

CATIA V5 Automotive Extensions Vehicle Architecture

User Guide — General

BPA Delivery 6 for V5R19 (V 5.6)

Instruction symbols used in this manual

The following symbols are used in this guide; these should enable you to navigate throughout the text with greater ease:

Warning triangle



The warning triangle refers to *critical circumstances*, which should be considered imperatively in order to avoid serious problems in your work.

Note symbol



The hand symbol relates to *notes*, which you should pay attention to in order to assure that you can *work without problems*.

Hint symbol



The light bulb relates to *hints*, which provide you with practical examples to simplify your work.

Information symbol



The information symbol relates to *Information*, which illustrates a situation.

Work steps symbol



The work steps symbol relates to a *step-by-step instruction sheet*.

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1. CAVA—General Introduction

„CATIA V5—Automotive Extensions Vehicle Architecture“—briefly CAVA—is a standardized application, conceived to integrate into the design process the provisions stipulated in rules and regulations for the field of automotive design and security. The aim of CAVA is to provide the car designers a tool, assuring the observation of car-design relevant national and international regulations and standards during whole the design process, starting from its beginning. Also CAVA allows the integration of company-internal design and security regulations into the car model.

For this purpose CAVA provides two check facilities—on the one hand the CAVA-internal checks, on the other hand the possibility to use CATIA knowledgeware checks. (For details about the knowledgeware checks see section 5. *Knowledgeware* on page 55.)

CAVA utilizes the feature-orientated, associative technology of CATIA V5. This offers (among others) the following advantages:

- When modifications are made on the values of CAVA features or on vehicle geometries, the effects are visualized immediately.
- The observation or non-observation of standards is signaled to the user even inside the design workspace, i. e. CATIA, where the discrepancies may be repaired.

At present CAVA provides approx. 41 easy-to-use check functionalities—see section 1.1 Overview of the CAVA Products on page 6. Each of these functionalities comprises the provisions of national and supranational standards and rules (ECE, EWG, FMVSS, SAE etc.) that are relevant for the respective field.

The CAVA-*Features* comprise two fundamental functions:

- Creation of the prescribed fields ranges of allowed values, dimensions, spaces etc.
- Control of existing geometries on the observance of the provisions

Thus CAVA is a helpful tool for every stage of automotive design:

- When starting the design process—the external contours or other conditions can be set, with which the components to be designed must comply.
- When elaborating the components in detail—the conformity with the rules can be checked in the process (some functions allowing automatic checking).
- When preparing homologation—the final component checks can be carried out with compilation of the required check reports.

CAVA checks allow that laborious and expensive tests on real car components can be substituted. For instance, the CAVA MIRROR function by several certification organizations has been certified for checking the fields of view of rear-view mirrors.




















1.1 Overview of the CAVA Products
























The CAVA tools are aggregated into five products:



- OVERALL VEHICLE ARCHITECTURE (OVA)
- SAFETY
- MANIKIN
- VISION
- WIPER.







The CAVA-EXPORT functionality is available for all CAVA products.

The products may be acquired separately.

Product + Description		Functions
OVA		
OVERALL VEHICLE ARCHITECTURE Car base data, positioning and parameters of car components, ground clearance		CAVA BASE DATA
		CAVA base-data data base
		CAVA SLOPE ANGLE
		CAVA STATIC CURB
		CAVA DYNAMIC CURB
		CAVA GROUND CLEARANCE
		CAVA INNER ANGLE
		CAVA OIL PAN
		CAVA WHEEL FIXING
		CAVA UNDERFLOOR COMPLETE
		CAVA LAMPS
		CAVA NUMBER PLATES
		CAVA BUMBERS
		CAVA CRASH BARRIERS
		CAVA WHEEL COVERING
		CAVA SEATING BELTS
		CAVA CHILD PROTECTION
		CAVA FREE SPACE TOP TETHER

Product + Description	Functions
<p>MANIKIN</p>  <p>Functions, allowing to define and visualize the passengers' geometry und the resulting positioning parameters according to the SAE J 826 2D template . (The eye points and eye ellipses functions will be described separately as they differ in their graphic user interface and in their administration.)</p> <p>Detailed description see CAVA MANIKIN User Manual.</p>	 CAVA EYE POINTS  CAVA EYE ELLIPSES  CAVA 2D MANIKIN TEMPLATE  CAVA HEAD POSITION CONTOUR  CAVA SRP LOCATION CURVE
<p>SAFETY</p>  <p>Safety for passengers and pedestrians (Impact simulation is not contained in CAVA.) Detailed description see CAVA SAFETY User Manual.</p>	 CAVA PEDESTRIAN PROTECTION  CAVA- PEDESTRIAN PROTECTION OFFSET  CAVA HEAD IMPACT
<p>VISION</p>  <p>Examination of the visibility, concerning the driver's direct and indirect fields of view as well as the optical properties of the windshield.</p> <p>Detailed descriptions see CAVA VISION User Manual.</p>	 CAVA MIRROR  CAVA FIELDS OF VIEW  CAVA EXTENDED/REDUCED FIELDS OF VIEW  CAVA A-PILLAR OBSTRUCTION  CAVA VISION POINTS  CAVA VISION CONE  CAVA VISION PLANES  CAVA OPTICAL DISTORTION  CAVA DOUBLE IMAGE  CAVA DIRECT VIEW  CAVA DIRECT VIEW 3D  CAVA CLOSE RANGE VISIBILITY

Product + Description	Functions
WIPERS 	
<p>Calculation of the wiped area on the wind-shield and/or rear window and of the wiper quality</p> <p>Detailed descriptions see CAVA WIPER User Manual.</p>	 CAVA WIPERS

Product + Description	Functions
CAVA EXPORT AND REPORT (in the <i>Report</i> toolbar) 	
<p>The CAVA EXPORT tool is provided to export CAVA-generated features as CATIA geometry. Detailed descriptions see this manual—section 6. <i>Geometry-Export Tool</i> on page 58.</p>	 CAVA EXPORT
<p>The CAVA REPORT tool is provided to generate reports from features created by CAVA. For detailed description see this manual—section 7. <i>Report Tool</i> on page 60.</p>	 CAVA REPORT
CAVA UPDATE 	(1)
<p>The CAVA UPDATE tool starts the update of the current model and all contained CAVA features. For detailed description see this manual—section 9. <i>Cava Update</i> on page 72.</p>	 CAVA UPDATE
<p>The CAVA FORCE UPDATE tool allows to update CAVA features that are excluded from automatic update according to the settings made under Tools/Option settings. For detailed description see this manual—section 9. <i>Cava Update</i> on page 72.</p>	 CAVA FORCED UPDATE

(1) The CAVA FORCED-UPDATE icon is visible on the CAVA UPDATE toolbar if in the model there are features that require forced update. Otherwise the icon is grayed out.

1.2 Licenses

Every CAVA product has its separate licenses.

The base-data creation functionality is available in each CAVA product; in other words: to be able to create base data when working with other products than CAVA OVA, it is not necessary to obtain additionally the CAVA OVA license.

For further information see section 3.4 *Licensing* Tab Card on page 27.

2. Workbench

2.1 CAVA Standard Buttons



OK

Adopting the changes and closing the dialog box.



Apply

Adopting temporarily the input data for preview.

Final adoption of the data will be effected after clicking *OK* button.



Cancel

Closing the dialog box. All input data made will be discarded.



Publish

Pressing this button results in publishing the features generated with the respective CAVA function.

2.2 Starting CAVA Workbench

To start the CAVA workbench, do the following:

- (1) Start CATIA with the CAVA environment.
- (2) Open the CATIA menu item *Start > Infrastructure > Cava Vehicle Architecture*. The CAVA workbench is opened, the CAVA icon and the different tool bars of the CAVA products will be displayed (for which you have activated the available licenses)
(toolbars – see above section 1.1 Overview of the CAVA Products on page 6;
Licenses – see section 3.4 *Licensing* Tab Card on page 27).

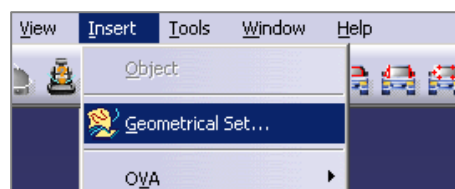


Note:

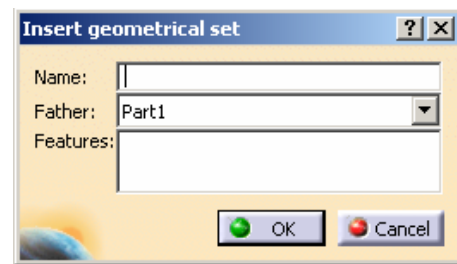
CAVA works on part level. If you have loaded an existing product and want to start additionally the CAVA workbench, you first have to activate a part. Otherwise CAVA will be opened in a new window with a new (empty) part.

2.3 Inserting a Geometrical Set

When working in the CAVA workbench, it is possible to add a Geometrical Set without having to open the Generative-Shape-Design workbench. To do so, click in the CATIA menu bar on *Insert > Geometrical Set*.



This opens the usual dialog box allowing to insert a Geometrical Set.



3. Configuration

The basic settings for CAVA are saved (in analogy to CATIA V5) in the CATsettings. Hence these settings can be made interactively in the menu item *Tools > Options*. In the administrator mode of CATIA V5 it is possible to lock the settings so that the user can not modify them.

The settings are saved in the following CATSettings files:

- TCACAVAAdminSetting.CATSettings
- TCACAVADefaultsSetting.CATSettings
- TCACAVASetting.CATSettings
- TCACAVAMeasureVisu.CATSettings
- TCACAVAFeatureSpecific.CATSettings
- TCACAVATemplates.CATSettings

The configuration files of the standards that are used for CAVA are files in XML format. They are stored in a separate directory. Detailed description see section 3.7. *Configuration Files* on page 38.

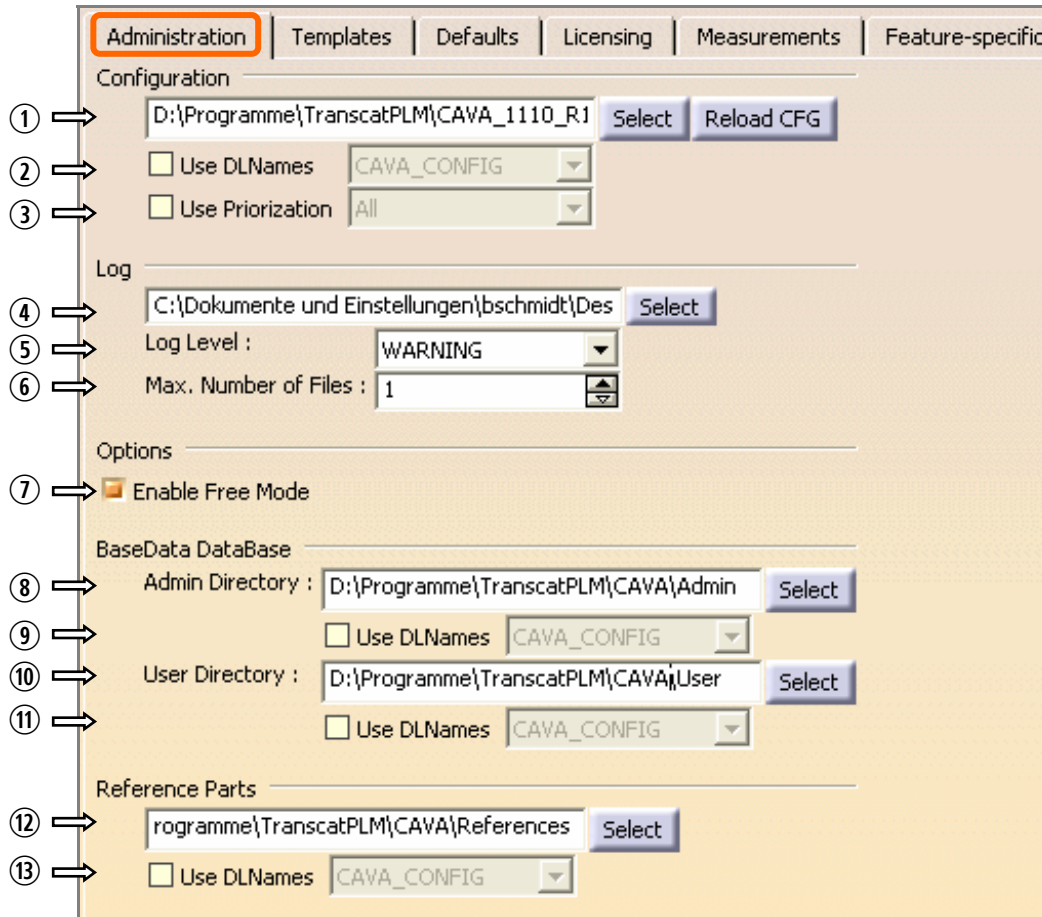


Entering values

In all CAVA value boxes that are associated with a unit of measurement (mm, deg etc.), only the value must be entered or adjusted. The unit of measurement can be deleted or overwritten when entering the value—it will be added thereafter automatically.

3.1 Administration Tab Card

Click in the CATIA menu *Tools > Options > Infrastructure* on *Cava Vehicle Architecture*. On the *Administration* tab card, the settings for the configuration and log files are made.



① *Configuration* text box with *Select* button

Enter in this text box the path of the configuration files. Select the *Configuration* subdirectory of your CAVA installation directory (and not a directory under this *Configuration* subdirectory!).

The path could also be defined as a variable in the system environment.

Example:

{ \$CAVA_CFG }

or

{ \$HOME } / configuration



To effect selection, use the *Select* button—a file selection dialog box will be opened.

Reload CFG

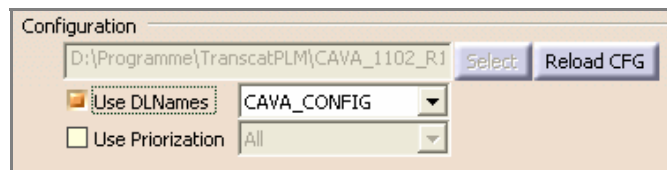
Use this button to reload the configuration files if you have made changes to the files or if you have changed the path during the runtime of a CAVA session. So you don't need to restart CAVA to make the changes active.



To ensure a correct function of CAVA, it is absolutely necessary to indicate a valid path of the configuration files.

② Use *DLNames* check box with list box

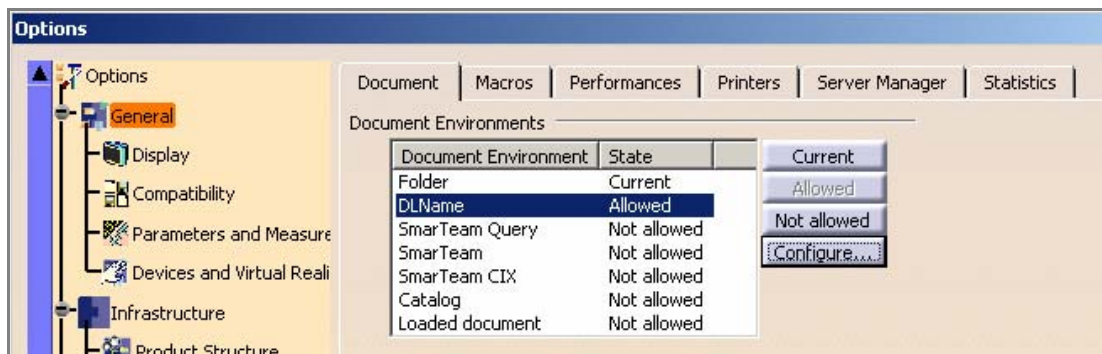
When this option is selected, the specified path to the configuration file is deactivated so that in the list box a *DLName* can be selected.



Precondition:

The *DLName* previously must be specified in the CATIA settings.

To do so, select in the CATIA menu item *Tools > Options > General >* on the *Document* tab card the *DLName* item, press the *Allowed* button and define in the following dialog box the *DLNames*.



③ Use Priorization

This option provides the opportunity to drive the standards in the list fields of the CAVA feature dialogs. You can limit the amount of shown standards in the list (according to the state of prioritization) and you can define the order in which the standards should appear in the list, as well.

For this you have to add a section to each of the configuration files of the *Custom* folder where you will define the prioritization of the standard.

Example:

```

<priorities>
  <priority level="0" >
    <standard name="SAE J826" />
  </priority>
  <priority level="1" >
    <standard name="SAE J826 (1995)" />
    <standard name="SAE J826 (1995, Loading Mass 2)" />
    <standard name="SAE J826 (1995, Vehicle grid parallel)" />
  </priority>
  <priority level="2" >
    <standard name="SAE J826 (1987)" />
    <standard name="SAE J826 (1987, Loading Mass 2)" />
    <standard name="SAE J826 (1987, Vehicle grid parallel)" />
  </priority>
  <priority level="3" >
    <standard name="Non Priorized Standard" />
  </priority>
</priorities>

```

The standards defined in the prioritization section must also exist in the standard definition section of the configuration file.

**HINT:**

If there are standards defined in the standard definition section that are not included in the prioritization section they will be assigned to priority level „0“ by default.

There are four priority levels (0, 1, 2 and 3) where 0 is the highest and 2 is the lowest priority. The priority level 3 contains all standards that should additionally appear in the list if the prioritization „All“ was selected.

If the *Use Priorization* option is selected, you will have to choose a priority level from the adjoining list field.

Priority level „0“:

The list of standards only contains the ones that are mentioned in the

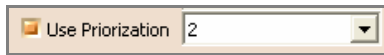
<priority level="0"> tag.

Priority level „1“:

The list of standards contains the ones that are mentioned in

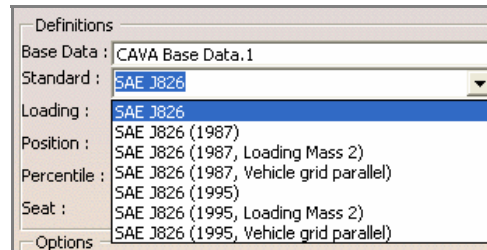
the <priority level="0"> tag and in the <priority level="1"> tag.

Priority level „2“:



The list of standards contains the ones that are mentioned in

the `<priority level="0">` tag,
the `<priority level="1">` tag and
the `<priority level="2">` tag.

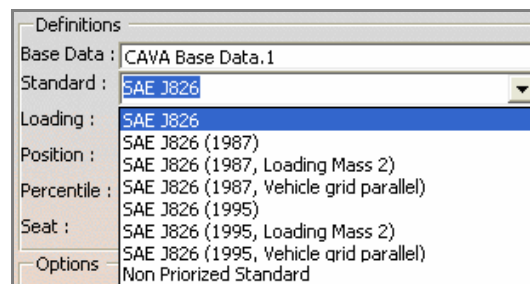


Priority level „All“:



The list of standards contains the ones that are mentioned in

the `<priority level="0">` tag,
the `<priority level="1">` tag,
the `<priority level="2">` tag and
the `<priority level="3">` tag.



The order of the standards in the selection list of the feature dialog boxes will be as follows:

- Priority level 0
- Priority level 1
- Priority level 2
- Priority level 3

Inside the priority levels the order is as defined in the priority level section.

④ *Log* text box with *Select* button

Enter in the *Log* text box the path of the log files. The log files by default are created in the *Log* subdirectory of your CAVA installation directory.



To effect selection, use the *Select* button—a file selection dialog box will be opened.

⑤ *Log level*/list box

Select in the *Log Level*/list box in which extent the actions and messages are to be logged.

- TRACE Every action is recorded.

- INFO All messages with INFO, WARNING, ERROR and FATAL ERROR state are logged.
- WARNING All messages with WARNING, ERROR and FATAL ERROR state are logged.
- ERROR All messages with ERROR and FATAL ERROR state are logged.
- FATAL ERROR Only FATAL ERRORS are logged.

⑥ *Max. number of log files* spinner box

Specify here the maximum number of log files. If the specified number of files is exceeded, the oldest existing log file will be deleted.



Note:

Depending on the selected level, the log files' size may become considerably. Therefore you should specify an appropriate value for *Max. Number of Files*.

⑦ *Enable "Free" Status* check box

With this option it may be defined whether for newly created features the *Free* state will be available or not.

The *Free* mode allows a free specification for the parameters the values of which in standard mode are set by the selected standard.

This *Free* option is lockable in CATIA-administrator mode.

For features that initially have been created with deactivated *Free* mode, the *Free* check box is not available.



Activated *Free* mode

When *Free* mode is activated:

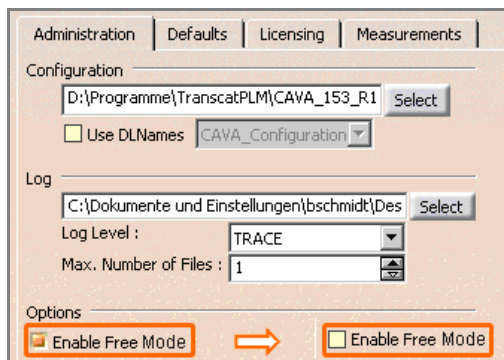
- The *Standard* list box is deactivated.
- Several boxes that before were deactivated are now activated, allowing a free value specification.



Deactivated *Free* mode

When *Free* mode is deactivated:

- The *Standard* list box is activated.
- Several boxes that before where activated are now deactivated.



CATIA-administrator deactivation of *Free* mode

In CATIA administration (menu item *Tools > Options > Infrastructure > Cava Vehicle Architecture*) the *Free*-mode check box can be deactivated completely. In this case in CAVA the check box will be no more indicated (see fig. below).



Free mode deactivated completely

When deactivated by the CATIA administrator, the *Free* mode is no more available in CAVA.



Note

For features that initially have been created in *Free* mode, the *Free* mode continues to be available (although it is generally deactivated). Only when the user unselects for the feature the *Free* mode, this mode is deactivated completely for the feature. Once the *Free* mode is deactivated, it can never more be activated!

⑧ *Admin Directory* text box

Directory where the XML data-base files with base data are stored. This directory is destined especially for the administrator-defined CAVA base data. Normal CAVA users don't have access via base-data data base to the base data which is stored here.

⑨ *Use DLNames* check box with list box

When this option is selected, the specified path to the configuration file is deactivated so that in the list box a DLName can be selected.

⑩ *User Directory* text box

Directory where the XML data-base files with base data are stored. This directory is destined especially for the user-defined CAVA base data.

⑪ *Use DLNames* check box with list box

When this option is selected, the specified path to the configuration file is deactivated so that in the list box a DLName can be selected.

⑫ *Reference-Parts* text box

Some CAVA features use predefined CATParts to create CAVA geometry (e.g. crash barriers). This minimizes the runtime needed for calculating and creating complex geometry.

Enter in this box the „ReferenceParts“ folder from your CAVA installation . The „ReferenceParts“ folder contains one subfolder for each CAVA Product that uses reference parts (e.g. OVA and SAFETY). The respective reference parts of a CAVA feature are situated in these subfolders.

In order to be recognized by the CAVA application, the name of the reference part must fit to a specific naming convention.

Example for SAFETY:

```
CAVAPPOffset_Sketch_MyName
```

- „CAVAPPOffset_Sketch_“ is the prefix and must not be renamed.
- For Myname you can choose a naming of your desire. This name will appear in the selection list of the use dialog.

⑬ *Use DLNames* checkbox and list box

When this option is selected, the specified path to the configuration file is deactivated so that in the list box a DLName can be selected.



You can set system variables to define mandatory paths for the configuration directory as well as for the Admin and User directory of the base-data data base. The names of the system variables are:

- CAVA_CFG_PATH
- CAVA_CFG_BASEDATA_ADMIN
- CAVA_CFG_BASEDATA_USER
- CAVA_CFG_DRAWING_ADMIN
- CAVA_CFG_DRAWING_USER

- TCA_CAVA_REPORT_OUTPUT_DIR

These system variables are used only if there is no directory defined in the CAVA *Tools > Options* settings. If the path is not defined at all, an error message will be displayed.

Note: The definitions specified under *Tools > Options* are of higher priority than the system variables are.

Further system variables:

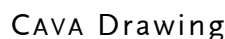
- CAVA_ADMIN
 - YES: The user is allowed to create / modify elements in the admin section.
 - NO: The user is not allowed to create / modify elements in the admin section.
- TCA_CAVA_SCREENSHOT_DIR

Directory that is preselected if the *Browse* button is pressed in the screenshot functionality of the CAVA Report Tool.
- TCA_CAVA_TOOLBAR_DOCK

Dock the CAVA toolbars in the workbench to a specific position

 - Right (is default).
 - Left
 - Top
 - Bottom
 - Unlocked

If the variable is not set, the toolbars by default will be locked right sided.



- Use this option to activate the *Drawing Text Automation* functionality.

For detailed information of the *Drawing Text Automation* functionality please refer to section 8 on page 68.

- Here you have to define the path to the *Drawing Text Automation* configuration files for the *Administrator*. This directory with the corresponding configuration files is created automatically during the CAVA installation process in the subfolder named. *DrawingConfiguration|Admin*.

This field will be disabled if the option *Use CAVA Drawing Text Automation* is not selected.

- When this option is selected, the specified path is deactivated so that in the list box a DLName can be selected.

Prerequisite: A DLName must have been specified in the CATIA settings before.

④ *User Directory*

Here you have to define the path to the *Drawing Text Automation* configuration files for the common CAVA *User*. This directory with the corresponding configuration files is created automatically during the CAVA installation process in the subfolder named *DrawingConfiguration|User*.

This field will be disabled if the option *Use CAVA Drawing Text Automation* is not selected.

⑤ See ③

⑥-⑨ CAVA Report

In this section you have to define the directories where the templates for the CAVA reports reside.



CAVA is using templates for the creation of the reports. These templates are filled with values from the selected CAVA feature.

You can find more information about CAVA reports in section 7 *Report Tool* on page 60.

⑥ Admin Directory

Directory where the report template files reside. This directory is especially for the administrator. All the templates inside this folder are protected for the common CAVA-user.



Please make sure that the referenced Admin Folder contains also the dictionary file (TCACAVADictionary.xml). If not you will get an error message when starting the report tool. You will be prompted to select the folder where the dictionary file reside before you can go on with your work (please refer to section 7 *Report Tool* on page 60).

⑦ See ③

⑧ User Directory

Directory where the report template files for the common CAVA-user reside.

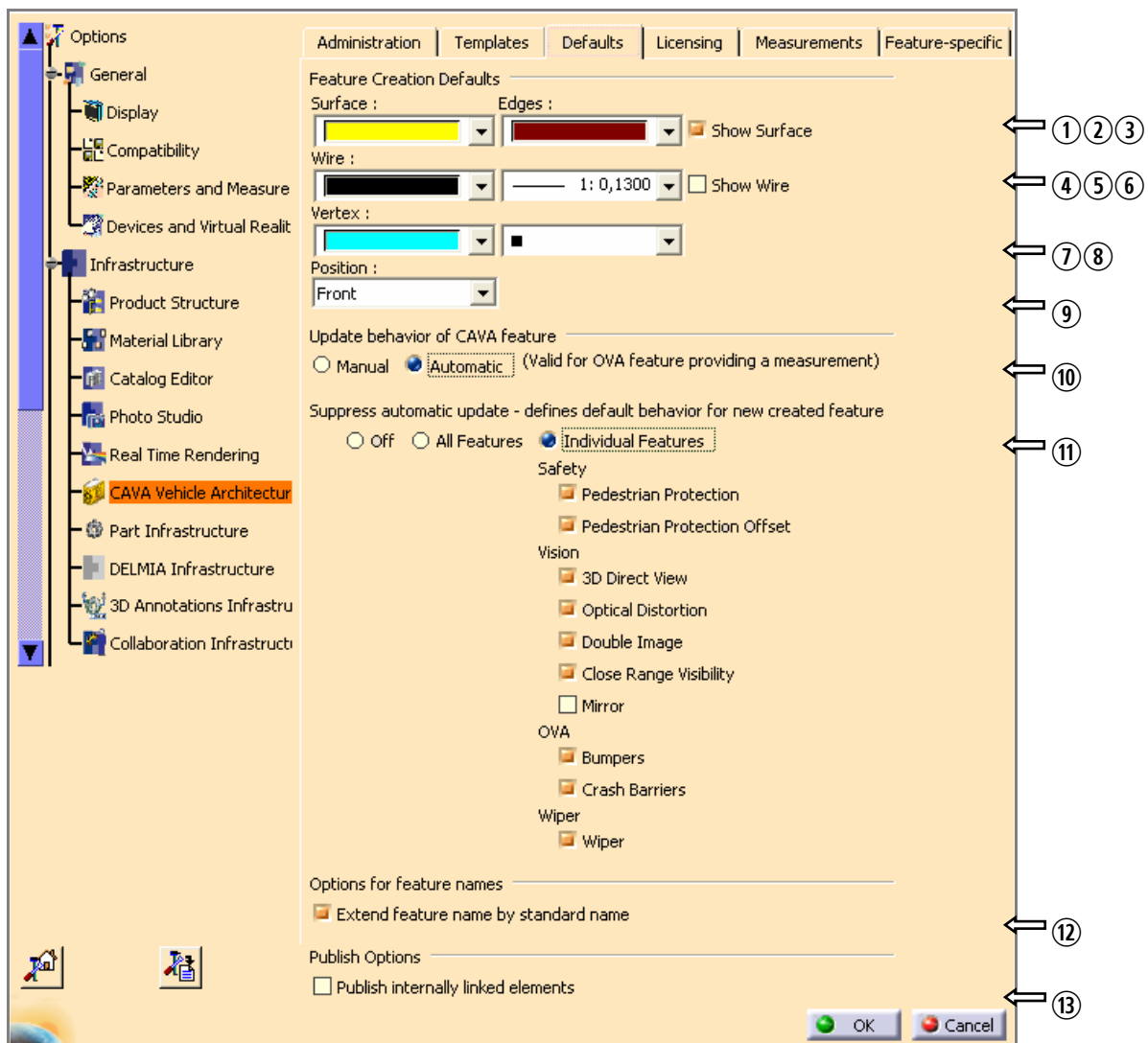
⑨ See ③



The CAVA installation creates a directory named „SampleTemplates“ with the sub directories „DrawingTextConfiguration“ and „ReportTemplates“. These Folders contain some sample templates which you can use as basis to create your own templates.

3.3 Defaults Tab Card

The control elements ① to ⑨ in this dialog box allow to control how the CAVA features to be created will be visualized. The colors and other values, set with these default settings, later by the user in the different features can be modified individually. While for normal work of CAVA it is not necessary to modify the settings for the options ①...⑨, it is important to make the required settings for the options ⑩...⑫ according to the users needs.



① *Surface* list box

Select in the *Surface* list box the default color for the visualization of the surfaces of the features to be created.

② *Edges* list box

Select in the *Edges* list box the default color for the visualization of the edges of the features to be created.

③⑥ *Show surface* and *Show wire* check boxes

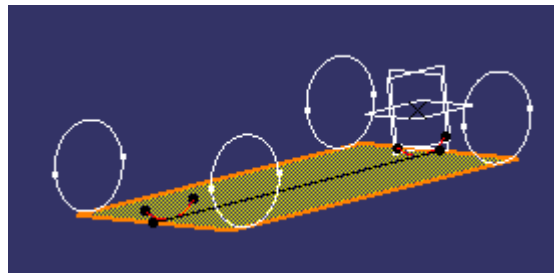
Some of the CAVA functions provide options controlling the feature visualization (with or without surfaces, with or without wires).

Activate the option ③ if the features created by CAVA by default should be shown with surfaces. This setting effectuates that in the feature dialog boxes the *Show Surface* option will be pre selected.

Activate the option ⑥ if the features created by CAVA by default should be shown with wires (as in a wire model)—see fig. below. This setting effectuates that in the feature dialog boxes the *Show Wire* option will be pre selected. The *Show surface* and *Show wire* options can be used together.

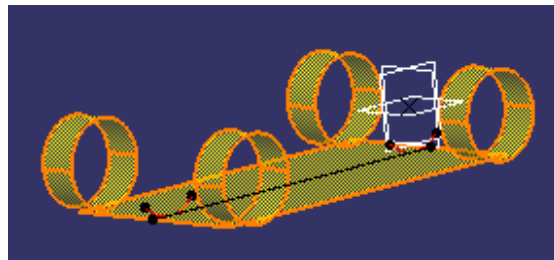
- *Wire:*

The features are visualized as wire model.



- *Surface*

The features are visualized as surface model.



④⑤ *Wire* list boxes—color and line thickness

Select in the left list box a color, in the right list box a line thickness for the visualization of the lines of the features to be created (for wire model representation).

⑥ *Show wire* check box—see ③.

⑦⑧ *Vertex* list boxes—color and sign

Select in the left list box a color, in the right list box a sign for the visualization of the vertexes of the features to be created.

⑨ *Position* list box

Select in the *Position* list box the position on the vehicle, where the feature is to be visualized.

- *Front* The feature will be visualized only for the front part of the vehicle.
- *Back* The feature will be visualized only for the rear part of the vehicle.
- *Both* The feature will be visualized for both the front and rear parts of the vehicle.

⑩ *Update of Measurements* radio buttons

This option is relevant for features allowing measurement (e.g. OVA UNDERFLOOR, OVA WHEEL COVERING).

After parameter modifications the model must be recalculated and updated. In case of geometry links this might be time-consuming. Therefore here a choice is provided how CAVA should execute recalculation:

- **Manually:**

The recalculation is initiated by the user on the *Current* tab card in the respective dialog boxes by clicking on the *Recalculate* button.

- **Automatically:**

The recalculation is initiated automatically after every modification.

⑪ Suppress automatic update

Since version 1.11.1 the automatic update of the CAVA features taking place after modification of values that are referenced by the feature can be disabled. This option avoids time consuming recalculations.

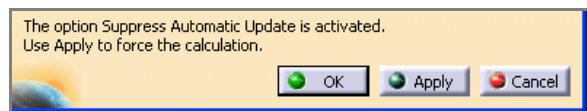



The update in this case is to be started manually by the user with the *Force Update* icon in the *Update* toolbar.

CAVA features that are excluded from automatic update are marked with a red update sign in the specification tree (see fig. On the right).



A message text displayed in the feature dialog signals that the feature has to be updated manually.



To update one of those features you have to select it in the specification tree and then press *Force Update* icon  or open the feature dialog box and click on 'Apply'.



If there are no CAVA features that need a manual forced update, the *Force Update* icon in the *Update* toolbar (see fig. below) will be grayed out.

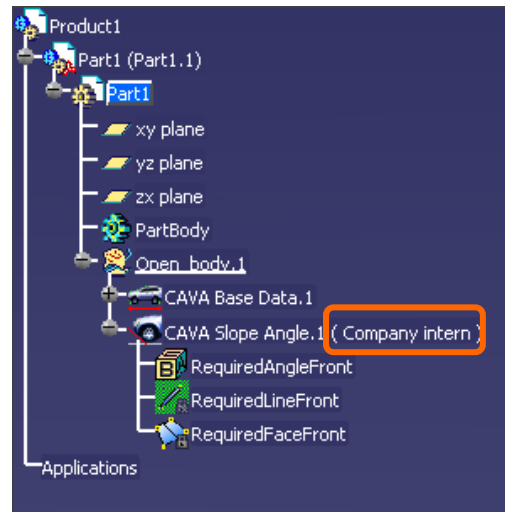
For the update functionality there are three settings:

- **Off** All CAVA features will be updated automatically.
- **All Features** All CAVA features will not be updated automatically but manually by the user.
- **Individual Features** Select specific CAVA features that should not be updated automatically by activating the respective check box.

⑫ *Options for feature names* check box

- Extend feature name by standard name

If this option is activated, in the specification tree to the feature name the name of the used standard is appended (see example fig.).



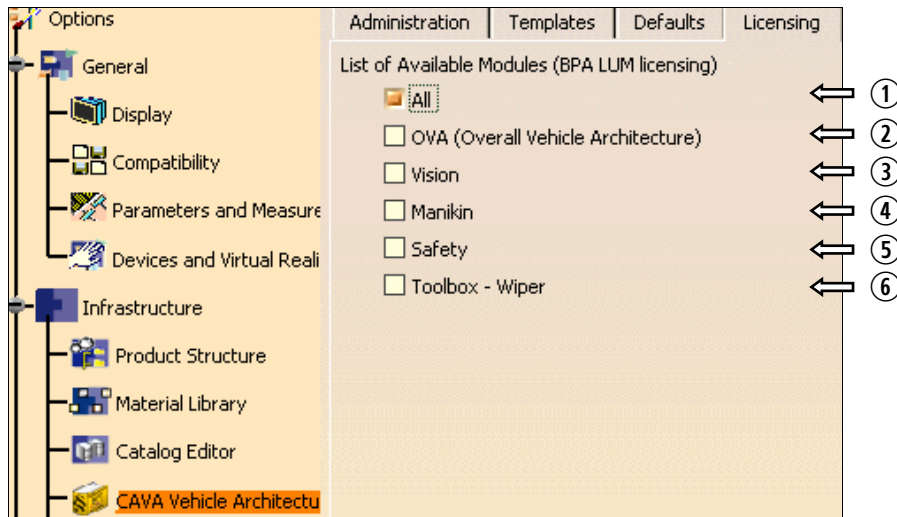
- If the feature is edited in the *Free* mode, to the feature name the text "Free mode" will be appended.
- For CAVA features referencing as input parameter a set point, the name of the used seat (as defined in the base data) also is appended to the feature name in the specification tree.

⑬ *Publish Options* check box

Activate the *Publish internally linked elements* option to publish the created elements. As CATIA V5 does not allow to publish all CAVA features, it will be published only all geometrical elements of the features.

3.4 *Licensing* Tab Card

CAVA contains an own licensing for the different products. For each product a separate license is required.



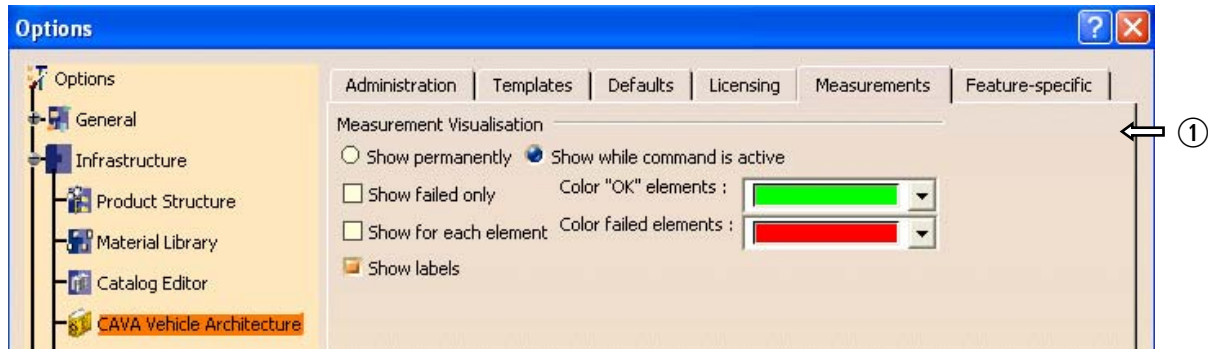
License type	Description
① All	License for all CAVA products
② OVA	Individual license for the <i>Overall Vehicle Architecture</i> product
③ Vision	Individual license for the <i>Vision</i> product
④ Manikin	Individual license for the <i>Manikin</i> product
⑤ Safety	Individual license for the <i>Safety</i> product
⑥ Toolbox Wiper	Individual license for the <i>Toolbox Wiper</i> product

The license check boxes may be activated and deactivated individually.

In case that a license is not available, this will be indicated on the Licensing tab card with a text, appended to the product name (e. g. "Vision– License not available on the server").

3.5 *Measurements* Tab Card

On this tab card settings are made that control the visualization of measurements. This setting helps the user to get a clear representation according to his needs.



① *Measurement visualization* radio buttons

Select one of the following options:

- *Show permanently*

The measurements will be shown in the model permanently, i. e. also when the dialog box is closed.

- *Show while command is active* check box

The measurements will be shown in the model only while the respective feature is active or, in other words, while the feature dialog box is opened.

- *Show failed only* check box

If this check box is activated, the measurements will be shown only for those features that disagree with the regulations.

- *Show for each element* check box

- When this check box is activated, in the CATIA workspace (model) there will be shown the results of the measurements for all selected geometries. (The listing of the selected geometries you can find in the measurement part of the feature dialog box on the feature tab cards— see example figure on the right.)

Required	Current	Front Elements	Back Elements												
<table><tr><th>Element</th><th>Type</th><th>Dist [mm]</th></tr><tr><td>Front Bu...</td><td>GEOM 2D</td><td>191,028</td></tr><tr><td>Surface.3</td><td>GEOM 2D</td><td>227,001</td></tr><tr><td>Surface.5</td><td>GEOM 2D</td><td>173,327</td></tr></table>			Element	Type	Dist [mm]	Front Bu...	GEOM 2D	191,028	Surface.3	GEOM 2D	227,001	Surface.5	GEOM 2D	173,327	<div>Select By Name</div> <div><input type="checkbox"/> Select CGR</div>
Element	Type	Dist [mm]													
Front Bu...	GEOM 2D	191,028													
Surface.3	GEOM 2D	227,001													
Surface.5	GEOM 2D	173,327													
Remove RemoveAll		Visu													

- When this check box is deactivated, in the CATIA workspace (model) there will be shown the result of the measurement for the geometry that deviate the most from the value, required in the standard.

Show labels check box

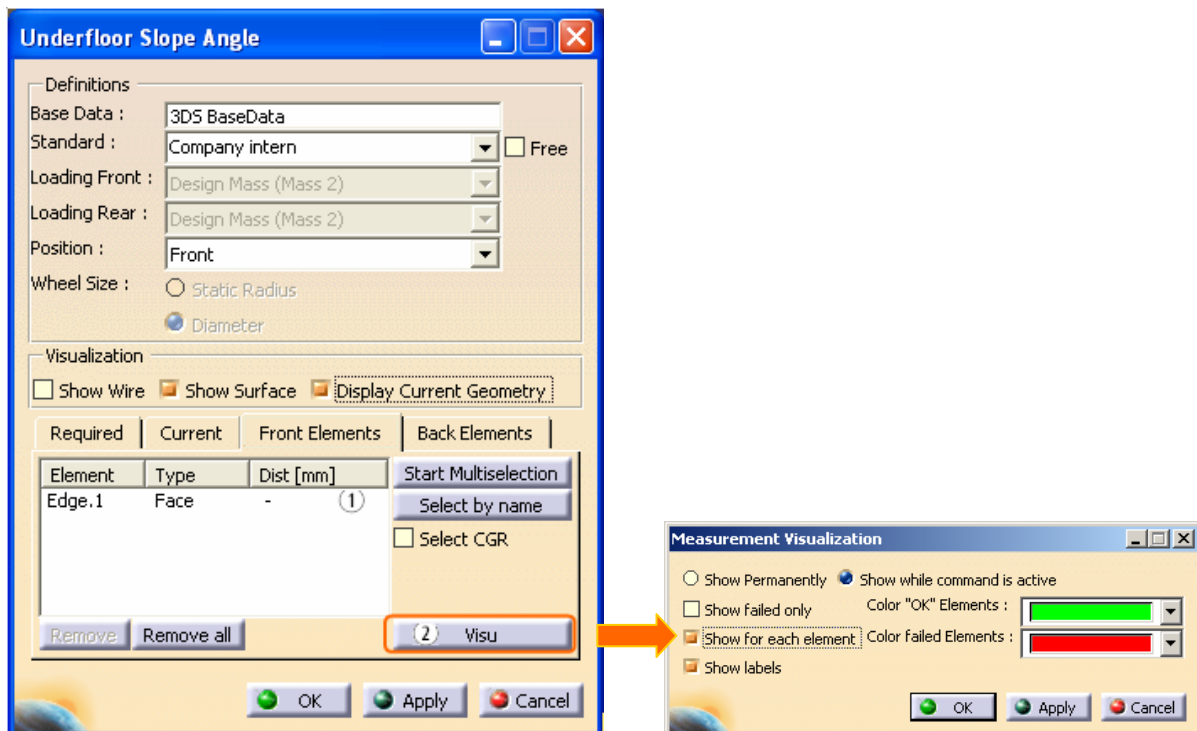
When this check box is activated, additionally to the measurement line (which indicates the distance between the element to be measured and the reference geometry [i. e. the feature]) also the measurement result value will be shown (see fig. in section „Visualization of the Measurement Results in CATIA” on page 54).

Color „OK“ elements and Color failed elements list boxes

Select a color which is to be used to highlight the OK elements and one for the failed elements.

Settings for the Measurement Visualization in the Individual Feature

While on the *Measurements* tab card in the CATIA menu *Tools > Options > Infrastructure > CAVA Vehicle Architecture* (as described above) the defaults for the measurement visualization in general may be set, the visualization of an individual feature may be specified in the dialog box of the respective CAVA function. To do so, select in the feature dialog box the *element* tab card (or one of them; in our example the *Front elements* tab card of the *CAVA Slope angle* function), then press the *Visu* button. This opens a dialog box where the settings may be modified (see fig. below). The settings made in the dialog box take effect on the features, contained in the elements list ①.



3.6 Feature Specific Tab Card

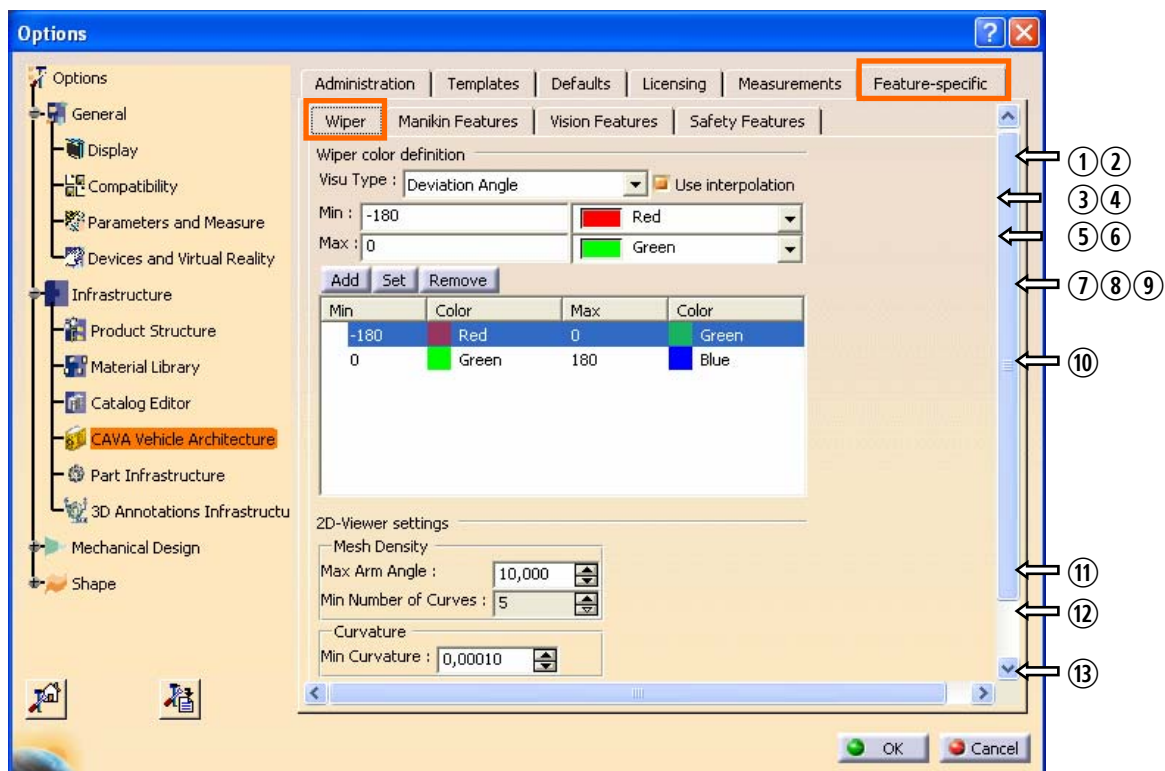
The *Feature Specific* tab card contains sub cards for feature-specific settings (at the moment only one sub card)

3.6.1 Wiper Tab Card

On the *Wiper* tab card, specific settings for the wipers can be made.

► *Color definition for the deviation angle between the wiper-blade plane and the windscreen normal*: The deviation angle depends from the concavity of the window and from the position of the wiper in the wiped area on the window. On this tab card default values can be specified for the color representation of the normals/points, representing the deviation angle in the model.

► *2D Viewer settings*—see below (11-12). (For detailed description of 2D Viewer see *Wiper* manual.)



① *Visu type* list box

Select here the required visualization type (deviation angle, curvature radius of blade, curvature of blade, sag of blade).

② *Use Interpolation* check box

- When this check box is activated, for the color representation of the value range one color may be used for the maximum value and one more color for the minimum value.
- the intermediate values will be displayed with interpolated color values. When this check box is deactivated, each value range completely will be displayed in one only color (i.e. the color, selected in the color list box on the right of the *Min* text box).

③-⑥ *Min* and *Max* text boxes and color list boxes

In the *Min* and *Max* text boxes the lower and upper limit value of the value range to define can be specified.

With the color list boxes to the limit values colors can be assigned. The color list box on the right of the *Max* text box is active only if the *Use Interpolation* check box is activated. (Cf. above description of the *Use Interpolation* check box ②.)



While defining the angle ranges, take care that the value ranges do not overlap. A range that overlaps a range that has been defined before can not be added to the list (an error message will be displayed).

⑦ *Add* button

Press this button to add to the list the values defined in the boxes ②–⑤.

⑧ *Set* button

To modify values in the list, mark the respective line in the list. The values then will be displayed in the boxes ③–⑥ and may be modified. Thereafter press the *Set* button to add the modified values to the list.

⑨ *Remove* button

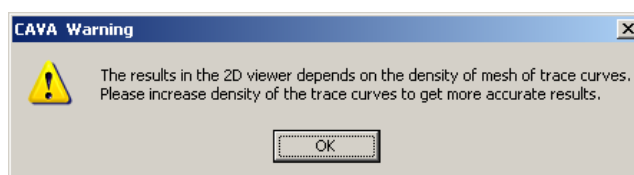
To remove a line from the list, highlight this line and press the *Remove* button.

⑩ List of the defined ranges with assigned colors

This list contains all specified angle ranges with their attributed colors, defined with the boxes ③–⑥.

⑪-⑫ *2D Viewer* settings

With the spinner boxes ⑪-⑫ the threshold values are specified for optimal result representation in *2D Viewer*. These parameters control the mesh density of the points used for calculation. For a good representation also are important the settings in the respective *Wiper* dialogs on the *Driving device* tab card. If in there with the *Number of Points* spinner box has been set a too small value, or with the *Angle Step* spinner box set a too big value, an error message will be displayed when starting *2D Viewer*.



⑪ *Max. Arm Angle* spinner box

Defines the maximum value of angle step of the wiper arm.

If in the wiper dialog with the *Angle Step* spinner box has been set a value bigger than this value, an error message will be displayed when starting 2D Viewer (see fig. above).

⑫ *Min. Number of Curves* spinner box

Defines the minimum number of points on the wiper blade.

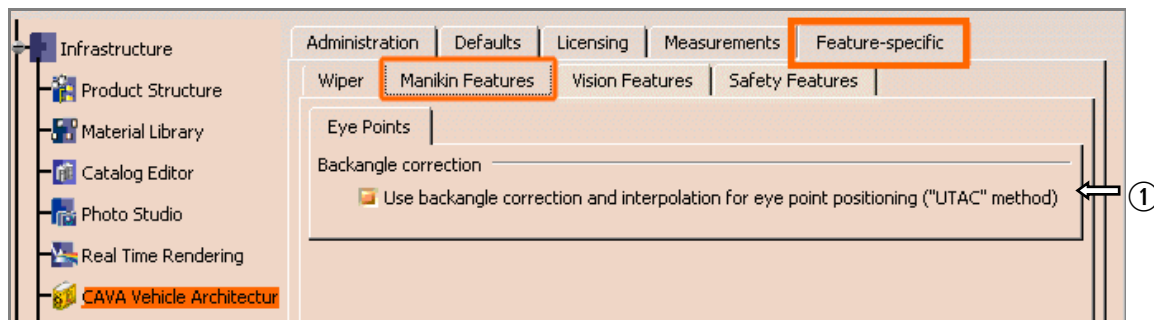
If in the wiper dialog with the *Number of points* spinner box has been set a value smaller than this value, an error message will be displayed when starting 2D Viewer (see fig. above).

⑬ *Minimum Curvature* spinner box

Lower limit value, which will be considered to be still a curvature. Values below this limit will be considered to be plane (curvature equals 0).

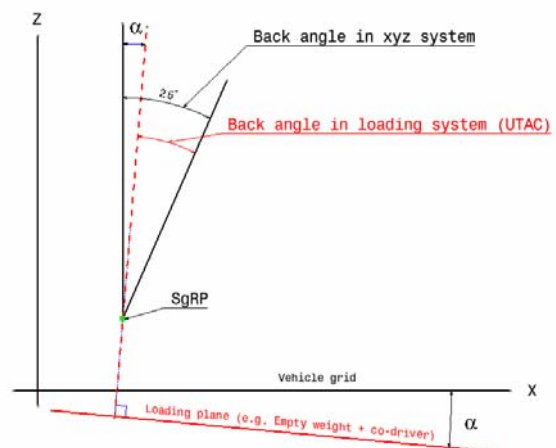
3.6.2 *Manikin Features* Tab Card

On the “Manikin Features” tab card—“Eye Points” sub-tab card the additional options for the eye points can be activated.



① Back angle correction

If the *Use back angle correction and interpolation for eye point positioning (UTAC method)* option is active, for the eye-point calculation the UTAC method will be used. This means that the inclination angle of the loading plane is also considered for the back angle definition (see fig. below) and the correction in x , y und z direction is calculated by using interpolation instead of static values from the table.



The exact values for the x and y delta will be calculated by the formula:

$$x = dx * a - dx * a1 + x1$$

Example:

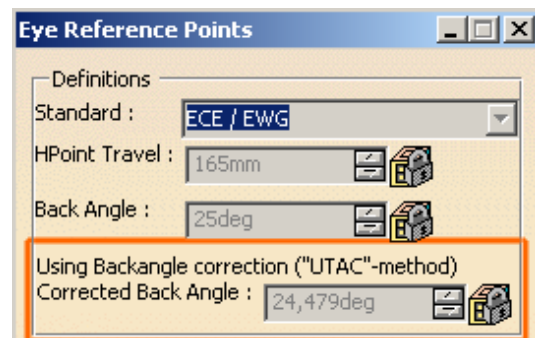
Assuming the values from the table for a1 / x1 and a2 / x2 are:

a1 = 23deg, x1 = -18, a2 = 24deg, x2 = -9.

For these values and an angle of e. g. 23.3 deg between a1 and a2 the following value x will result:

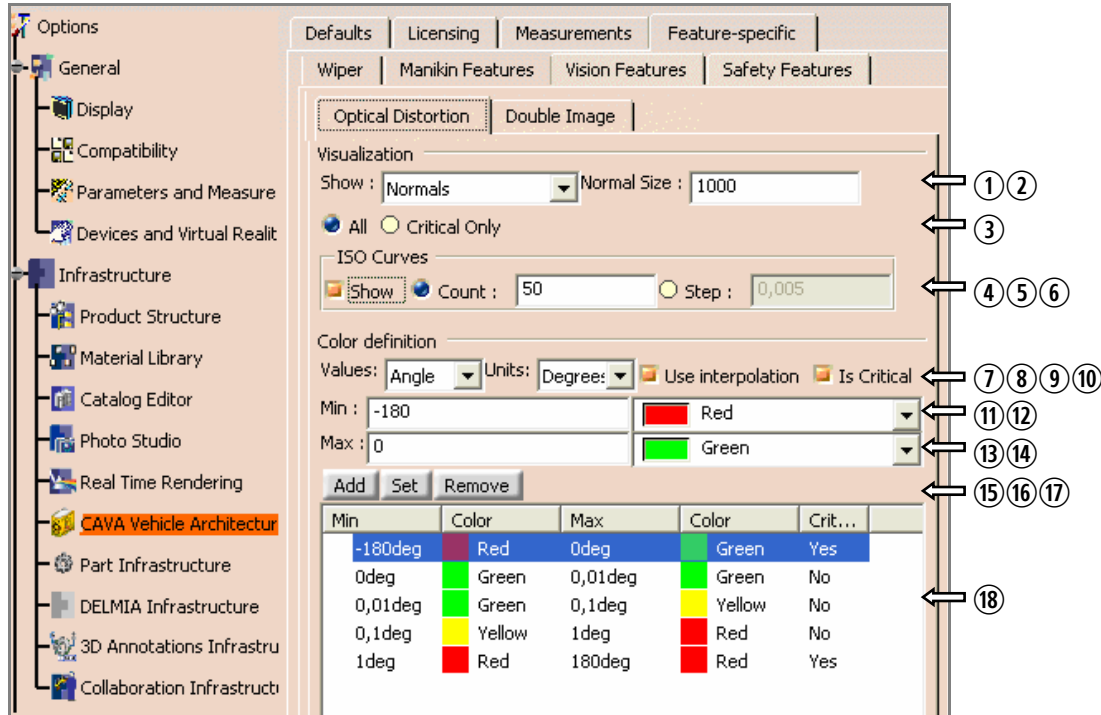
$$x = 9 * 23.3 - 9 * 23 + (-18) = 9 * 23.3 - 225$$

The eye points according to UTAC will be referenced by all CAVA features that use eye points as input. You can check up the method used for the eye point calculation by clicking on the eye point icon in the respective CAVA-feature dialog box.



3.6.3 Vision Features—Optical Distortion Tab Card

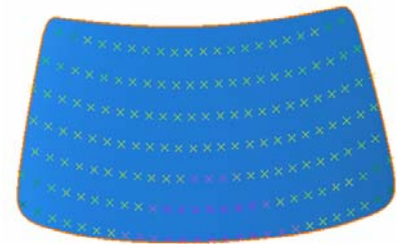
In this tab card you can define default settings of the optical distortion feature. Each time you create a CAVA Optical Distortion feature the starting values will be like the ones defined here.



① Representation of results (Method)

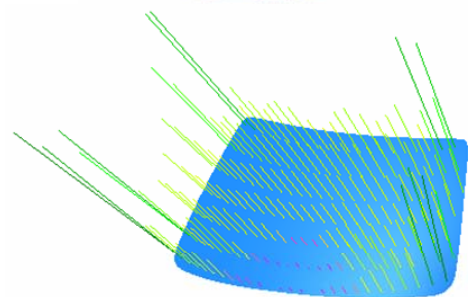
Intersections

The results are shown as colored points on the windscreen.



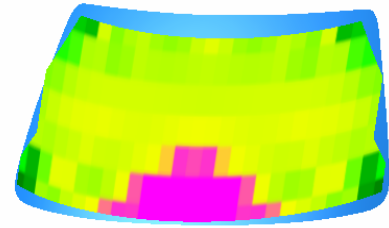
Normals

The results are shown as normals (porcupine), and the stated length defines the scaling factor.

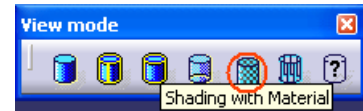


Color Map

The results are shown as colored area.



For the *Color Map* visualization method you have to activate the *Material* mode in CATIA.



② Normal Size

(Only active if the representation method *Normals* is selected in field ①)

This value defines the length of the normal for the maximum calculated result. The length is used as scaling factor for all the other result values.

③ „All“ / „Critical Only“

Select whether only the critical results or everything should be visualized. The definition of critical results is done with the option ⑩ described below.

④ Representation as iso-curves

Along with the representation as points, normals or respectively as color map, it is also possible to visualize the results in the form of iso-curves, i.e. curves on which lies the points with the same angle value.

⑤ Count

If you have selected this option you can define the number of iso-curves. You can create up to 50 iso-curves.

The range between the calculated minimum and maximum is divided into N equal steps (where N is the number specified in the *Count* field). For each of these step values CAVA creates an iso-curve.

⑥ Step

If you have selected this option you can define a step value for the creation of the iso-curves. Starting from the calculated minimum value, CAVA creates an iso-curve every N degrees or dioptries (where N is the value selected in the *Step* field).

⑦ Values

Here you can select whether you want to have the calculated results as angles or as dioptry.

⑧ Units

If you have selected the *Angle* option in the *Values* field, you can select whether you want to get displayed the calculated results in degrees or minutes.

⑨ Use Interpolation check box

- When this check box is activated, for the color representation of the value range one color may be used for the maximum value and one more color for the minimum value.
- The intermediate values will be displayed with interpolated color values. When this check box is deactivated, each value range will be displayed completely in one only color (i.e. the color, selected in the color list box on the right of the *Min* text box).

⑩ Is Critical

Activate this option to define the range as critical. The results than will be visualized if you have selected the option to show only critical results (see above number ③).

⑪-⑭ *Min* and *Max* text boxes and *color* list boxes

In the *Min* and *Max* text boxes the lower and upper limit value of the value range to define can be specified.

With the color list boxes to the limit values colors can be assigned. The color list box on the right of the *Max* text box is active only if the *Use Interpolation* check box is activated. (Cf. description of the *Use Interpolation* check box ⑨—see above.)



While defining the angle ranges, take care that the value ranges do not overlap. A range that overlaps a range that has been defined before can not be added to the list (an error message will be displayed).

⑮ *Add* button

Press this button to add to the list the values defined in the boxes ⑪-⑭.

⑯ *Set* button

To modify values in the list, mark the respective line in the list. The values then will be displayed in the boxes ⑪-⑭ and may be modified. Thereafter press the *Set* button to add the modified values to the list.

⑰ *Remove* button

To remove a line from the list, highlight this line and press the *Remove* button.

⑱ List of the defined ranges with assigned colors

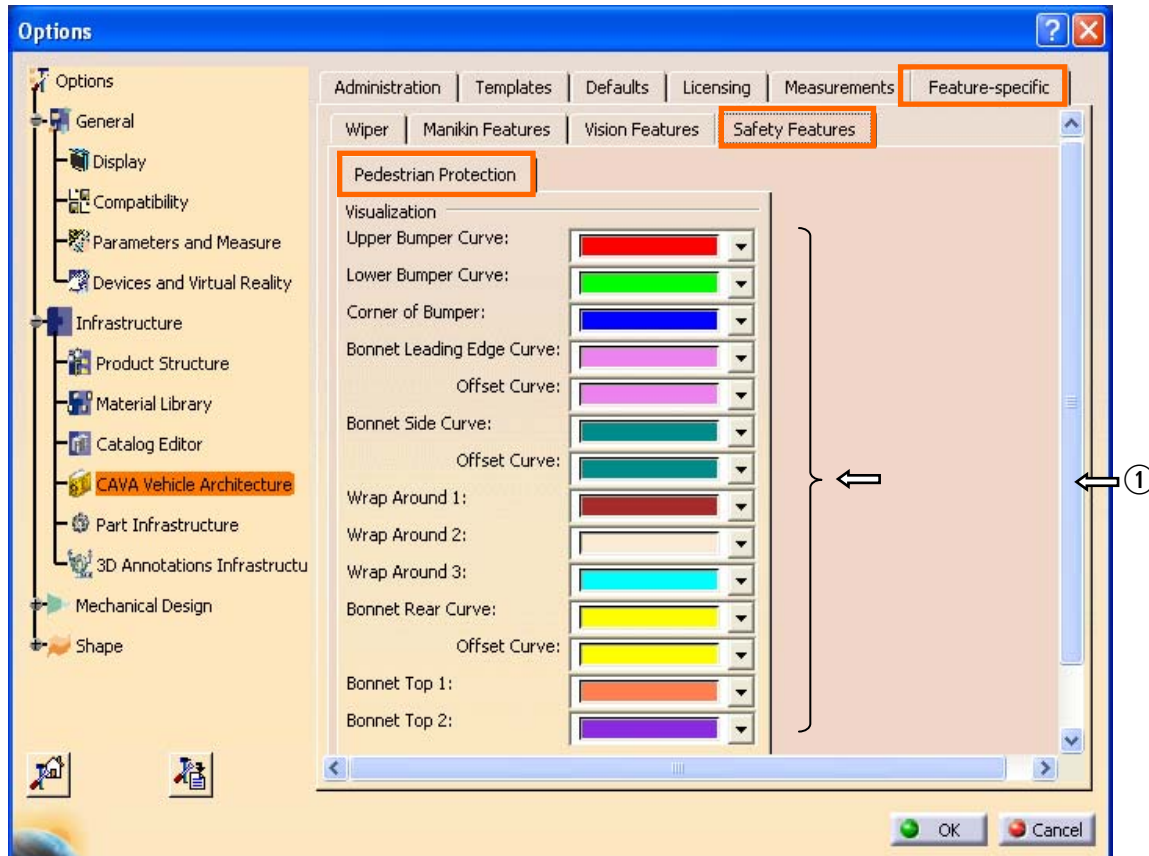
This list contains all specified value ranges with their attributed colors, defined with the boxes ⑪-⑭.

3.6.4 Vision Features – Double Image Tab Card

Same as described in section 3.6.3 *Vision Features—Optical Distortion Tab Card*.

3.6.5 Safety Features—Pedestrian-Protection Tab Card

On this tab card you can define default settings of the safety feature. Each time you create a CAVA Pedestrian Protection feature, the starting values will be like the ones defined here.



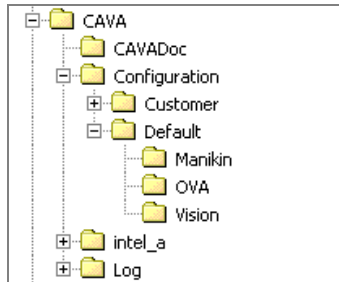
① Color Definition

Assign a specific color to each reference line.

Note: You can define these colors also inside the `PedestrianProtection.xml` configuration file in the `configuration > Customer > Safety` directory of the CAVA installation.

3.7 Configuration Files

Installing CAVA also installs a set of configuration files in the Configuration > Default subdirectory of the CAVA installation directory. The configuration files are files in XML format.



It is possible to edit these files and to add to them company-specific data. Configuration files with company-specific data must be put in the Customer directory and must have the same file names as the files in the Default directory (see fig. above). If in a customer configuration for the same standard as in the default configuration other values are used, the customer-defined values take the priority over the default values.

Note:

- The syntax of the used tags is described on the top of each configuration file.
- In order to be able to use the modified configuration files during a running CAVA session, please click the *“Reload CFG” button in the CATIA menu Tools/Options/Infrastructure/CAVA => Administration*. Otherwise the modifications on the configuration files will take effect only after CAVA restart.

Products	Configuration Files	
OVA	BaseData.xml Bumpers.xml CrashBarriers.xml ChildProtection.xml FreeSpace.xml LampPositions.xml NumberPlates.xml SeatingBelts.xml UFComplete.xml	UFCurb.xml UFDynamicCurb.xml UFIinnerAngle.xml UFOilTub.xml UFSlopeAngle.xml UFSpaceToRoad.xml UFWheelFixing.xml WheelCovering.xml
Manikin	EyeEllipses.xml EyePoints.xml	ManikinTemplate.xml SRPLocationCurves.xml HeadContour.xml
Vision	APillar.xml DirectView.xml DirectView3D.xml FieldsOfView.xml MultipleReflection.xml OpticalDistortion.xml	VisionCone.xml VisionPlanes.xml VisionPoints.xml Mirror.xml CloseRangeVisibility.xml

Products	Configuration Files
Safety	HeadImpact.xml PedestrianProtection.xml PedestrianProtectionOffset.xml
Wiper	Wipers.xml

3.7.1 Default values for specific CAVA features

You can define specific flags inside the configuration files to define default values for certain fields in the user dialog boxes.

Note: The values defined inside the configuration files will overrule the settings made in the Tools/Options/... menu. This means that if you have defined a red line for the upper bumper curve in the feature-specific settings for Pedestrian Protection and inside the PedestrianProtection.xml configuration file the value is set to green, then the line will be created by default in green color.

This is an example for the color definition of the lines used in the Pedestrian-Protection feature:

```
<PedestrianProtection>
  <DefaultSettings>
    <Settings name = "TestSettings1">
      <parameter name = "bonnetLeadingColor" value = "cyan" />
      <parameter name = "bonnetLeadingOffsetColor" value = "magenta"/>
      <parameter name = "bonnetSideColor" value = "yellow" />
      <parameter name = "bonnetSideOffsetColor" value = "gray" />
      <parameter name = "wrapAround1Color" value = "light gray" " />
      <parameter name = "wrapAround2Color" value = "dark red" " />
      <parameter name = "wrapAround3Color" value = "dark green" />
      <parameter name = "bonnetRearColor" value = "dark blue" />
      <parameter name = "bonnetRearOffsetColor" value = "dark cyan"/>
      <parameter name = "bonnetTop1Color" value = "dark magenta" />
      <parameter name = "bonnetTop2Color" value = "dark yellow" />
    </Settings>

    <Settings name = "TestSettings2">
      <parameter name = "upperBumperColor" value = "3" />
    </Settings>

    <Settings name = "TestSettings3">
      <parameter name = "upperBumperColor" value = "0xFF0000FF" />
    </Settings>

    <standard name = "Japan (2005)">
      <UseDefaultSettings name = "TestSettings1" />
    </standard>
  </DefaultSettings>
</PedestrianProtection>
```

As you can see, it is possible to define the color in three different ways: By name, by index or by its hexadecimal code.

The table below contains all supported default CATIA V5 colors with their index, number and hexadecimal code:

Index	Value	Name		Index	Value	Name
01	0xFFFFFFFF	white		11	0x800000FF	dark red
02	0x000000FF	black		12	0x008000FF	dark green
03	0xFF0000FF	red		13	0x000080FF	dark blue
04	0x00FF00FF	green		14	0x008080FF	dark cyan
05	0x0000FFFF	blue		15	0x800080FF	dark magenta
06	0x00FFFFFF	cyan		16	0x808000FF	dark yellow
07	0xFF00FFFF	magenta		17	0x800040FF	plum
08	0xFFFF00FF	yellow		18	0x804040FF	maroon
09	0x808080FF	gray		19	0xFF0080FF	light purple
10	0xCoCoCoFF	light gray		20	0xFF80FFFF	orchid
21	0xFF80CoFF	hot pink		31	0x008080FF	teal
22	0xFF8080FF	salmon		32	0x008040FF	aquamarine
23	0xEA8466FF	pink salmon		33	0x00FF80FF	spring green
24	0xFF8040FF	pink orange		34	0x00FF40FF	blue green
25	0xFF8000FF	orange		35	0x80FF00FF	chartreuse
26	0xF2A257FF	orange salmon		36	0x80FF80FF	pale green
27	0xFABE47FF	golden yellow		37	0x80FFFFFF	dark slate grey
28	0xFFBE47FF	sandy yellow		38	0xBFCD90FF	light khaki green
29	0xFFFF80FF	pale yellow		39	0xAED19BFF	light sea green
30	0xD3B27DFF	sandy brown		40	0x94C9BFFF	sea green
41	0x7EA297FF	dark grey green		51	0xC4B3D1FF	light lavender
42	0x81CoE8FF	sky blue		52	0xC1C4CoFF	grey-28%
43	0x83AAD6FF	slate blue		53	0x800080FF	purple
44	0x0080CoFF	royal blue		54	0x800000FF	burgundy
45	0x0080FFFF	dodger blue		55	0x808080FF	grey
46	0x8080FFFF	pale blue		56	0xCoCoCoFF	light grey
47	0x8000FFFF	violet				
48	0x333366FF	blue grey				
49	0x8080CoFF	dark slate blue				
50	0x9993BFFF	dark lavender				



Make these modifications only inside the configuration files of the *Customer* folder.

The files inside the *Default* folder must not be modified!

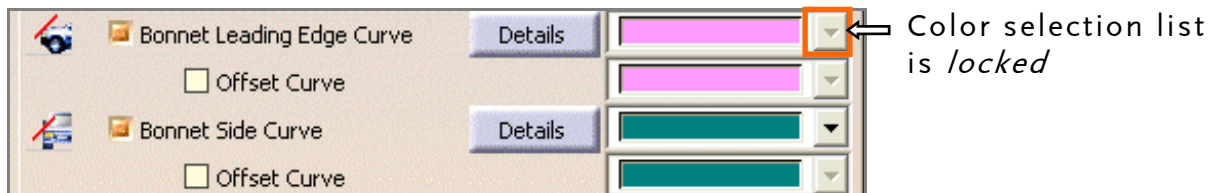
3.7.2 Access control to specific values in CAVA feature dialog boxes

You can define a flag inside the configuration files to limit the access to specific field values in the CAVA user dialog boxes. This flag is named “*access*” and its value has to be set to `readOnly` to lock the field for user input.

Example:

```
<PedestrianProtection>
  <DefaultSettings>
    <Settings name = "TestSettings1">
      <parameter name = "upperBumperColor" access = "readOnly" />
    </Settings>

    <standard name = "Japan (2005)">
      <UseDefaultSettings name = "TestSettings1" />
    </standard>
  </DefaultSettings>
</PedestrianProtection>
```



The table below lists the supported attribute names for Optical properties:

Common attributes:	
• <i>Windshield</i> tab page:	
“refractionIndex”	Refraction Index
“thickness”	Thickness
• <i>Visualization</i> tab page:	
“units”	Units
“showISOCurvesByStep”	Show iso-curves by Step
“isoCurvesCount”	Iso-curves Count
“isoCurvesStep”	Iso-curves Step
“angles”	Color ranges for angle values
“dioptry”	Color ranges for dioptry values
• <i>Settings</i> tab page :	
“raysFromInside”	Rays start from inside
Optical Distortion:	
• <i>Windshield</i> tab page:	
“calculationType”	Calculation Type
Double Image:	
• <i>Settings</i> tab page :	
“useCurvaturePart”	Use Curvature Part
“useQualityPart”	Use Quality Part
“glassQuality”	Glass Quality



Make these modifications only inside the configuration files of the *Customer* folder.

The files inside the folder *Default* must not be modified!

4. Creating CAVA Features—General Proceeding



WORK STEPS

- (1) Start CAVA workbench (if not yet started)—see section 2.2 *Starting Cava Workbench* on page 10.
- (2) Activate in the CATIA specification tree the OpenBody or the GeometricalSet inside of which you want to create the CAVA feature(s).
- (3) Create base-data (if not yet created).
Creating the base-data feature is described in the CAVA OVA user manual.
- (4) Start the desired CAVA function by clicking an icon in one of the CAVA toolbars.
(The icons of several CAVA functions appear only after expanding the tool bar by clicking on the triangle in the upper icon—see at the right.)

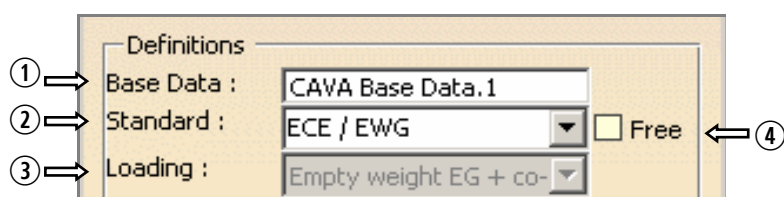


Alternative:

Start the CAVA function in the CATIA *Insert* menu.

After that the dialog box of the respective CAVA function will be opened.

The dialog box below stands as an example for all other dialog boxes; here only those boxes will be described that are used in all dialog boxes. The specific boxes of the individual CAVA functions will be described in the user manual of the respective CAVA products.



- (5) Select base data—click in reference box ①.

For this reference box the base data of the vehicle category must be selected. To do so, click the base-data feature in the CATIA specification tree or in the CATIA workspace. After that, in the text box the name of the selected base data will appear.

- (6) Select the work mode—list box ② and the check box ④.

Select your work mode / the required standard:

- Normally use the standard mode—select in list box ② the required standard or regulation.
- *Free* mode—this mode is used only in case of exception. (Details see below section under *Free* mode on page 44).

Standard Mode

Selecting the desired standard or regulation adopts its values for the further work in CAVA, the values being filled in the different boxes of the feature dialog box. The standards and their values are stored in the configuration files.



When working with one of the standards, some of the boxes are filled with values, but they are deactivated and not editable by the user. This is the normal case, where the values are used which are set by the standard.

Besides the boxes filled with the standard values, the function dialog box may contain other boxes that must (or may) be filled by the user.

Free mode

The *Free* mode is activated by checking the *Free* check box ④ (on the right of the *standard* list box).



Precondition:

Using *Free* mode must be allowed (in the CATIA menu *Tools > Options > Infrastructure > Cava Vehicle Architecture* > on the *Administration* tab card the *Enable Free Status* option must be activated; cf. on page 17).

Activating *Free* mode deactivates the *standard* list box; in a part of the boxes of the respective dialog box now arbitrary values, deviating from those of the standards, can be specified.

The *Free* mode in CAVA is the atypical mode, because this mode ignores the standard values so that CAVA can not check on compliance with the standards. In *Free* mode CAVA compares the geometry with arbitrary values. This allows the user to test the effects, resulting from value modifications—unimpeded by the standards value limits.

In order to exclude confusions between features modified in *Free* mode with ones that have been checked on standard compliance, the names of features edited in *Free* mode are marked with the name suffix “Free mode” (see fig. below).



Precondition:

In the CATIA menu *Tools > Options > Infrastructure > Cava Vehicle Architecture* > on the *Defaults* tab card the *Extend Feature-Name by Standard Name* option must be activated.





When unselecting *Free* mode to return to *Standard* mode, the following confirmation prompt will be displayed.

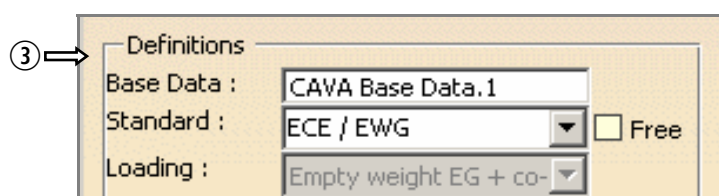


If you confirm with OK, your entries will be discarded, the last used standard will be reactivated.

(7) Select loading—list box ③

Attention: A loading can be selected only in *Free* mode.

In *Standard* mode the loading is predefined by the selected standard.



The list box ③ contains all loadings that are activated in the base-data dialog box on the *Preconfigured Loadings* and *User-Defined Loadings* tab cards (see CAVA OVA manual).

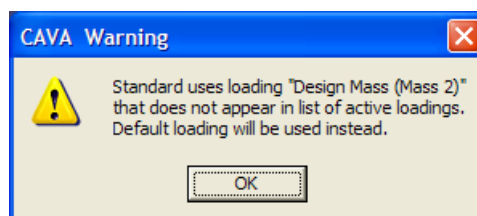


In the following CAVA functions you can select a separate loading plane for the front and the rear:

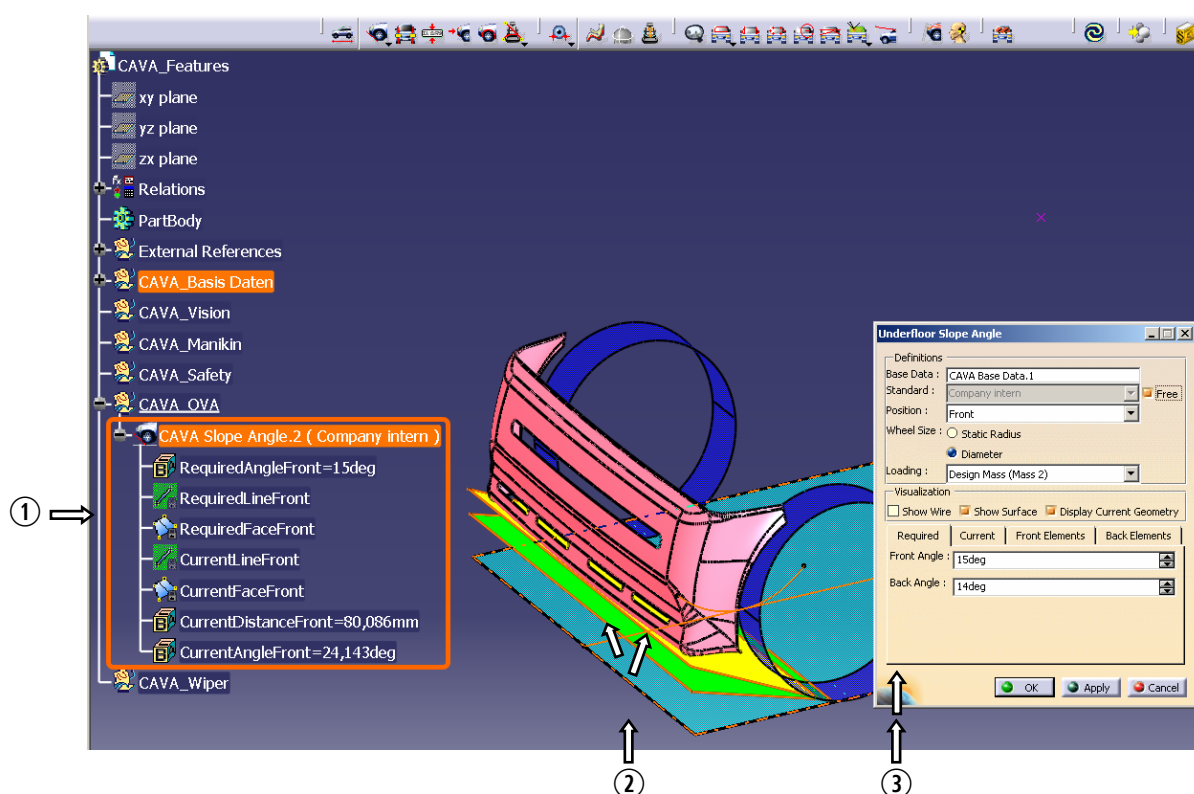
- Slope Angle
- Static Curb
- Dynamic Curb
- Number Plate

In the configuration file for the respective CAVA function a special loading is defined for each standard. If while creating a new feature or while editing an existing feature (e. g. when switching to an other standard)

CAVA can not find in the list the respective loading, or if this loading is deactivated, an error message is displayed, saying that instead of the required loading the *Default* loading will be used. Normally, this is the loading titled "*No Loading*", which in CAVA is available in every case.



Depending on the selected CAVA function, the definition of the CAVA feature may be accomplished with the described steps, or it may be necessary to input data in other boxes of the dialog box. When all required data is entered in the dialog box and the OK button of the dialog box is pressed, the respective CAVA feature will be created. For most of the features the required values (that are set according to the selected regulation or standard or are defined by the user arbitrarily) will be visualized (if this option is activated) in form of surfaces or wires, representing the area boundaries, as well as in form of points, lines, surfaces or other. The newly created CAVA features will be added also to the specification tree (see fig. below).



Example figure: Adding a CAVA feature

- ① Features, added to the specification tree for the CAVA function “SLOPE ANGLE”
- ② CAVA geometry, added for this function to the CATIA workspace to visualize the required value geometry and the current value geometry (the required value geometry here is shown in yellow, the current value geometry in green).
For representation of the measurement lines and measurement results see section Visualization of the Measurement Results in CATIA on page 54.
- ③ The dialog box for this CAVA function.

(8) Working with the feature

The specific advices for the features are given in the user manuals of the respective CAVA functions.



In all CAVA value boxes that are associated with a unit of measurement (mm, deg etc.), only the value must be entered or adjusted. The unit of measurement can be deleted or overwritten when entering the value—it will be added thereafter automatically.

• CAVA Symbols

• Lock symbol



A number of spinner boxes in the CAVA dialog boxes is labeled with a lock symbol, the spinner box itself being grayed out. The value in spinner boxes with such a symbol is a calculated value and can not be changed by the user; he is displayed for user information.

• CAVA assessment icons



No Calculation No calculation is possible (e.g. because the selected element can not intersect the geometry of the CAVA feature).



Not Available The user did not select elements—the elements list is empty.



Not defined The field of view is not defined in the respective standard.



OK The measurement result is within the range, allowed by the required value.



Error The selected element (the current geometry) is outside of the range, allowed by the required value and collides with the geometry of the CAVA feature (required geometry).

4.1 Opening Feature Dialog Boxes

To open the dialog box of an existing feature for editing, several alternative ways can be used:

- double-clicking the feature in CATIA workspace *or*
- double-clicking the feature in the specification tree *or*
- selecting the feature in the specification tree and clicking in the context-sensitive menu the „Definition“ item.

4.2 CAVA Measurements

Certain of the CAVA functions comprise measurement facilities. The measurements in CAVA are performed by the means of the dialog boxes. The measurement results are visualized in the dialog boxes on the *Current* tab card, in the specification tree and (optionally) also in the CATIA workspace (see section Visualization of the Measurement Results in CATIA on page 54).

The measurements in the dialog boxes may be performed immediately when creating a CAVA feature or later in the course of the design process. To do that, it must be clicked on the feature in the specification tree, what will reopen the dialog box for editing. Measurements, of course, can be performed only in dialog boxes of those features that are provided with measurements.

For the measurements two modes are available:

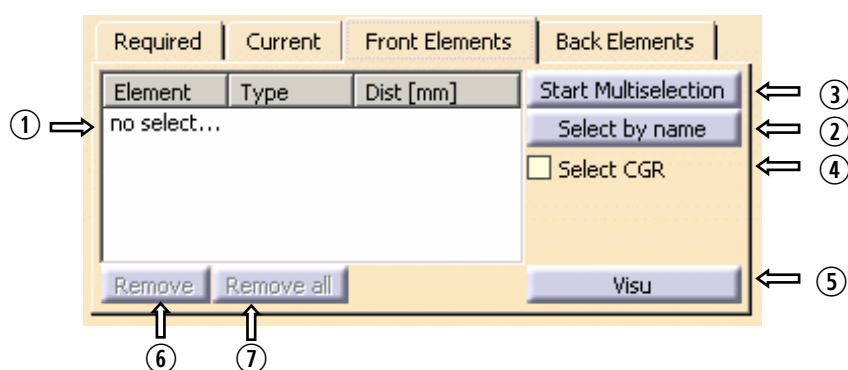
- Automatic: — The measurements are updated automatically.
(In this case the *Recalculate* button is deactivated.)
- Manual: — The measurements are performed after pressing the *Recalculate* button.

The measurement mode can be set under *Tools > Options > Infrastructure > Cava Vehicle Architecture* on the *Defaults* tab card with the *Update of measurements* radio buttons.


As a precondition for the respective concrete measurement first the geometries to be checked are to be selected. This will be explained below.

Selection of Geometries

The dialog boxes of the features where measurements are defined have one or several elements tab cards allowing to select the geometries to check. (On our example figure you can find the tab cards *Slope Angle > Front Elements* and *Back Elements*.)



- ① After having opened the respective elements tab card, select by mouse clicking in the model (on the CATIA workspace or in the specification tree) one or several elements to check. These elements will be included in the list in list box ①.

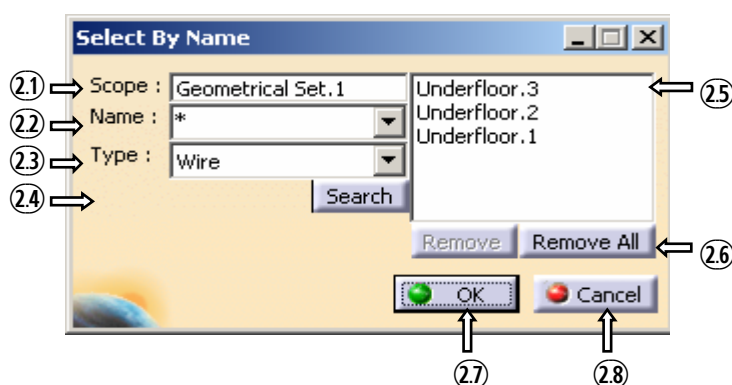
- ②  If this button is pressed, a dialog box will be opened facilitating the selection of several elements that have uniform properties. The dialog box allows to search for elements within a selected branch of the specification tree ("scope") by their name and type, to make a selection of the found elements and to add the selection to the element list for the measurements.



Attention:

The user must take care to select the right elements, corresponding to the respective CAVA function and to the element type of respective element tab card. Otherwise measurement results will be obtained that are completely wrong!

As CAVA can not distinguish whether the selected elements correspond to the respective CAVA function, it is however possible to assign e.g. to the *Front Elements* tab card elements situated in the vehicle's back part. With these misattributed elements measurements can be executed in a (seemingly) normal way—but the measurement results will be completely useless!



- ②① *Scope* text box

Define in this box the branch, in which the element search is to be executed. To do so, activate the text box by clicking on it and select in the CATIA specification tree the branch (e.g. a certain geometrical set, part or other) by clicking on it. The name of the branch then will be taken over in the text box.

- ②② *Name* combo box

Enter here a name for the feature to search (or a part of a name); wildcards (*) can be used.

- ②③ *Type* list box

Select a type.

- ②④ *Search* button

- ②⑤ After having entered in the boxes ①...③ the search specifications, press this button. This will start the search for features, having the specified properties.

The search results will be displayed in list box ⑤.

Notes:

(1) The search results list is static, i.e. it contains only the elements existing at the moment when the search is executed. If after the search operation new elements will be added to the model, matching the search specifications, however they will not be added automatically to the measurement element list.

(2) Starting a new search will not delete the search results of the previous search; the new search result will be added to the search results list.

②.6 *Remove* and *Remove All* buttons:


With these buttons respectively individual elements selected in the search results list and whole the list may be deleted.

②.7 *OK* Button

When this button is pressed, the elements of list ⑤ will be added to the elements of the measurement elements list.

②.8 *Cancel* Button

This button closes the dialog box, the search results being discarded.

③  After pressing this button, a toolbar is opened offering several multi-selection tools.



The symbols on the left side of the toolbar correspond to the known CATIA V5 trap areas:

- Selection by mouse pointer– additionally multi selection in spec tree by using „Ctrl“ or „Shift“ key.
- Selection Trap
- Intersection Trap
- Polygon Trap
- Paint Stroke Selection
- Outside Trap Selection
- Intersection Outside Trap Selection

The text field displays the number of elements that are currently selected.

- List of selected items – Opens a list containing the currently selected elements.
- Finish – Closes the multi selection dialog. The current selection is transferred to the CAVA element list.



After starting the multi selection and appearance of the tool bar, the meaning of the button changes to „End Multiselection“.

If you press this button the current selection will not be transferred to the CAVA element list.

This button is helpful if the user want to discard the current selection.



Attention!

If the current selection should be transferred to the element selection list in the CAVA function you mandatory have to click the *Finish* button in the multi selection tool bar.

④



If this option is activated, features that are represented in form of CGR data can be selected as such, and will not be converted into design mode data. (CGR data are features, which are available in the model in visualization-mode.) CAVA performs calculations with CGR data on the basis of their tessellation. If this option is not activated, CGR data will be converted into design-mode data, what could result in a too high computation-intensity of CAVA checks.



Note

Using CGR data for CAVA checks may lead to minor deviations in comparison to calculation using design-mode data.

⑤



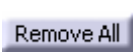
When this button is pressed, a dialog box will be opened where the settings for the visualization of measurements can be made (see section 3.5 *Measurements* Tab Card on page 28.)

⑥



To delete an element from the list, select it by mouse click and click then on the *Remove* button.

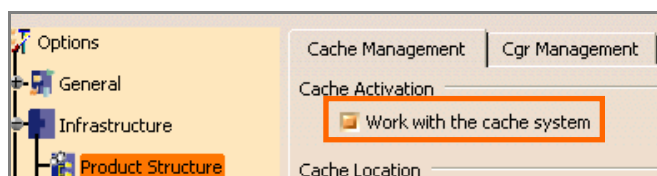
⑦



Click on the *Remove All* button to delete all elements of the list.

• Using STL-Data

If you want to work with STL-data that are inside a product or a part it is recommended to enable the “work with the cache system” option in the CATIA settings.



The STL-data are automatically converted to CGR-data and can be used inside the CAVA dialog boxes in the same way.

Required tab card

This tab card contains the required values (i.e. desired values or set values—the values that the feature must have) for the respective CAVA feature (in our example the *Front and back slope angle* feature). In *Standard* mode the required values are taken from the standard, selected for the respective CAVA feature. The user can enter its own required values only in *Free* mode (i.e. when the *Free* option is activated)— see *Free* mode on page 44.

Required	Current	Front Elements	Back Elements
Front Angle :	15deg		
Back Angle :	14deg		

Current tab card

This tab card shows the results of the measurements in form of a symbol and the corresponding value difference for each measurement.

The measurement is performed as comparison of the current values of the elements on the elements tab card(s) with their required values (see *Required Values* tab card). Depending on the *Update of Measurements* setting (see section 3.3 *Defaults* Tab Card on page 23), either the measurement results are updated automatically, or the *ReCalculate* button ① must be pressed to get the up-to-date measurement result.

Required	Current	Front Elements	Back Elements
Front Distance :	191,028mm		
Back Distance :	No Calculation		
Front Angle :	90deg		
Back Angle :	Not Available		

ReCalculate

- ① Values of the difference between required and current value



Irrespective of the number of elements, listed on the element tab card(s), on the *Current* tab card for all measurements one only value will be displayed (see fig. above). This displayed value is the value for that element, one point of the geometry of which is (compared to the other elements) situated closest to the measurement reference plane (in case of positive distance values) or most distant from this latter (in case of negative distance values). The distance is measured on the normal of the loading plane that runs through this point.

The measurement results for all elements are indicated on the elements tab cards (on the example figure the *Front elements* and *Back Elements* tab cards).

Required	Current	Front Elements	Back Elements												
<table><tr><th>Element</th><th>Type</th><th>Dist [mm]</th></tr><tr><td>Front Bu...</td><td>GEOM 2D</td><td>191,028</td></tr><tr><td>Surface.3</td><td>GEOM 2D</td><td>227,001</td></tr><tr><td>Surface.5</td><td>GEOM 2D</td><td>173,327</td></tr></table>			Element	Type	Dist [mm]	Front Bu...	GEOM 2D	191,028	Surface.3	GEOM 2D	227,001	Surface.5	GEOM 2D	173,327	<div>Select By Name</div> <div><input type="checkbox"/> Select CGR</div>
Element	Type	Dist [mm]													
Front Bu...	GEOM 2D	191,028													
Surface.3	GEOM 2D	227,001													
Surface.5	GEOM 2D	173,327													
Remove RemoveAll		Visu													

② • CAVA assessment icons



No Calculation No calculation is possible (e.g. because the selected element can not intersect the geometry of the CAVA feature).



Not Available The user did not select elements—the elements list is empty.



Not defined The field of view is not defined in the respective standard.



OK The measurement result is within the range, allowed by the required value.



Error The selected element (the current geometry) is outside of the range, allowed by the required value and collides with the geometry of the CAVA feature (required geometry).

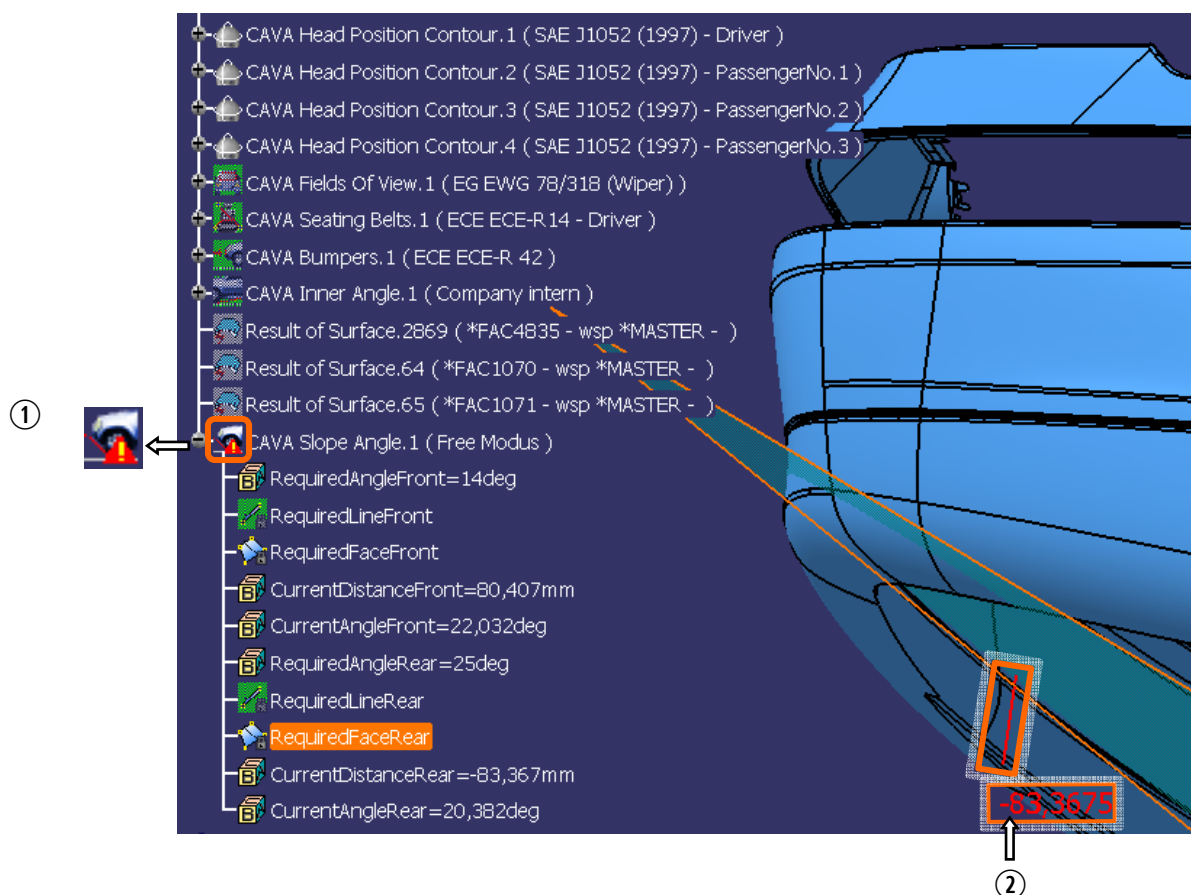
③ *ReCalculate* button

Press this button to start the manual measurement (if no automatic measurement was set).

This button is active only if under *Tools > Options > Infrastructure > CAVA Vehicle Architecture* on the *Defaults* tab card for the *Update of measurements* setting the *Manual* option is selected.

Visualization of the Measurement Results in CATIA

Besides of displaying on the *Current* tab card, the measurement results also are visualized in the CATIA workspace (measurement line and, if activated, measurement value) as well as in the CATIA specification tree (warning triangle icon for failed elements).



① Warning triangle icon

This icon in the specification tree (which is combined with other CAVA icons) signals that the CAVA feature contains (at least) one element, which does not comply with the required values. (The icon does not show how many elements in total are failed.) As soon as the measurement results in OK elements, the normal icon of the CAVA feature without warning triangle will be displayed.



Note: The icon indicates that the respective CAVA feature contains an error in general. Beside of the non-compliance with the required value described above this might be also result from insufficient or wrong data entry.

② Measurement line and measured value

Whether the measurement line and the corresponding measured value are displayed and how they are displayed, depends from the visualization settings (see 3.5 *Measurements Tab Card* on page 28).

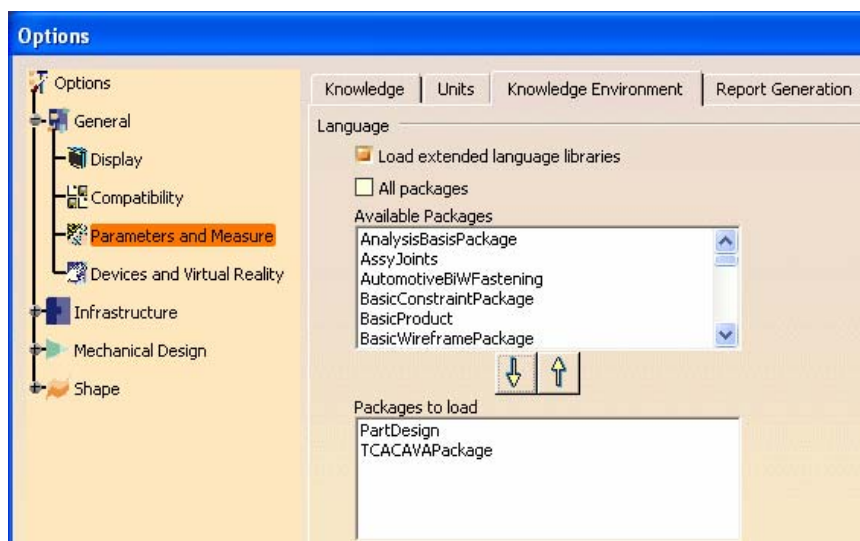
5. Knowledgeware

Additionally to check facilities provided by CAVA itself, it is also possible to use knowledgeware for certain checks (e.g. to check on the existence of features or to check whether a feature uses certain standards). The knowledgeware tools of CATIA allow the user to define his own specific checks.

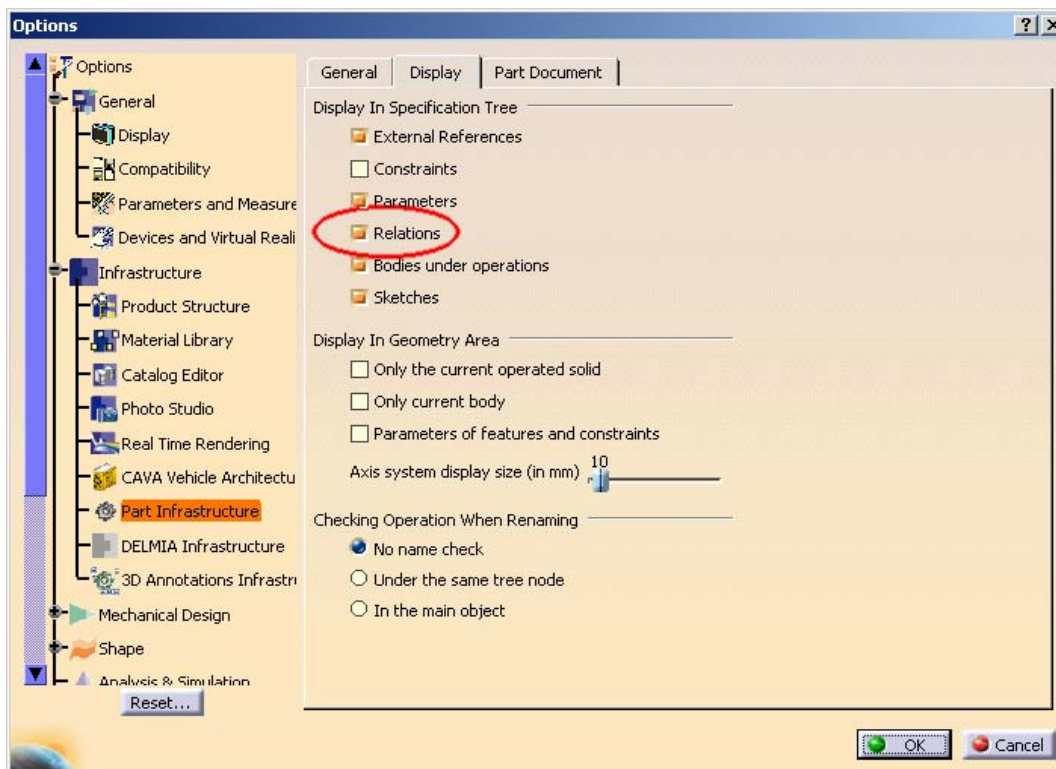
5.1 Settings for Work with CATIA Knowledgeware

In order to be able to use the CATIA-Knowledgeware Check and Report Tool for CAVA, some settings are to be done:

- Select in the dialog box under *Tools > Options > General > Parameter and Measure* on the *Language* tab card, which library do you want to load.
- If only the *Load extended language libraries* option is selected, it is to be ensured that the List of the Packages to load (on the right) contains the libraries „*TCACAVAPackage*“ and „*PartDesign*“. (The *PartDesign* library gives access to all general data and functions on Part level.)



- If you have activated the *All packages* option, verify whether the list contains the *TCACAVAPackage* library.
- Loading all packages can result in a sensible loss of system performance as a considerable part of the RAM will be occupied by the packages.
- In the dialog box *Tools > Options > Infrastructure > Part Infrastructure* on the *Display* tab card select the *Relations* option (see figure below). Only if this option is activated, the knowledgeware checks will be displayed in the specification tree.



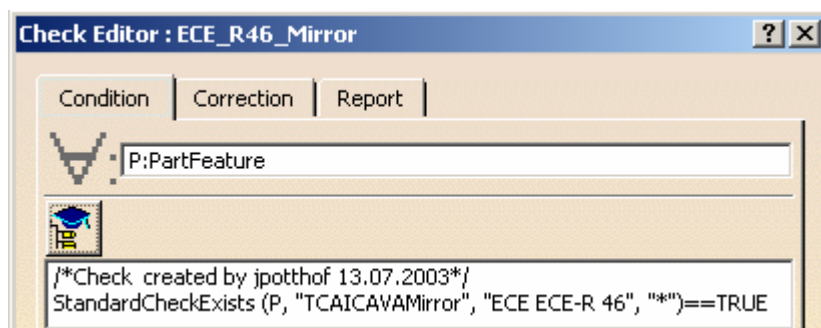
5.2 Check Possibilities of Knowledgeware

At the moment there are two kinds of checks that can be defined for CAVA by the means of CATIA knowledgeware:

- (1) Checking for the existence of certain CAVA features in Part or Product.

Example:

Checking whether in a CATPart a CAVA feature of the *mirror* type exists, that uses the EG ECE-R 46 standard (see fig. below).



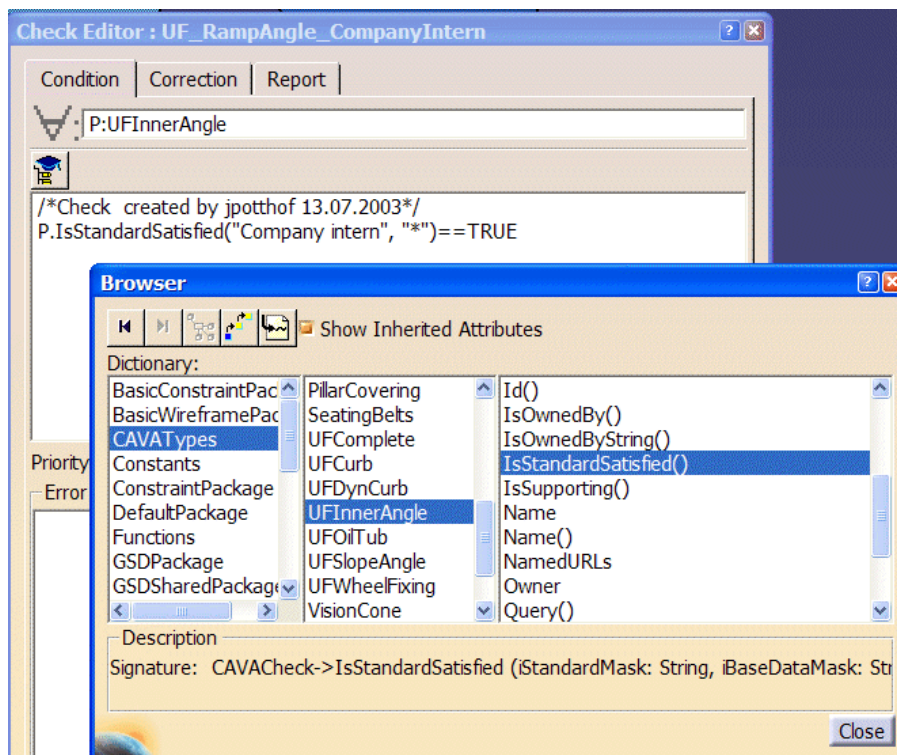
- (2) Checking whether CAVA features of a certain type comply with certain requirements (e.g. used standard or link to a certain basis-data feature. Input for these checks is here the feature type).

**ATTENTION**

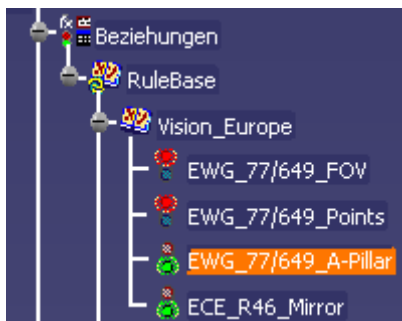
If no geometry has been selected, the check nevertheless will give an OK result!

Example:

Checking whether the existing CAVA features of the *Inner Angle* type that use the *Company intern* standard, are OK or not—i. e. if they are linked with a geometry, whether the geometry complies with the requirements or not.



If the checks result in OK, in the specification tree in the *Relations* branch the green traffic-light icon will be displayed; otherwise the red traffic-light icon will signal an error.



6. Geometry-Export Tool

The feature geometries created by CAVA initially are available only inside of CAVA. To make them available for users that do not have CAVA, the CAVA geometries must be exported into CATIA. The CAVA export tool exports the geometries of a selected CAVA feature into a Geometrical Set. The origin CAVA-*Feature* after export operation will be kept.



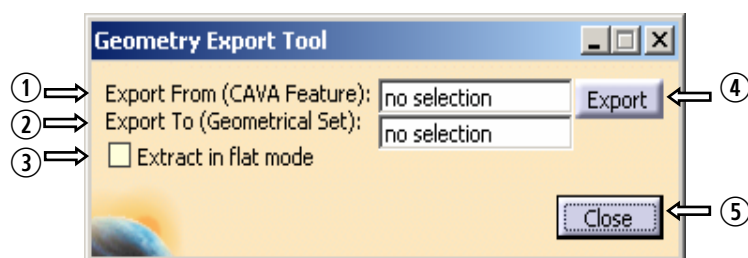
The colors defined for the CAVA geometry remain the same in the exported geometry.

• Opening the dialog box

The Geometry-Export Tool is started in the CAVA workbench by clicking the *CAVA Export Tool* icon on the *Report* tool bar.



After clicking the following dialog box will be opened:



① *Export from* list box

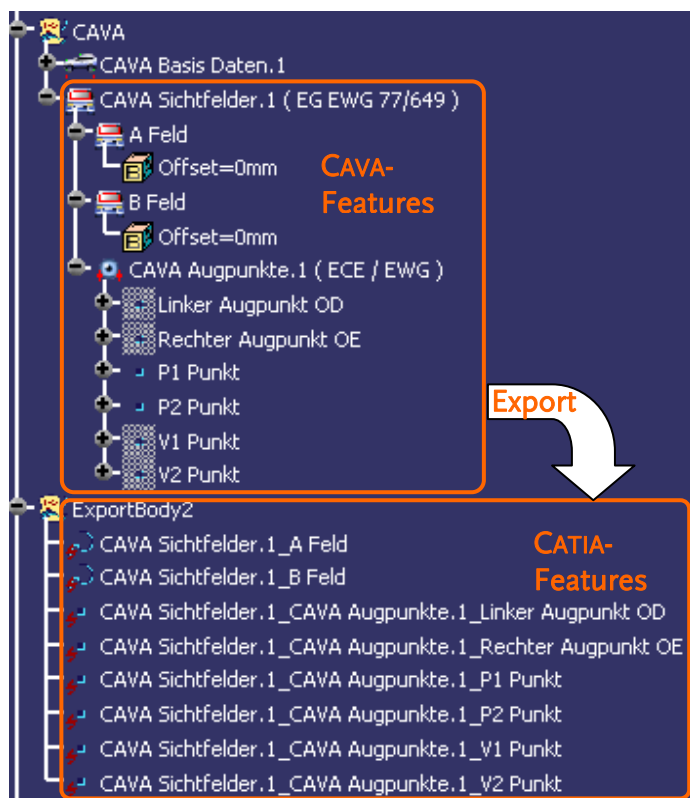
Select a CAVA feature the geometry of which is to be exported.

② *Export to* list box

Select a Geometrical Set, in which the exported geometry is to be inserted.

③ *Extract in flat mode* check box

- When this option is activated, the exported geometry will be created in the target Geometrical Set without children elements; all geometries will be inserted in the specification tree in one level only (see fig. below).



- When this option is deactivated, depending on the exported feature, additional structures (Geometrical Sets) possibly might be generated, containing e. g. certain geometries.

④ *Export* button

When this button is pressed, the export of the selected feature will be started.

⑤ *Close* button

When this button is pressed, the dialog box will be closed.

7. Report Tool



The aim of the CAVA Report Tool is to export data from a CAVA feature into a report file. This allows you to have clearly arranged on one data sheet all required values from the selected standard and the CAVA check result values. You can print out this data sheet and then you have the CAVA checks also available as a hardcopy.

The CAVA Report Tool provides different types of output files (.txt, .xls, .xml, .html, .CATDrawing). To some of these report types you can add screenshots (for instance of the CATIA model).

For the creation of the reports CAVA uses an existing template of the selected report type (refer to point ① below). This template is filled with the current values of the selected CAVA feature and then it is saved at the location defined by the user (refer to point ② below).



At delivery state there are only a few example template files available because the content is very specific for each company. You will have to create your own report templates that fit to your own special needs.

Dictionary file

The dictionary file is used to make the creation and customization of the report templates easier for the user. The dictionary file contains the CAVA internal identifier and an alias name for each of them. So the user can take these understandable expressions in the report template file to define the content of the report.

The dictionary file (TCACAVADictionary.xml) has to reside in the Report/Admin directory, which is defined in the CATIA menu under *Tools > Options > Infrastructure > CAVA Vehicle Architecture/Templates => CAVA Report => Admin Directory*.

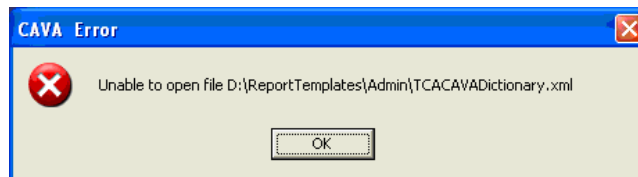
• Opening the dialog box

The report-functionality can be reached by clicking the icon „CAVA Report Tool“ from the *Report*-toolbar in the CAVA Workbench.





If the following message appears after clicking the report icon, you did not define the correct path to the dictionary file (TCACAVADictionary.xml).

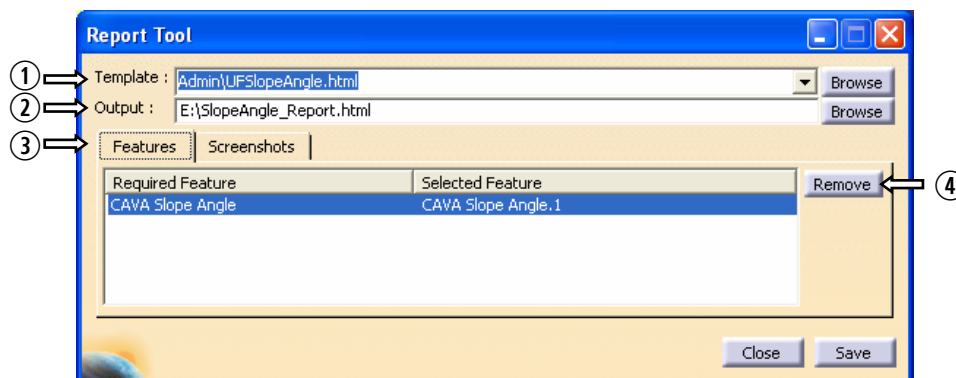


Confirm this message with *OK*. A file selection box will open where you have to define the correct path to the dictionary file (TCACAVADictionary.xml). So the dictionary file is now available for this unique creation of this report. But you will have to repeat this procedure for each single report you create. Because of that it will be better to proceed in the following way:

Open the CAVA settings (Tools/Options/CAVA Vehicle Architecture/Templates => CAVA Report => Admin Directory).

The dictionary file (TCACAVADictionary.xml) has to reside in the directory that is defined here.

After clicking on the *Report* icon, the following dialog box will open:



① Template

Here you can select a template that should be used for the creation of the report. The selection list contains all templates that are located in the *Admin* and in the *User* directory defined in *Tools > Options > Infrastructure > CAVA Vehicle Architecture > Templates* section *CAVA Report*.

At the moment the following file types are available for the report creation:

- TXT
- XLS
- XML
- HTML
- CATDrawing

Below you find an example of a template for the *Slope Angle*:

```
#####
#   Text report for Slope Angle   #
#####
Front slope angle
=====
Required Angle:      <tca:insert feature="TCAICAVAUFSlopeAngle"
                      param="FrontReqAngle">
Current Angle:      <tca:insert feature="TCAICAVAUFSlopeAngle"
                      param="FrontCurrAngle">

Back slope angle
=====
Required Angle:      <tca:insert feature="TCAICAVAUFSlopeAngle"
                      param="BackReqAngle">
Current Angle:      <tca:insert feature="TCAICAVAUFSlopeAngle"
                      param="BackCurrAngle">

Xixi V5Parameter:      <tca:insert v5parm="xixi">
Date in "dd/mm/yy" format: <tca:insert date="dd/mm/yy">
Date in "dd/mm/yyyy" format: <tca:insert date="dd/mm/yyyy">
Time in "hh:mm" format: <tca:insert time="hh:mm">
Time in "hh:mm:ss" format: <tca:insert time="hh:mm:ss">
Username: <tca:user>
DocName: <tca:docname>
CAVA version: <tca:cavaversion>
```

② Output

Here you have to select the target directory where you want to save the created report file. The saved file has the same file type as the selected template.



You can set a system variable to define a default output directory that is preselected if the *Browse* button is pressed. The name of the variable is TCA_CAVA_REPORT_OUTPUT_DIR.

③ Features

• Required Feature

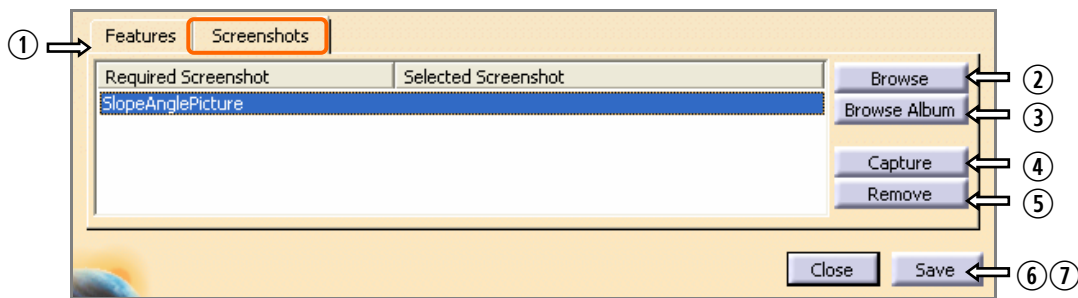
Depending on the selected report template, the required CAVA feature type is displayed in this column. Depending on the definitions in the selected report template there could be several required CAVA feature types for one CAVA feature report.

• Selected Feature

For each required CAVA feature type you have to select one CAVA feature from the model.

④ Remove

Use this button to remove one of your selected CAVA features from the list. Mark the CAVA feature that has to be deleted and press the *Remove* button.



① Screenshots

Some of the template types (e. g. HTML) allow to insert a screenshot into the report file. In the table on this tab card you can add a screenshot of your model for each required screenshot that is defined by the used report template. The handling is described below in the points ②-④.

At the moment there is no automatic integration of screenshots for the file types `.txt`, `.xls`, `.xml` and `.CATDrawing` by CAVA functionality. But you can add the screenshots by hand after creation of the report (if the file type supports images).

② Browse

This button opens a file selection box to choose the screenshot file that should be included in the report.

If you do not have a screenshot file yet, you can use the *Capture* button to create one. (Please refer to point ④).



You can set a system variable to define a default screenshot directory that is preselected if the *Browse* button is pressed. The name of the variable is `TCA_CAVA_SCREENSHOT_DIR`.



Please assure that you select a file type for the screenshot that can be handled by the template. (Use the image type `.gif` or `.jpg` for the HTML template.)

③ Browse Album

Use this button if you want to load an image file from the CATIA Album. This album is a standard folder named *Album* that is defined in the CATIA settings. By default, the *Album* folder is a subfolder of the *CATTemp* directory.

If the album does not yet contain the appropriate screenshot file you can use the *Capture* button to create one. (Please refer to point ④).



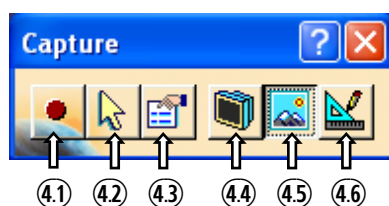
For the administration of the album you can also use the CATIA menu `Tools > Image > Album`.

④ Capture

Use this button to create screenshots from your model. A dialog box will open.



The *Capture* functionality is a built-in CATIA function. It can also be accessed via the CATIA menu item `Tools > Image > Capture`.



For detailed information about the *Capture* function consult CATIA help.

④.1 Capture

Click on this button to create an image file of the marked screen area (see ④.2 to ④.6).

④.2 Select Mode

This button activates the selection frame to define the area for the screenshot.

④.3 Options

This button opens a dialog box where you can define several settings for the screenshot. (For detailed information please refer to the CATIA documentation.)

④.4 Screen Mode

If this option is active, the *Capture* button will create a picture from the whole screen.

④.5 Pixel Mode

Activate this option to capture the screen in pixel mode.

④.6 Vector Mode

Activate this option to capture the screen in vector mode.

⑤ Remove

Use this button to remove one element from the List. Mark the elements in the list that you want to delete and click on the *Remove* button.

⑥ Close

Use this button to close the report dialog box. If you have not created the report before, all the settings in the dialog will be lost.

⑦ Save

Use this button to create and save the report in the defined *Output* folder.

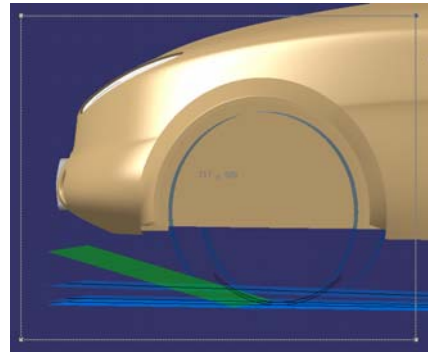
Creating a screenshot

Use the e.g. the *Select* mode and mark the screen area that is relevant for the visualization in the report.

Click then on the *Capture* button.



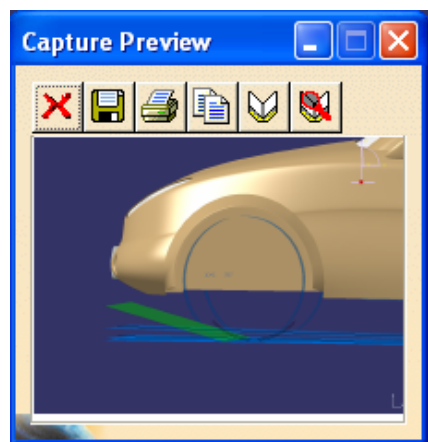
→ The *Capture Preview* dialog box opens.



In this dialog box, use the button *Save As* to save the screenshot at a location of your choice.

Or:

Use the button *Album* to save the screenshot in the CATIA Album. In this case you do not need to specify a location. The album path is already defined in the CATIA settings.



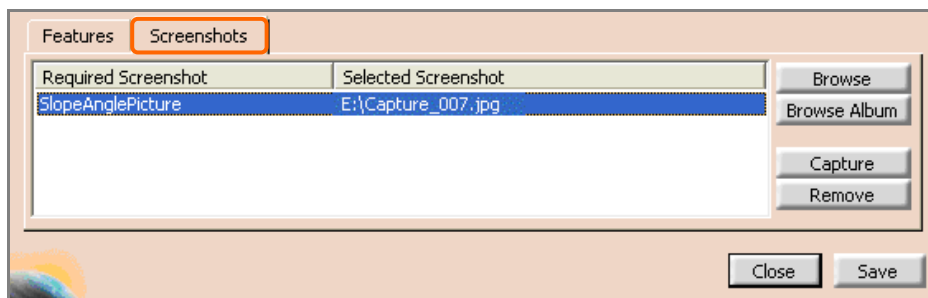
Close the preview window and also the *Capture* dialog.

Adding a screenshot to the screenshot list

Use the *Browse* or *Browse Album* button to add a screenshot file to the list.

(See point ②)

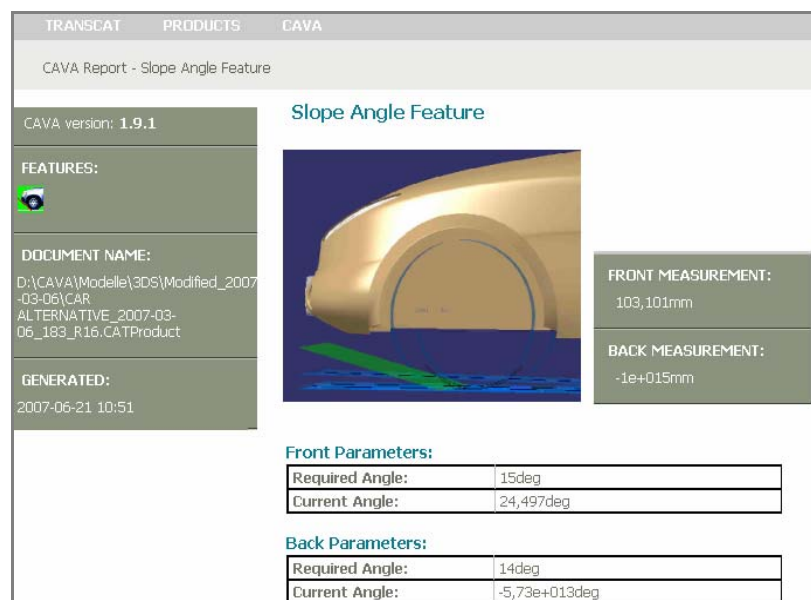
- If you have used the *Save As* option to save the screenshot file, you will have to use the *Browse* button to open the file selection dialog and choose the folder that contains the screenshot file. Select the file and click on the *Open* button. The path of the screenshot file is now added to the *Selected Screenshot* column of the screenshot list.
- If you have used the *Album* option to save the screenshot file, you will have to use the *Browse Album* button to select a screenshot file from the Album. Select the file and click on the *Open* button. The path of the screenshot file is now added to the *Selected Screenshot* column of the screenshot list.



Result

In the figure on the right, you see an example of a HTML report for the slope angle.

The content and design of the HTML document is, as mentioned above, configurable. Edit the template file to adjust the content and/or the design to your own needs.





Important Information for the use of .xls template files

If you use an *Excel* sheet as template for the report creation, you have to respect the following design rules:

- Only the first sheet is read.
- The first row defines the amount of columns to be read.
- The first column defines amount of rows to be read.

The application recognizes only one area which is defined by the first row and the first column under the condition that the cells of the first row and first column all must be filled with at least one character.

This means that each cell of the first column and of the first row that in the report should look empty in the *xls* document must contain at least a blank.

Below you can find an example of a template in *.xls* format. All the yellow cells (which seem to be empty) contain blanks.

Result: All columns from A to H and all lines from 1 to 31 can be recognized by the application.

	L37								
	A	B	C	D	E	F	G	H	I
1									
2	TRANSCAT								
3	A DASSAULT SYSTEMES COMPANY								
4									
5	Report for CAVA Wheel Covering feature								
6	Date:		<tca:insert date="mm"						
7	Time:		<tca:insert time="hh:m"						
8	CAVA version:		<tca:cavaversion>						
9	Created by user:		<tca:user>						
10	From document:		<tca:docname>						
11									
12	Aliases:								
13	Base Data:		<tca:insert feature="CAVA Wheel Covering" param="Base Data Name">						
14	Standard:		<tca:insert feature="CAVA Wheel Covering" param="Standard Name">						
15	Loading:		<tca:insert feature="CAVA Wheel Covering" param="Loading Name">						
16									
17	Front Alpha:		<tca:insert feature="CAVA Wheel Covering" param="Front Alpha">						
18	Front Beta:		<tca:insert feature="CAVA Wheel Covering" param="Front Beta">						
19	Back Alpha:		<tca:insert feature="CAVA Wheel Covering" param="Back Alpha">						
20	Back Beta:		<tca:insert feature="CAVA Wheel Covering" param="Back Beta">						
21	Triangle Height:		<tca:insert feature="CAVA Wheel Covering" param="Triangle Height">						
22	Line Height:		<tca:insert feature="CAVA Wheel Covering" param="Line Height">						
23	Bottom Offset:		<tca:insert feature="CAVA Wheel Covering" param="Bottom Offset">						
24	Tolerance:		<tca:insert feature="CAVA Wheel Covering" param="Tolerance">						
25	Front Wheel Covered:		<tca:insert feature="CAVA Wheel Covering" param="Front Wheel Covered">						
26	Back Wheel Covered:		<tca:insert feature="CAVA Wheel Covering" param="Back Wheel Covered">						
27									
28	CAVA Names:								
29	Base Data:		<tca:insert feature="CAVA Wheel Covering" param="BaseDataName">						
30	Standard:		<tca:insert feature="CAVA Wheel Covering" param="Standard">						
31	Loading:		<tca:insert feature="CAVA Wheel Covering" param="Name">						

8. Drawing Text Automation

The *Drawing Text Automation* functionality enables you to link specific drawing text to a CAVA feature in a loaded part.

For documentation or homologation of the vehicle, it is often necessary to generate drawings of the CAVA feature. The drawing creation of the geometry uses common V5 functionality. But there is also the need to have texts with parameters inside the drawings, e.g. "Slope Angle current: 12.012deg" or "used standard: ECE xxx".

In CATIA V5 it is possible to add a link to an existing V5 parameter to a drawing text (the box of the drawing text must be marked "green"; then use right mouse button to get "Attribute Link" > select V5 parameter (in different part) > select parameter in the opened list and click *OK*. The parameter value will be inserted in the text and keep there its associativity. This is the way it can be handled interactively but linking each parameter takes is very laborious.

The CAVA *Drawing Text Automation* accomplishes all this tasks for you. It provides a user-friendly dialog where you can do the required settings and then you will have the result for a couple of parameters within a few mouse clicks.



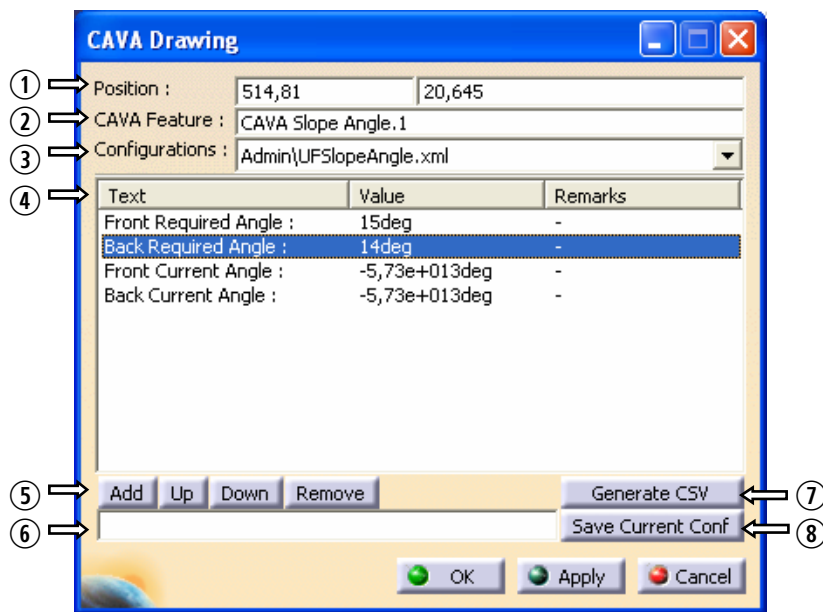
Prerequisites:

- To use the *Drawing Text Automation* functionality you need to have activated the "Use Cava Drawing Automation" option in the CAVA settings (*Tools > Options > Infrastructure > Cava Vehicle Architecture > "Templates" tab card > section "CAVA Drawing"*). Otherwise you cannot start the dialog because the Toolbar is not present in the Drafting workbench.
- The part that contains the CAVA feature which you want to link to the drawing text has to be loaded.
- The dictionary file (`TCACAVADictionary.xml`) must reside in the directory that is defined in the CAVA settings for the CAVA Report Admin-directory (*Tools > Options > Infrastructure > Cava Vehicle Architecture > "Templates" tab card > section „CAVA Report“ => Admin Directory*).

• Opening the dialog box

If you have started CATIA with the CAVA environment, you find a new toolbar in the *Drafting* workbench, named CAVA DRAWING. The *Drawing Text Automation* functionality can be reached by clicking the icon „CAVA Drawing“.





① Position

Indicate with the mouse pointer where you want to place the text in the drawing and click the left mouse button. The *x* and *y* coordinates are inserted in the two fields.

The anchor point of the drawing text is set by default to *Top/Left*. But after creation of the text you can change it, using the “*Properties*” context menu.

② CAVA Feature

Select the CAVA feature from the model in the 3D part for which you want to link the parameter to the 2D drawing. (The 3D part must be loaded).

③ Configurations

List of available configurations for the selected CAVA feature. On the basis of these files you can predefine the drawing text that is created by the *CAVA Drawing Text Automation* functionality. This list contains all configurations from the *Admin* and the *User* directory which are defined in the CAVA settings (*Tools > Options > Infrastructure > Cava Vehicle Architecture > Tab card “Templates” > Section “CAVA Drawing”*).

The configuration files are XML based and can be easily adopted (see example below). The file contains the CAVA feature name (`tca:insert feature`), the parameter name (`param`) and the text (`paramstext`) that should be displayed in the *CAVA Drawing Text Automation* dialog box.

Example of a configuration for the Slope Angle (`UFSlopeAngle.xml`) :

```
<TCACAVAUFSlopeAngle>
  <tca:insert feature="CAVA Slope Angle" param="RequiredAngleFront" paramstext="Front
    Required Angle : "/>
  <tca:insert feature="CAVA Slope Angle" param="RequiredAngleRear" paramstext="Back
    Required Angle : "/>
  <tca:insert feature="CAVA Slope Angle" param="CurrentAngleFront" paramstext="Front
    Current Angle : "/>
  <tca:insert feature="CAVA Slope Angle" param="CurrentAngleRear" paramstext="Back
    Current Angle : "/>
</TCACAVAUFSlopeAngle>
```

Dialog box using the example configuration file „UFSlopeAngle.xml”:

Text	Value	Remarks
Front Required Angle :	15deg	-
Back Required Angle :	14deg	-
Front Current Angle :	-5,73e+013deg	-
Back Current Angle :	-5,73e+013deg	-

The “Configurations” field will be empty if there are no configuration files defined for the currently selected CAVA feature or if you have not selected a CAVA feature in box ②.



If there is no configuration file available for the selected CAVA feature, the list of drawing text elements that should be created will be empty. In this case you have to create some elements on your own and add them to the list by using the *Add* button (see ⑤).

④ Element list

This list contains all the elements that will be created as drawing text. There are some preconfigured texts included which are defined in the configuration file of the respective CAVA feature. But you can add some more elements to the list using the *Add* button (see ⑤).

- Column Text

This is the text as it will appear in the drawing.

- Column Value

This value is referenced from related CAVA feature in the 3D part.

- Column Remark

Text information related to a parameter in the list (e.g. if a drawing text is not linked to a 3D parameter).

⑤ List control buttons

- Changing order of the list:

Select one element from the list and use the *Up* or *Down* button to change the order of the list elements.

- Adding new elements to the list:

You can add additional elements to the list using the *Add* button. A new dialog will open from which you can select the parameter name from a selection list and in the field beside you can specify a text that should appear in the generated drawing text. Click *OK* to add the new parameter to the list.

If the parameter already exists in the list, an error message will be displayed; the newly specified parameter will be discarded.



The preconfigured content of the list usually comprise parameters that are provided directly by the selected CAVA feature.

If you add a parameter that is not directly given from the selected CAVA feature but is referenced by the CAVA feature (e.g. the Base Data, Loading Name, Standard Name, etc.), this parameter is not linked associatively to the 3D part. (You will get a note in the *Remark* column of the list.)



If you want to change the text of an element in the list, you will first have to remove it using the *Remove* button and then recreate it with the *Add* button. In the *Add* dialog you can define a new name.

- Removing elements from the list:

Select the list element you want to remove with the mouse pointer and click the *Remove* button.

⑥ Text field Name

If you want to save an adopted configuration to disk, you will have to specify a name for the file in this field.

The file will be saved to the *Admin* or *User* folder that you have defined in the *Drawing Text Automation* configuration (Tools > Options > Infrastructure > Cava Vehicle Architecture > Tab card “Templates” > section “CAVA Drawing”).

⑦ Save Current Conf

Press this button to save the current configuration in the user directory with the name you have defined in field ⑥.

⑧ Generate CSV

Use this button to export the content of the list (parameter and value) as a Comma Separated Value (CSV) text file. You can use the CSV file, for instance, as import file for an other application that can handle CSV files (e.g. Excel).

Example:

```
"RequiredAngleFront", "15deg"
"RequiredAngleRear", "14deg"
"CurrentAngleFront", "19,37deg"
"CurrentAngleRear", "-5,73e+013deg"
```

9. CAVA UPDATE Buttons

This button is on the *Update* tool bar.



The function of this button is identical to the CATIA *Update all* function (situated, for instance; on the *Tools* tool bar of the *Part Design* workbench).

Since version 1.11.1 the automatic update of the CAVA features taking place after modification of values that are referenced by the feature can be disabled. This option avoids time consuming recalculations.

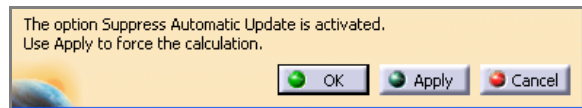



The update in this case is to be started manually by the user with the *Force Update* icon in the *Update* toolbar.

CAVA features that are excluded from automatic update are marked with a red update sign in the specification tree (see fig. On the right).



A message text displayed in the feature dialog signals that the feature has to be updated manually.



To update one of those features you have to select it in the specification tree and then press *Force Update* icon  or open the feature dialog box and click on 'Apply'.

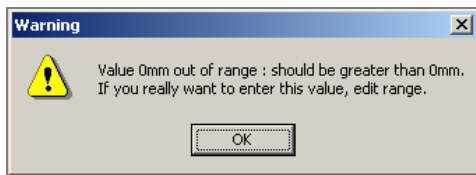


If there are no CAVA features that need a manual forced update, the *Force Update* icon in the *Update* toolbar (see fig. below) will be grayed out.

10. Trouble Shooting

- *SYMPTOM*

In a spinner box a value is to be set to zero. But the spinner box allows to decrement the value only to “1”; when “0” is entered and confirmed with the OK button, the following message is displayed:



- *QUESTION*

How can I decrease the value to “0”?

- *SOLUTION*

Proceed as follows:

- (1) Put the cursor in the respective spinner box.
- (2) Press the right mouse button.
- (3) Select in the context-sensitive menu *Range > Edit*.
- (4) Activate the *Lower limit* and *Included* options and enter „0“ for the lower limit value.
- (5) Confirm by pressing the OK button.

* * *