks 4 (6,001-8,500 lbs. GVWR, 5751 lbs. and greater ALVW)
6	HDV2B	Class 2b Heavy-Duty Vehicles (8501-10,000 lbs. GVWR)
7	HDV3	Class 3 Heavy-Duty Vehicles (10,001-14,000 lbs. GVWR)
8	HDV4	Class 4 Heavy-Duty Vehicles (14,001-16,000 lbs. GVWR)
9	HDV5	Class 5 Heavy-Duty Vehicles (16,001-19,500 lbs. GVWR)
10	HDV6	Class 6 Heavy-Duty Vehicles (19,501-26,000 lbs. GVWR)
11	HDV7	Class 7 Heavy-Duty Vehicles (26,001-33,000 lbs. GVWR)
12	HDV8A	Class 8a Heavy-Duty Vehicles (33,001-60,000 lbs. GVWR)
13	HDV8B	Class 8b Heavy-Duty Vehicles (>60,000 lbs. GVWR)
14	HDBS	School Buses

Keyword index

- D -

- E -

- F -

- G -

- H -

- I -

- K -

- L -

- M -

- N -

- O -

- P -

- R -

- S -

- T -

- U -

- V -

- W -

- Y -

- Z -

This page was intentionally left blank.