

Allegro® X DesignTrue DFM Rule Aggregator User Guide

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Allegro X DesignTrue DFM Rule Aggregator User Guide

Introduction

When obtaining DFM rules from multiple PCB fabricators, there may be subtle differences in the DFM rules from one PCB fabricator to another. When running low quantities of PCBs, a single fabricator can manage the workload, but when PCBs are high in numbers, limiting production to one fabricator is not a viable solution, and the difference in DFM rules may be an issue.

To account for these differences in DFM rules across fabricators, it is common practice to create a common denominator rule set that can be applied to all fabricators. This process is manual and hence error-prone. Often it is done by an in-house software solution, which is convenient if the right resources are available to create and maintain the tools.

The DesignTrue DFM Rule Aggregator is a solution that combines DFM rules and produces an aggregated set of rules with the common denominator based on most conservative values. It is primarily focused on technology files obtained by fabricator partners in the [DFM Rules Request Web portal](#).

This user guide describes features and functionality of DesignTrue DFM Rule Aggregator for the following layout editors:

- Allegro Venture PCB Designer
- Allegro Enterprise PCB Designer
- SiP Layout XL
- Silicon Layout

Aggregation of DFM Rules Constraint Sets

DFM Rule Aggregator groups multiple CSets that represent similar layer types, copper thickness, manufacturing classes, and other key technology factors obtained from multiple sources, and merge them to produce a common denominator group of CSets in a single technology file.

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The best method to create an aggregated DFM Rule technology file is by using technology files obtained through the DesignTrue DFM Web Portal. The technology files created from the portal contain embedded attributes that are critical to automating the aggregation process. It is also possible to aggregate technology files that are not generated from the web portal. That process requires manual intervention and is semi-automated.

Explanation of Technology File Attributes Used for Rule Aggregation

Key attributes contained in the technology file are part of the naming scheme of the technology file name, produced by the DFM Rule web portal by PCB fabricators. These attributes are used to aid in the combining of like attributes for rule aggregation within the technology file. The following table explains various technology file attributes:

Request Setting	Description	File Name Code
Manufacturing Class	Chose to apply industry manufacturing and quality standards specification to the design. A value can be selected from the pull-down menu. If <code>Other</code> is selected, add specification reference in the Remarks section.	MC
Design Technology	Defines the targeted materials and technology used for the design. Assists the fabricator in identifying special requirements for rule definitions.	DT
Units	Specifies the dimensional units used in the current rules request. Available units are, <code>Mils</code> , <code>Inches</code> , <code>Microns</code> , and <code>Millimeter</code>	
Minimum Finished Hole size	Defines the targeted minimum plated finished hole size to be used in the design in units specified	HS
Expected Minimum Line width	Specifies the minimum conductor trace width used in the current design in units specified	LW
Expected Minimum Line to Line Spacing	Specifies the minimum conductor trace to conductor trace spacing used in the current design in units specified	LS

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Minimum BGA Pin Pitch	Specifies the fine pitch BGA pin center to center pin pitch in the units specified.	BPP
Minimum BGA Pin Pad Size	Specifies the fine pitch BGA pin minimum pad size in the units specified	BPS
Micro Via	Indicates if micro via (or laser via) technology is used in the design	MV
Blind Buried Via	Indicates if blind buried via technology is used in the design	BB
Back Drill	Indicates if back drilling technology is used in the design	BD
Embedded/Coin	Indicates if embedded component or embedded coin via technology is used in the design	EC
Outline	Indicates a request for Allegro DesignTrue DFM Design for Fabrication Outline rules	OTLN
Mask	Indicates a request for Allegro DesignTrue DFM Design for Fabrication Mask rules	MASK
Silkscreen	Indicates a request for Allegro DesignTrue DFM Design for Fabrication Silk Screen rules	SILK
Conductors	Indicates a request for Allegro DesignTrue DFM Design for Fabrication conductor rules	COND
Layer Weight * .oz External	Indicates a request for Allegro DesignTrue DFM Design for Fabrication external conductor layer rules. For external layers the value is the copper weight. Additional information can be specified in the Remarks section.	EXT
Layer Weight * .oz Internal	Indicates a request for Allegro DesignTrue DFM Design for Fabrication internal conductor layer rules. For external layers, the value is the copper weight. Additional information can be specified in the Remarks section.	INT

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Layer Weight * .oz Plane Indicates a request for Allegro DesignTrue PLN
DFM Design for Fabrication external
conductor layer rules. For external layers, the
value is the copper weight. Additional
information can be specified in the Remarks
section.

The DesignTrue DFM Rule Aggregator creates aggregated constraint sets and always assigns the most conservative value to them. The aggregated CSet values cannot be modified directly in the rule aggregator and can be managed only through the DFM Aggregator Policy file.

Management of Conservative Values in DFM Rule Aggregator

The DFM Rule Aggregator uses the most conservative value for each CSet within an aggregated rule set group to create an aggregated CSet to be exported to a technology file. The conservative value is based on the type of value a rule requires.

Conservative value of Aggregated CSet can be:

- Set to the greatest value of a physical size or spacing.
- Set to the maximum value for all dimensional values and angles
- Set to the lowest value for ratios

Example

Aggregate Group				
Sample Rule	CSet1	CSet2	CSet3	Aggregated_Cset
Line to line spacing	25	17	20	25
Aspect Ratio	10	6	8	6
Acute Angle	45	90	30	90

- Set to On, if one or more rules is set to On.
- Set to Off if all grouped CSets are set to blank or Off.

Example

	Aggregate Group			
Sample Rule	CSet1	CSet2	CSet3	Aggregated_Cset
Missing Trace Tapers	Off	Off	Off	Off
Missing Pad Fillets	Off	On	Off	On
Missing T Fillets	On	On	On	On

To manage conservative values, the DFM Aggregator Policy file `dfm_aggreg.xml` defines which values are to be designated as the most conservative. The policy file is in XML format and located in the `<install_directory>/share/pcb/consmgr/` directory.

Sample DFM Aggregator Policy File

```

- <AGGREGATION_POLICY>
  - <DOMAIN_MANUFACTURING>
    - <DFF>
      - <OVERRIDEN_CONSTR_IDS>
        <OVERRIDEN_CONSTR_ID set="MIN" id="DFFHLS_SKIP_VIA"/>
        <OVERRIDEN_CONSTR_ID set="MIN" id="DFF_CF_MAXSOLIDFILLSHPS"/>
        <OVERRIDEN_CONSTR_ID set="MIN" id="DFF_AR_MDPPD_TO_MSK"/>
        <OVERRIDEN_CONSTR_ID set="MIN" id="DFF_HL_MAXSTACKED_COUNT"/>
      </OVERRIDEN_CONSTR_IDS>
      - <AGGREGATE_CRITERIA>
        - <AGGREGATE_CRITERION priority="1" type="DATA_TYPE">
          <ELEM set="MIN" name="RATIO"/>
          <ELEM set="MAX" name="ANGLE"/>
        </AGGREGATE_CRITERION>
        <AGGREGATE_CRITERION priority="2" type="LAYER_TYPE"> </AGGREGATE_CRITERION>
      </AGGREGATE_CRITERIA>
    </DFF>
    - <DFA>
      - <OVERRIDEN_CONSTR_IDS>
        <OVERRIDEN_CONSTR_ID set="predefinedfunc" id="DFA_PKG_TO_PKG_SPACING"/>
      </OVERRIDEN_CONSTR_IDS>
    </DFA>
    <DFT> </DFT>
  </DOMAIN_MANUFACTURING>
</AGGREGATION_POLICY>

```

The `AGGREGATE_CRITERIA` XML element determines the rule value. The key data types are `RATIO` and `ANGLE`. The legal values assigned to these data types are either `MIN` or `MAX`, which represents the smallest and the greatest numerical values, respectively.

For all dimensional data types, the `MIN/MAX` value can only be overridden by adding an entry into the `OVERRIDEN_CONSTR_IDS` XML element. For example, to set the maximum number of stacked vias to the `MIN` value, you can modify the XML as follows:

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```
<OVERRIDE_ID id = "DFFHLS_SKIP_VIA" set="MIN"></OVERRIDE_ID>
```

When adding a new DFF rule as an exception, the `id` field specifies the constraint name found in the technology file. In the following example, the DFF Mask category rule, Mask to Trace constraint name is `DFF_MASK_TO_TRACE`:

Islands	10.00	10.00
Opening on shapes	3000.00	3000.00
Mask To Trace	3.00	3.00
Mask To Shape	MAX	MAX
Via Partially Covered With Mask Opening	On	On
Exposed etch	50.00	50.00

Trace to Mask Opening (DFF_MASK_TO_TRACE)

The current conservative value is set to MAX. To make an exception to the conservative value and to use the MIN value the XML can be edited as follows:

```
<OVERRIDE_ID id = "DFF_MASK_TO_TRACE" set="MIN"></OVERRIDE_ID>
```

Note: Misplaced character or white space may cause the reading of the policy file to fail. Always copy and save the original policy file for reuse.

Getting Started with DesignTrue DFM Rule Aggregator

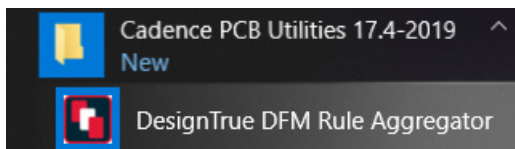
This module gets you started with DFM Rule Aggregator and walks you through its user interface.

- [Starting DFM Rule Aggregator](#)
- [DFM Rule Aggregator User Interface](#)

Starting DFM Rule Aggregator

To start DFM Rule Aggregator, follow these steps:

1. Choose *Start – Cadence PCB Utilities <release> – DesignTrue DFM Rule Aggregator*.



2. To launch the free viewer from the command line:
 - a. Type `dfmagr` in a command window and press `Enter`.

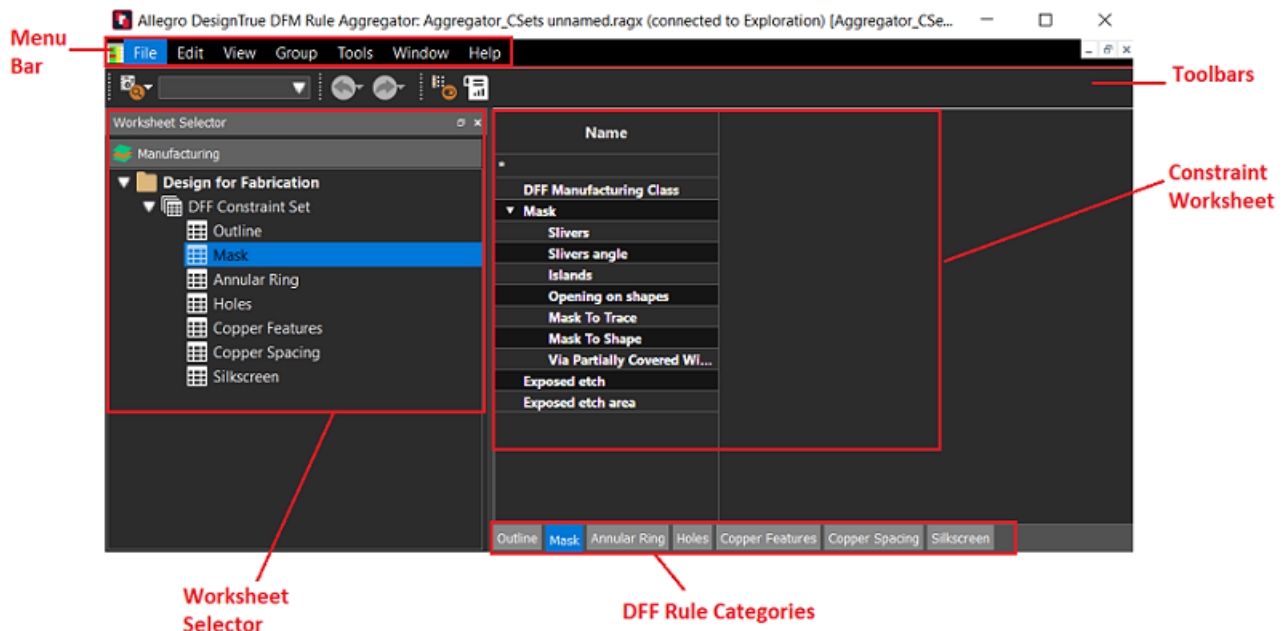
Or

- b. Type `consmgr -dfmAggr` in a command window and press `Enter`.

Allegro DesignTrue DFM Rule Aggregator window opens with a blank design.

DFM Rule Aggregator User Interface

The user interface is the same as the Constraint Manager. The current version of the DesignTrue DFM Rule Aggregator is based on Design for Fabrication rule aggregation and available on all Allegro supported platforms.

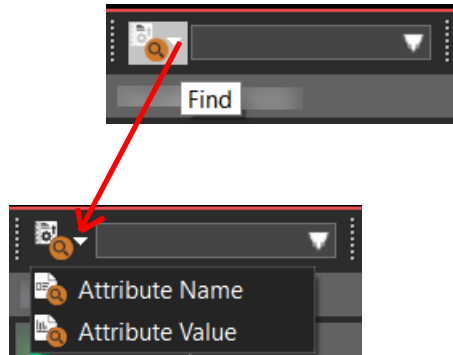


Toolbar

There are three toolbars in the DFM Rule Aggregator window:

Find Toolbar

The Find toolbar provides a drop-down menu to choose the search type either by attribute name or by its value.



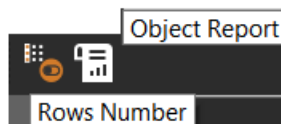
View History Toolbar

This toolbar has controls for navigating across different DFM CSet categories. The drop-down combo box lists all the CSets you have set. You can use the drop-down combo box to open a CSet directly in the worksheet.



Tools Toolbar

This toolbar provides two options. The first option enables the display of row numbers in the worksheet spreadsheet. The second option opens the Reports window to generate the reports for verification and other requirements.



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Getting Started with DesignTrue DFM Rule Aggregator

Aggregating DFM Rule CSets

The DesignTrue DFM Rule Aggregator provides the ability to collect DesignTrue DFM constraint sets (CSets) for similar technologies and combined them to create a common technology file that fits all PCBs.

This module explains various capabilities and flows that are supported in the DesignTrue DFM Rule Aggregator:

- [Importing Technology files](#)
- [Aggregating DFM Rules Constraint Sets](#)
- [Exporting Aggregated CSets into Technology File](#)
- [Importing Aggregated CSets into Layout Editor](#)

Importing Technology files

To begin with DFM Rule Aggregator, you first need to import technology files and save them in the rule aggregator. Perform the following steps to import the technology files into DFM Rule Aggregator:

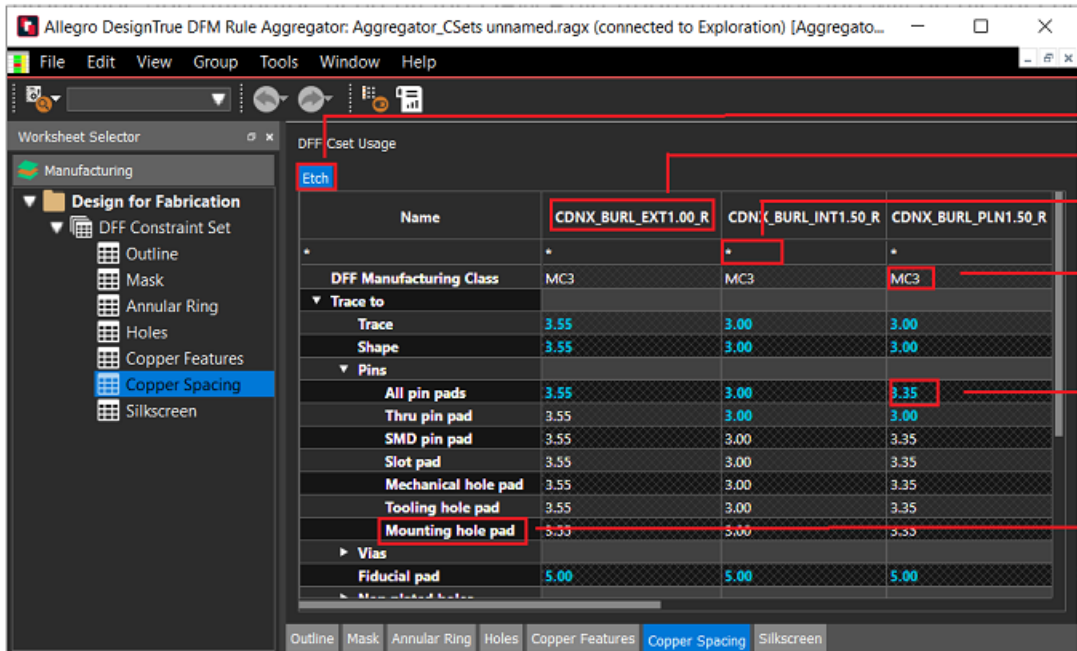
1. Choose *File – Import Technology Files*.
2. Navigate to the directory of technology files in the file browser and select one or more technology files to open.

A progress meter displays status of importing and loading technology files in the DFM Rule Aggregator.

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Aggregating DFM Rule CSets

- Expand the worksheet to display CSet names, rules and values.



The screenshot shows the Allegro DesignTrue DFM Rule Aggregator interface. The 'CSet Usage' tab is selected, displaying a table of rules and values. The table has columns for Name, CSet Name, and Rule Value. The 'Etch' tab is selected. The 'CSet Name' filter is set to 'MC3'. The 'Manufacturing Class Label' is 'MC3'. The 'Rule Value (Read Only)' is '3.35'. The 'Rule Name' is 'Mounting hole pad'.

Name	CDNX_BURL_EXT1.00_R	CDNX_BURL_INT1.50_R	CDNX_BURL_PLN1.50_R
DFF Manufacturing Class	MC3	MC3	MC3
Trace to			
Trace	3.55	3.00	3.00
Shape	3.55	3.00	3.00
Pins			
All pin pads	3.55	3.00	3.35
Thru pin pad	3.55	3.00	3.00
SMD pin pad	3.55	3.00	3.35
Slot pad	3.55	3.00	3.35
Mechanical hole pad	3.55	3.00	3.35
Tooling hole pad	3.55	3.00	3.35
Mounting hole pad	3.35	3.00	3.35
Vias			
Fiducial pad	5.00	5.00	5.00

- To save the XML DFM Rule Aggregator File (.ragx) for later editing, choose *File – Save As*. Navigate to the directory you want to save the file, specify a name and click the *Save* button.
- Choose *File – Exit* to close the DFM Rule Aggregator.
- To verify the saved aggregator file, restart DFM Rule Aggregator and open the file.

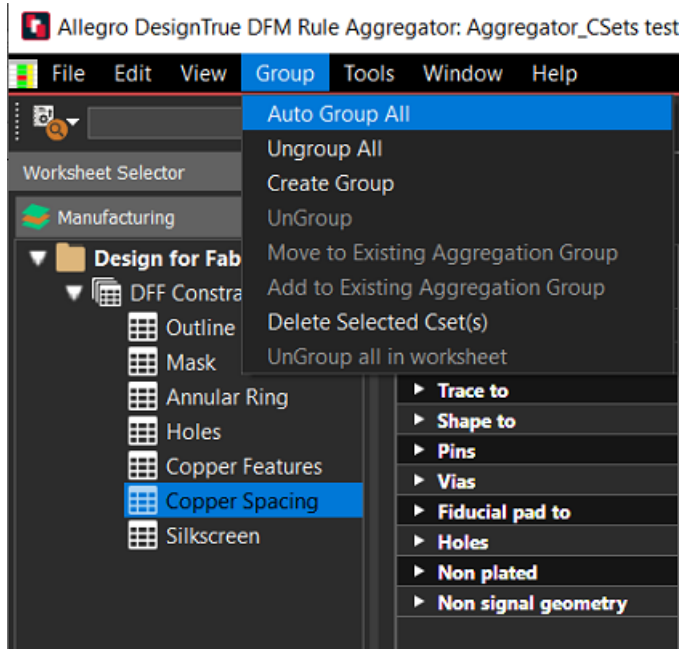
Aggregating DFM Rules Constraint Sets

Creating an aggregated DFM Rule technology file obtained through the DesignTrue DFM Web Portal is an automated process and done by the DFM Rule Aggregator. The portal creates technology files with embedded attributes that are critical to automating the aggregation process. It is also possible to aggregate technology files that are not from the portal. But that process require manual intervention and is semi-automated.

The first step is to create aggregated CSets is to combine all similar CSets based on specific attributes into groups. The automated process reads the attributes embedded into the technology file to create the groups.

Creating Aggregated DFM Rule Constraint Sets Automatically

1. Choose *File – Open* and open XML DFM Rule Aggregator (.ragx) file.
2. Select a DFF worksheet.
3. To group CSets, choose *Group – Auto Group All*.



A progress meter shows the automatic aggregation process.

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Aggregating DFM Rule CSets

4. Expand the worksheet to view the aggregated groups and CSets.

The screenshot shows the Allegro DesignTrue DFM Rule Aggregator interface. The 'Worksheet Selector' on the left shows the 'Design for Fabrication' worksheet selected. The main area displays the 'DFF Cset Usage' table. The table has a header row with the following columns: 'Name', 'CDNX_BURL_EXT1.00_R', 'ZE_SHZN_EXT1.00', 'CDNX_CHEL_EXT1.00_R', 'IBET_LSVG_EXT1.00_R', and 'AGGRSET_ETCH_1'. The table is titled 'DFF Cset Usage' and has a dropdown menu set to 'DFF Manufacturing Class'. The table contains data for 'Trace to', 'Shape', and 'Pins' categories. A red box highlights the 'DFF Manufacturing Class' header, labeled 'Aggregated Group'. A green box highlights the 'Pins' data rows, labeled 'Imported CSets'. An orange box highlights the 'AGGRSET_ETCH_1' column, labeled 'Aggregated CSets'.

Name	CDNX_BURL_EXT1.00_R	ZE_SHZN_EXT1.00	CDNX_CHEL_EXT1.00_R	IBET_LSVG_EXT1.00_R	AGGRSET_ETCH_1
DFF Manufacturing Class	MC3	MC3	MC3	MC3	MC3
Trace to					
Trace	3.55	3.75	3.50	3.00	3.75
Shape	3.55	3.75	3.50	3.00	3.75
Pins					
All pin pads	3.55	3.75	3.50	3.00	3.75
Thru pin pad	3.55	3.75	3.50	3.00	3.75
SMD pin pad	3.55	3.75	3.50	3.00	3.75
Slot pad	3.55	3.75	3.50	3.00	3.75

The aggregated group has two rows in its header. The top row represents a system-defined aggregated group name. The second row contains CSets that are contained within the aggregation group. When collapsed, the first column displays the first imported CSet of the aggregation group and the second column displays the Aggregated CSet. On expanding the aggregated group, the aggregated CSet is always displayed in the right-most column.

Note: An aggregation group must contain two or more CSets.

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Aggregating DFM Rule CSets

5. Compare the rule values of the aggregation group. The aggregated CSet contains the most conservative value for that rule.

DFF Cset Usage

Etch

Name	DFM_AGGRSET_ETCH_1				
	CDNX_BURL_EXT1.00_R	'ZE_SHZN_EXT1.00	CDNX_CHEL_EXT1.00_R	IBET_LSVG_EXT1.00_R	AGGRSET_ETCH_1
*	*	*	*	*	*
DFF Manufacturing Class	MC3	MC3	MC3	MC3	MC3
▼ Trace to					
Trace	3.55	3.75	3.50	3.00	3.75
Shape	3.55	3.75	3.50	3.00	3.75
▼ Pins					
All pin pads	3.55	3.75	3.50	3.00	3.75
Thru pin pad	3.55	3.75	3.50	3.00	3.75
SMD pin pad	3.55	3.75	3.50	3.00	3.75
Slot pad	3.55	3.75	3.50	3.00	3.75

Outline Mask Annular Ring Holes Copper Features Copper Spacing Silkscreen

Modifying Aggregated CSet Values

The aggregated CSet value is generated by the system and cannot be edited manually. It can be overridden by the value of a different CSet of the same aggregation group.

1. Choose *File – Open* and open XML DFM Rule Aggregator (.ragx) file.
2. Select the worksheet and expand an aggregation group.

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Aggregating DFM Rule CSets

3. Select one of the CSet in the aggregated group and right-click to choose *Override* from the pop-up menu.

DFF Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1				
	CDNX_BURL_EXT1.00_R	XYZE_SHZN_EXT1.00_R	CDNX_CHEL_EXT1.00_R	IBET_LSVG_EXT1.00_R	AGGRCSET_ETCH_1
*	*	*	*	*	*
DFF Manufacturing Class	MC3	MC3	MC3	MC3	MC3
▼ Trace to					
Trace	3.55	3.75	3.50	3.00	3.75
Shape	3.55	3.75	3.50	3.00	3.75
► Pins					
▼ Vias					
All via pads	3.55	3.75	3.50	3.00	3.75
Thru via pad	3.55	3.75	3.50	3.00	3.75
BB via pad	3.55	3.75	3.50	3.00	3.75
Micro via pad	3.55	3.75	3.50	3.00	3.75
Fiducial pad	5.00	5.00	5.00	5.00	5.00
► Non plated holes					
► Holes					

The override value is highlighted in the aggregation CSet column.

DFF Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1				
	CDNX_BURL_EXT1.00_R	XYZE_SHZN_EXT1.00_R	CDNX_CHEL_EXT1.00_R	IBET_LSVG_EXT1.00_R	AGGRCSET_ETCH_1
*	*	*	*	*	*
DFF Manufacturing Class	MC3	MC3	MC3	MC3	MC3
▼ Trace to					
Trace	3.55	3.75	3.50	3.00	3.75
Shape	3.55	3.75	3.50	3.00	3.75
► Pins					
▼ Vias					
All via pads	3.55	3.75	3.50	3.00	3.75
Thru via pad	3.55	3.75	3.50	3.00	3.75
BB via pad	3.55	3.75	3.50	3.00	3.75
Micro via pad	3.55	3.75	3.50	3.00	3.50
Fiducial pad	5.00	5.00	5.00	5.00	5.00
► Non plated holes					
► Holes					

Overriden
Aggregated
CSet value

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Aggregating DFM Rule CSets

- To restore the aggregated CSet value to its original calculated value, right-click the highlighted aggregated CSet value and choose *Remove Override* from the pop-up menu.

DFM Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1					GGRRCSET
	DNX_BURL_EXT1.00	YZE_SHZN_EXT1.00	INX_CHEL_EXT1.00	BET_LSVG_EXT1.00	AGGRRCSET_ETCH_1	BURL_INT
*	*	*	*	*	*	*
DFM Manufacturing Class	MC3	MC3	MC3	MC3	MC3	MC3
▼ Trace to						
Trace	3.55	3.75	3.50	3.00	3.75	3.00
Shape	3.55	3.75	3.50	3.00	3.75	3.00
► Pins						
▼ Vias						
All via pads	3.55	3.75	3.50	3.00	3.75	3.55
Thru via pad	3.55	3.75	3.50	3.00	3.75	3.55
BB via pad	3.55	3.75	3.50	3.00	3.75	3.55
Micro via pad	3.55	3.75	3.50	3.00	3.50	
Fiducial pad	5.00	5.00	5.00	5.00	5.00	
► Non plated holes						
► Holes						
► Non signal						
► Shape to						

Remove Override
Go to source

Creating Aggregated DFM Rule Constraint Sets Manually

If the DFM rules are not obtained through the DFM Web Portal, the aggregation can be done using a semi-automated process. This process requires importing one or more technology files that contain one or more CSets that would be aggregated together.

- Start the DFM Rule Aggregator.
- Choose *File – Import Technology Files*, select files to import and click *Open*.
- Double-click to open a worksheet.
- To create an aggregate CSet Group, select the CSet name headers.

The selected CSet highlights as soon as they are selected.

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Aggregating DFM Rule CSets

5. Hover the cursor over any of the highlighted CSet name headers, right-click and choose *Create Group*.

DFF Cset Usage

Etch

Name	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT
*	*		
DFF Manufacturing Class			
▼ Outline To			
Trace	12.00		
Shape	12.00		
► Pins			
► Vias			
► Holes			
► Non plated			
Cutout			
► Non signal			
Fiducial	40.00	40.00	40.00

Context menu options:

- Auto Group
- Create Group
- UnGroup
- Move to Existing Aggregation Group
- Add to Existing Aggregation Group
- Delete Selected Cset(s)
- UnGroup all in worksheet

An aggregated group is created using the selected CSets. The last column of that group represents the aggregated CSet and has the most conservative value for each rule.

DFF Cset Usage

Etch

Name	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1
*	*	*	*	*
DFF Manufacturing Class				
▼ Outline To				
Trace	12.00	15.00	12.00	15.00
Shape	12.00	17.00	15.00	17.00
► Pins				
► Vias				
► Holes				
► Non plated				
Cutout				
► Non signal				
Fiducial	40.00	40.00	40.00	40.00

Annotations:

- Aggregated Group (points to the header row)
- Grouped CSets (points to the first three columns)
- Aggregated CSets (points to the last column)

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Aggregating DFM Rule CSets

6. To modify the aggregated CSet value to a different one, select one of the CSets in aggregated group, right-click and choose *Override*.

DFF Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1			
	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1
*	*	*	*	*
DFF Manufacturing Class				
▼ Outline To				
Trace	12.00	15.00	12.00	15.00
Shape	12.00	17.00	15.00	17.00
► Pins				
► Vias				
► Holes				
► Non plated				
Cutout				
► Non signal				
Fiducial	40.00	40.00		

DFF Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1			
	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1
*	*	*	*	*
DFF Manufacturing Class				
▼ Outline To				
Trace	12.00	15.00	12.00	15.00
Shape	12.00	17.00	15.00	12.00
► Pins				
► Vias				
► Holes				
► Non plated				
Cutout				
► Non signal				
Fiducial	40.00	40.00	40.00	40.00

7. To include an additional CSet to an existing group,
 - a. Choose *File – Import Technology Files* and select a technology file to import.

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Aggregating DFM Rule CSets

The new imported and ungrouped CSets are displayed in the right side of the worksheet.

DFF Cset Usage

Etch

Aggregated Group

Name	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1	PLN_S2_OUTLN	EXT_S2_OUTLN	INT_S2_OUTLN
DFF Manufacturing Class							
▼ Outline To							
Trace	12.00	15.00	12.00	15.00	12.00	12.00	12.00
Shape	12.00	17.00	15.00	17.00	12.00	12.00	12.00
▶ Pins							
▶ Vias							
▶ Holes							
▶ Non plated							
Cutout							
▶ Non signal							
Fiducial	40.00	40.00	40.00	40.00	25.00	25.00	25.00

Grouped CSets

Aggregated CSets

Ungrouped CSets

- Select the CSet header you want to add to the aggregated group, right-click and choose *Add to Existing Aggregation Group*.

DFF Cset Usage

Etch

Newly Imported CSet

Name	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1	PLN_S2_OUTLN	EXT_S2_OUTLN	INT_S2_OUTLN
DFF Manufacturing Class							
▼ Outline To							
Trace	12.00	15.00	12.00	15.00	12.00		
Shape	12.00	17.00	15.00	17.00	12.00		
▶ Pins							
▶ Vias							
▶ Holes							
▶ Non plated							
Cutout							
▶ Non signal							
Fiducial	40.00	40.00	40.00	40.00	25.00	25.00	25.00

Auto Group

Create Group

UnGroup

Move to Existing Aggregation Group

Add to Existing Aggregation Group

Delete Selected Cset(s)

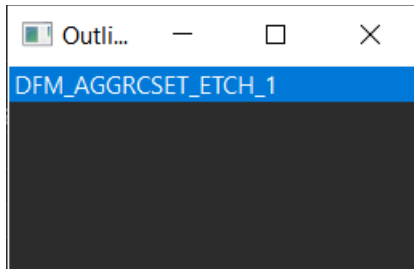
UnGroup all in worksheet

Rename

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Aggregating DFM Rule CSets

- c. Double-click to select an aggregate CSet group from the list that is displayed.



The selected CSet is now part of the aggregated group and moved from the right side of the worksheet into the group and to the left of the aggregated CSet column.

DFF Cset Usage

Etch

Name	DFM_AGGRSET_ETCH_1					AGGRSET_ETCH_1
	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	PLN_S2_OUTLN		
* DFF Manufacturing Class	*	*	*	* *		
▼ Outline To						
Trace	12.00	15.00	12.00	12.00		15.00
Shape	12.00	17.00	15.00	12.00		17.00
► Pins						
► Vias						
► Holes						
► Non plated						
Cutout						
► Non signal						
Fiducial	40.00	40.00	40.00	25.00		40.00

- d. To add multiple ungrouped CSets, repeat the previous two steps.
8. To remove a CSet from an aggregate group:
- e. Select to highlight the CSet you want to remove.

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Aggregating DFM Rule CSets

- f. Right-click to the highlighted CSet and choose *UnGroup*.

DFM Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH_1				EXT_S2_OUTLN	
	OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	PLN S2 OUTLN	AGGRCSET_ETCH_1	
* DFF Manufacturing Class	*	*	*	*		
▼ Outline To						
Trace	12.00	15.00	12.00	1		
Shape	12.00	17.00	15.00	1		
▶ Pins						
▶ Vias						
▶ Holes						
▶ Non plated						
Cutout						
▶ Non signal						
Fiducial	40.00	40.00	40.00	25.00	40.00	25.00

- g. The selected CSet is removed from the aggregated group and moves to the extreme right of the worksheet in the last column.
9. To move a CSet from one aggregated group to another,
- h. Select the CSet, and choose *Move to Existing Aggregation Group* from the right-click menu.

DFM_AGGRCSET_ETCH_1				DFM_AGGRCSET_ETCH_2				
OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	PLN_S2_OUTLN	AGGRCSET_ETCH_1	EXT_S2_OUTLN	INT_S2_OUTLN	R3_EXT_OTLN	AGGRCSET_ETCH_2
*	*	*	*	Auto Group				*
				Create Group				
				UnGroup				
12.00	15.00	12.00	12.00	Move to Existing Aggregation Group	0	15.00	15.00	
12.00	17.00	15.00	12.00	Add to Existing Aggregation Group	0	15.00	15.00	
				Delete Selected Cset(s)				
				UnGroup all in worksheet				
40.00	40.00	40.00	25.00	40.00	25.00	25.00	25.00	25.00

- i. Double-click to select different aggregator group from the list.

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Aggregating DFM Rule CSets

The CSet moves from one group to the another.

DFM_AGGRCSET_ETCH_1				DFM_AGGRCSET_ETCH_2				
OL_SET1_PL	OL_SET1_EXT	OL_SET1_INT	AGGRCSET_ETCH_1	EXT_S2_OUTLN	INT_S2_OUTLN	R3_EXT_OTLN	PLN_S2_OUTLN	AGGRCSET_ETCH_2
*	*	*	*	*	*	*	*	*
12.00	15.00	12.00	15.00	12.00	12.00	15.00	12.00	15.00
12.00	17.00	15.00	17.00	12.00	12.00	15.00	12.00	15.00
40.00	40.00	40.00	40.00	25.00	25.00	25.00	25.00	25.00

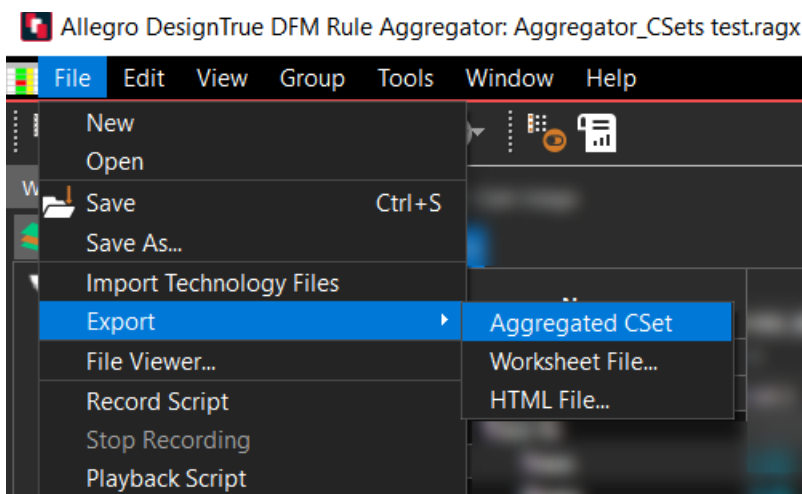
10. Choose *File – Exit* to close the DFM Rule Aggregator.

Exporting Aggregated CSets into Technology File

After aggregating all CSets export them into a technology file. The exported technology file contains all aggregated CSets and only CSets that are aggregated are exported.

You can aggregate different manufacturing categories into different technology files. The aggregation can be done even for one aggregated CSet group in any of the DFF categories.

1. Open the .ragx file that has aggregated CSets.
2. Choose *File – Export – Aggregated CSet*.



3. Specify to the directory where you want to save the technology file in the file browser that opens.

4. Optionally, specify a name for the technology file and click *Save*.

By default, the technology file is saved with default name `Aggregator_CSets.tcfx`.

5. Choose *File – Exit* to close the DFM Rule Aggregator.

Importing Aggregated CSets into Layout Editor

To import aggregated technology file in the layout design, start Allegro PCB Editor and do the following:

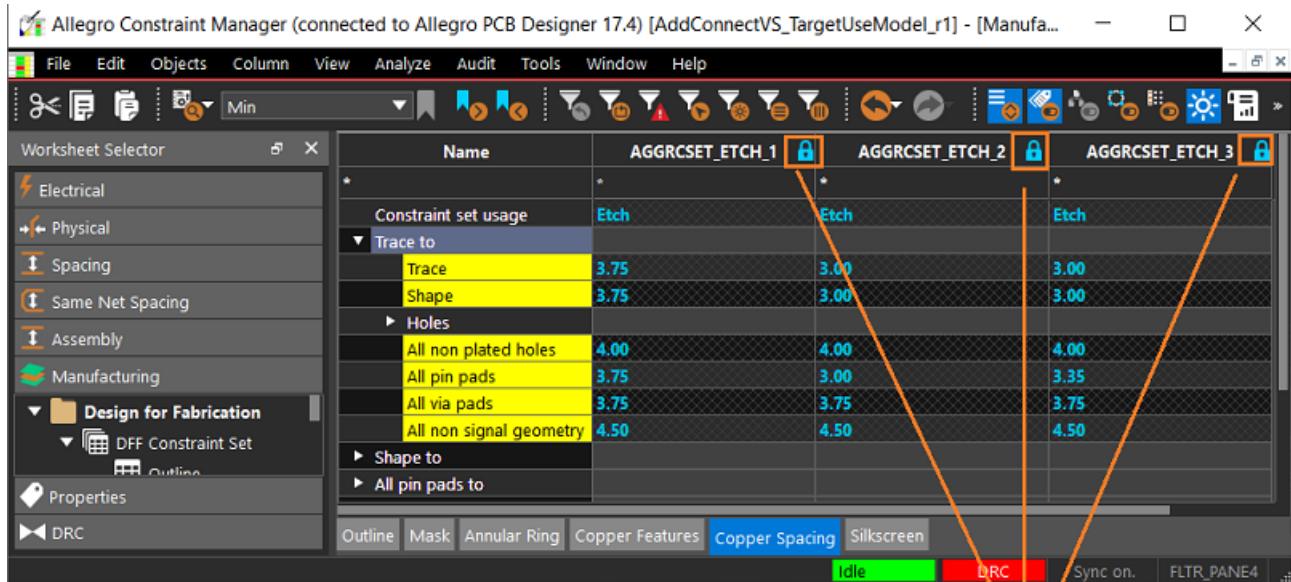
1. In PCB Editor, choose *File – New* to create a new drawing or open an existing board design.
2. Launch Constraint Manager from *Setup – Constraints – Constraint Manager*.
3. In Constraint Manager,
 - a. Navigate to the *Manufacturing – Design for Fabrication – DFF Constraint Sets*.
 - b. Select a worksheet to view the rules in the right pane.
 - c. Choose *File – Import – Technology file* to select the aggregated technology file created in the DFM Rule Aggregator.
 - d. Select the technology file and click *Open* to import the file.

A Technology Difference Report is generated once the import process is completed.
 - e. Close the difference report.

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Aggregating DFM Rule CSets

The Constraint Manager displays the imported aggregated CSets. The aggregated CSets are in a locked state to prevent inadvertent changes in the CSet values.



Locked Aggregated CSets

- f. To analyze the CSets, expand rows in the worksheet.
- g. To enable these checks, choose *Analyze – Analysis Modes*. Open Design For Fabrication page and enable relevant checks.
- h. Close the Constraint Manager and the PCB Editor.

Miscellaneous Tasks

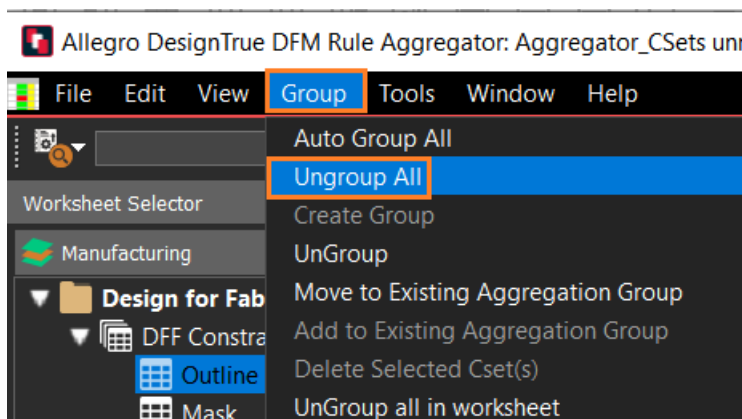
DFM Rule Aggregator provides commands that are useful while creating aggregated CSets.

- [Ungrouping Commands](#)
- [Creating Reports](#)
- [Renaming Aggregated CSet](#)

Ungrouping Commands

Ungrouping of aggregated CSets from a group can be done using two different methods and depends on whether you choose to ungroup globally or to a specific constraint worksheet.

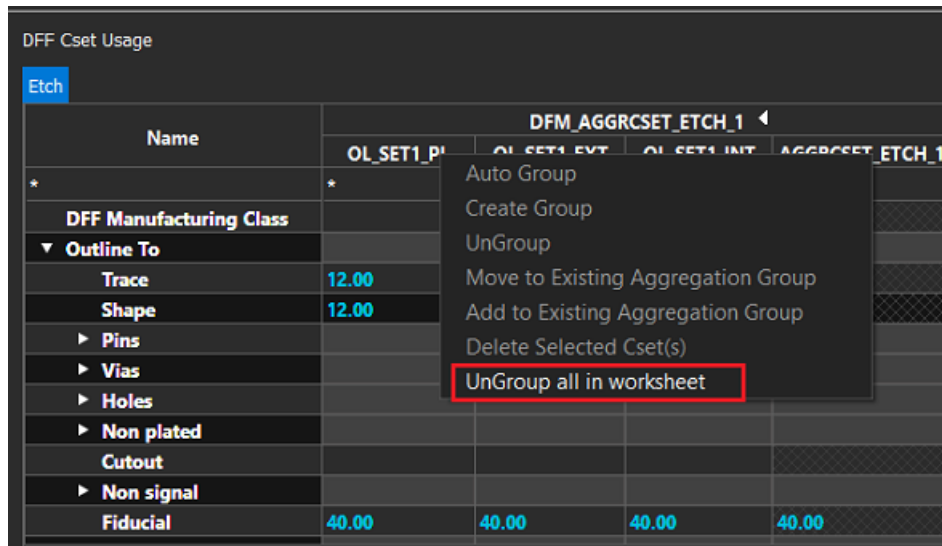
1. To ungroup all the CSets, choose *Group – Ungroup All* from the top menu. This global option ungroups all the aggregation groups from all of the DFF Constraint Sets.



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Aggregating DFM Rule CSets

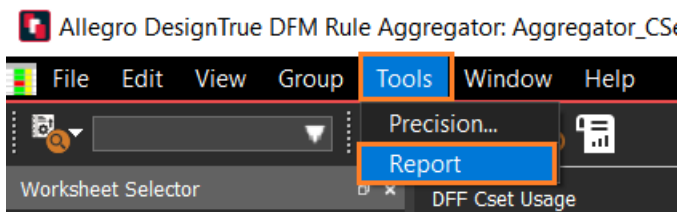
2. For ungrouping all aggregation groups in the current DFF Constraint worksheet, right-click any grouped CSet header and select *Ungroup all in worksheet*.



Creating Reports

For verifying any step during the aggregation process you can generate report at any time. The report is based on the current visibility display of the worksheets.

1. Choose *Tools – Report* from the main menu.

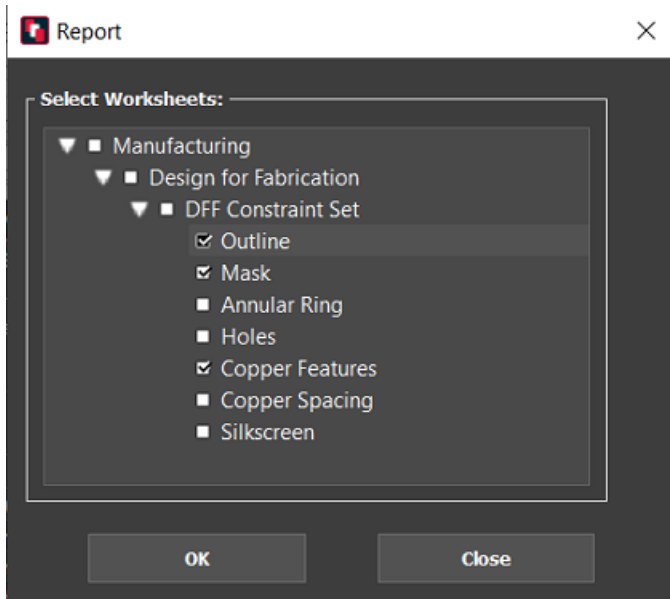


2. In the Report window, expand the select worksheet selection tree.

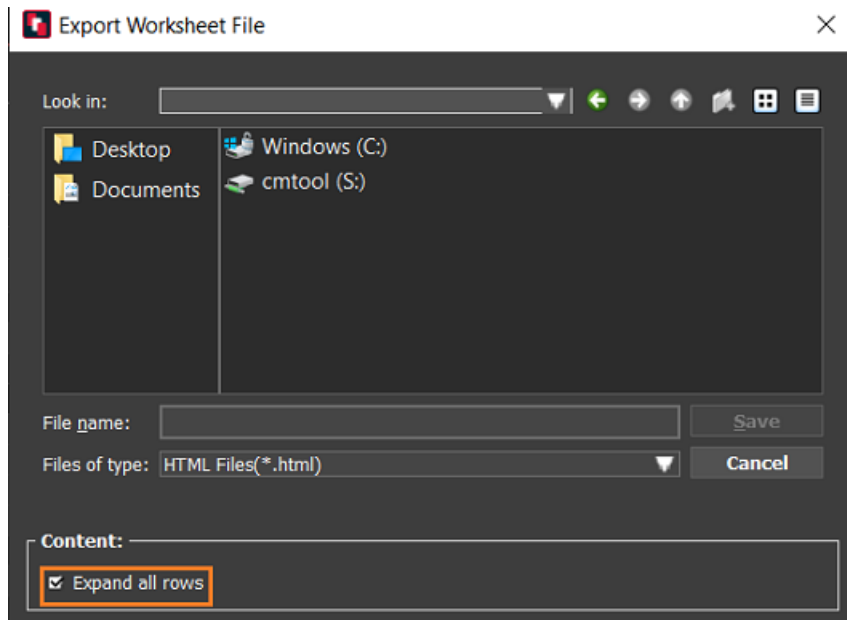
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Aggregating DFM Rule CSets

3. Enable the worksheets checkboxes.



4. To generate the report for selected rule categories, click *OK*.
5. Specify the location and name for the exported worksheet file. By default, the *Expand all rows* checkbox is enabled, which displays report in expanded form.



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Aggregating DFM Rule CSets

6. Click *Save* to generate the report in an HTML format.

Report file :: C:\D_drive\pubs\allegro\17.42\Testcases\DFM_rule_aggr\test\report_Manufacturing.html

Version : 17.400

Date/Time : 2020-11-01T21:17:33

1. Manufacturing\Design for Fabrication\DFM Constraint Set\Outline

Name	DFM_AGGRSET_ETCH_1	DFM_AGGRSET_ETCH_2	R3_INT_OTLN	R3_PLN_OTLN	NW-OTL-EXT	NW-OTL-INT	NW-OTL-PLN
* DFF Manufacturing Class							
Outline To							
Trace	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Shape	12.00	17.00	15.00	17.00	12.00	15.00	12.00
Pins							
All pin pads	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Thru pin pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
SMD pin	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Slot pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Mechanical hole pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Tooling hole pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Mounting hole pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Vias							
All via pads	12.00	15.00	12.00	15.00	12.00	15.00	12.00
Thru via pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00
BB via pad	12.00	15.00	12.00	15.00	12.00	15.00	12.00

Renaming Aggregated CSet

The name of aggregated CSet is system-generated and can be modified if required. To rename an aggregated CSet do the following:

1. Choose *File – Open* and open XML DFM Rule Aggregator (.ragx) file.

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Aggregating DFM Rule CSets

2. Right-click the aggregated CSet column header and choose *Rename*.

DFF Cset Usage

Etch

Name	DFM_AGGRCSET_ETCH 1 ▾		XYZE_SHZN_EXT1.00_R
	CDNX_BURL_EXT1.00_R	AGGRCSET_ETCH_1	
*	*	*	Auto Group
Trace	3.55	3.55	Create Group
Shape	4.00	4.00	UnGroup
▶ Pins			Move to Existing Aggregation Group
▼ Vias			Add to Existing Aggregation Group
All via pads	4.00	4.00	Delete Selected Cset(s)
Thru via pad	4.00	4.00	UnGroup all in worksheet
BB via pad	4.00	4.00	Rename
Micro via pad	4.00	4.00	
Fiducial pad	5.00	5.00	5.00
▶ Non plated hole			
▶ Holes			

3. Enter a new name in the rename dialog and click *OK*.

Rename DFF Copper Spacing CSet AGGRCSET_ETCH_1 ✕

New DFF Copper Spacing CSet Name

Ok Cancel

4. Save the DFM Rule Aggregator file using *File* menu save options.