Altium Designer

Advanced Training with Altium 365

Teardrops

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Teardrops

1 Purpose

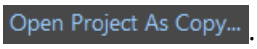
Teardrops are often used at the connection point between a track and a pad to prevent drill breakout during board manufacture. Teardrops are especially valuable in flex designs to help prevent a crack from forming where the track meets the pad or via, or when the drill hole isn't in the center of the pad or via. Other reasons for adding teardrops are Highspeed-related (Avoiding 90° corners).

2 Shortcuts

Shortcuts used when working with Teardrops

F1	Help
T » E	Teardrops
R » M / Ctrl+M	Measure Distance
L	View Configuration Panel
Shift+C	Clear
CTRL+S	Save Document

3 Preparation

1. Close all existing projects and documents.
2. Next, create a copy of the Training Project: `Teardrops`.
3. Select **File » Open Project...** to open the *Open Project* dialog.
4. Enable the folder view button  .
5. Navigate to the predefined Training Project `Teardrops (Top\Projects\Altium Designer Advanced Training Course\...)`.
6. Select **Open Project as Copy...** 

.
7. In the new dialog *Create Project Copy:*
   a) Add your name to the project name: `Teardrops – [Your Name]`.
   b) Add a description: `Altium Advanced Training – [Your name]`.
   c) Open the *Advanced* section.
   d) Select the **Ellipsis Button**  from the *Folder* configuration to open the *Choose Folder* dialog.
      i) Select the folder with your name: `Project\For Attendees\[Your name]`.
      ii) Select **OK**.
   e) Change the **Local Storage** path if needed.
   f) Select **OK** to create the copy.
8. Wait until Altium Designer creates the copy of the project and opened the Project for you in the *Projects* panel, this may take up to 1 minute.

Hint: For details how to copy the predefined training project, see module *03 Getting started - Opening a Project*.

4 Teardrop Menu

4.1 Teardrop Application

9. Open the PCB `Teardrops.PcbDoc`.
10. Select **Tools » Teardrops** to open the Teardrops dialog, as show in Figure 1 below.
11. Select the **Add** radio button in the *Working Mode* section to enable the generation of teardrops in the example.
12. Select the **All** radio button in the *Objects section* to have teardrops added to all applicable objects.

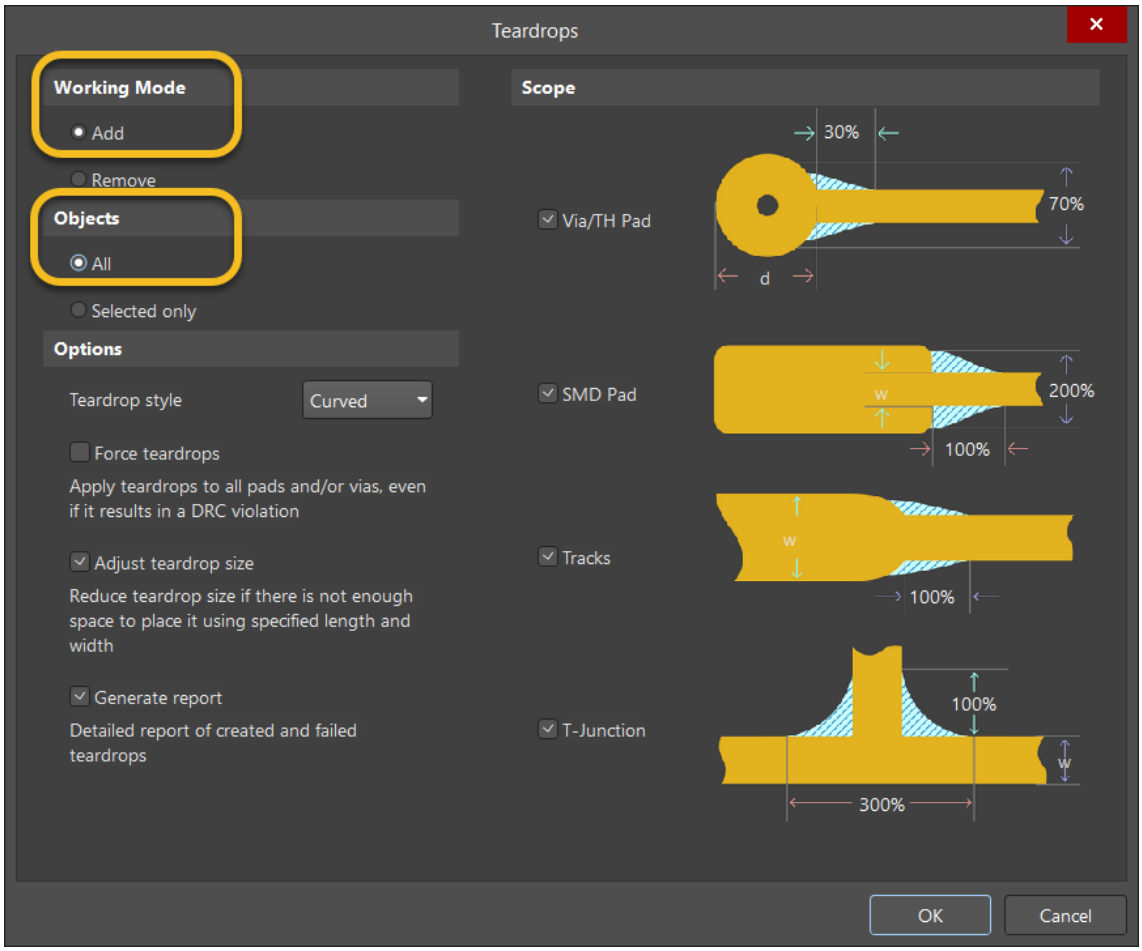


Figure 1. Teardrops dialog

13. Set the *Teardrop style* dropdown menu to **Curved**, as shown in Figure 2 below. This will create arc teardrops on all applicable objects such as Vias, SMD Pads, Tracks, and T-Junctions.
14. In the *Options* dialog, enable **Adjust teardrop size** and disable all other options, as seen in Figure 2 below.

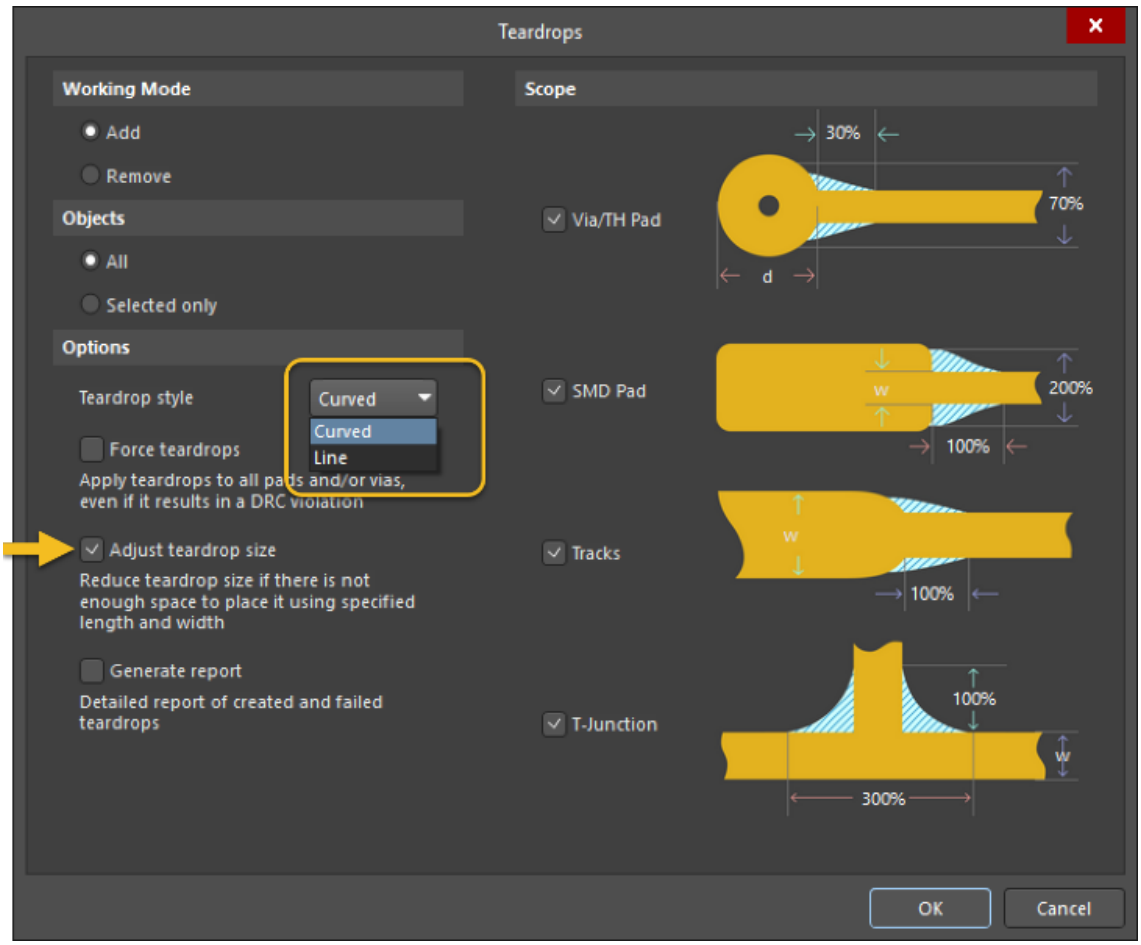


Figure 2. Teardrop Options Dialog

15. Select the **OK** button.

4.2 Teardrop Check

16. Navigate to the Through Hole Pad example in the PcbDoc and observe if the Pad acquired teardrops around the Via. The trace should be connected, as shown in Figure 3 below.

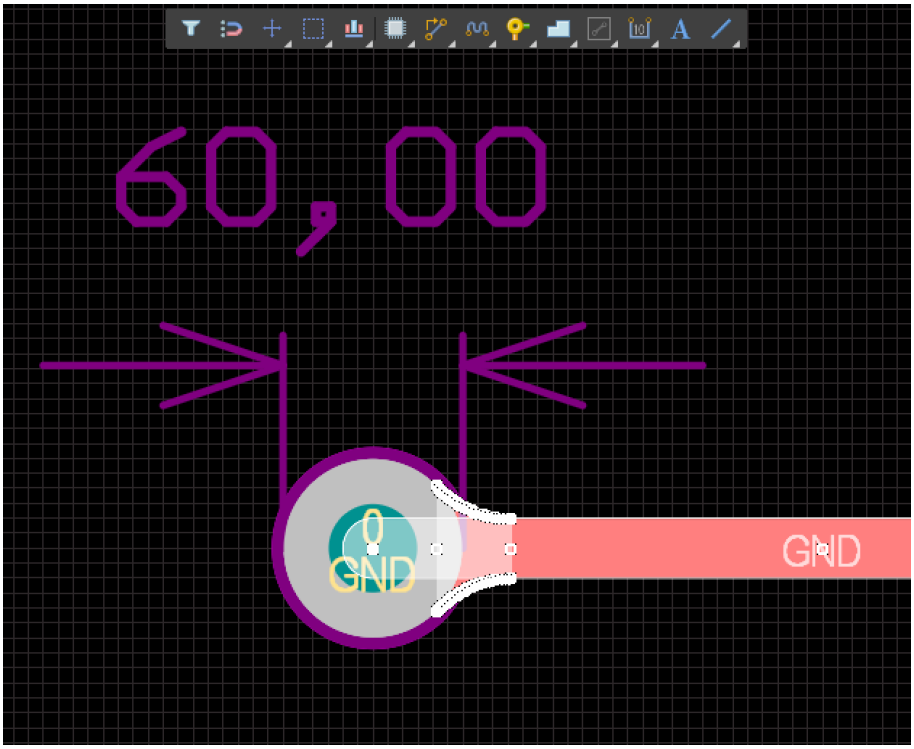


Figure 3. Via with teardrop

17. To confirm if the applied teardrop followed the specifications set forth in the teardrop dialog, open the *View Configuration* panel using the **Panels** button.
18. Select the *View Options* tab in the *View Configuration* panel and select the **Pads Draft** check box. See Figure 4 below.

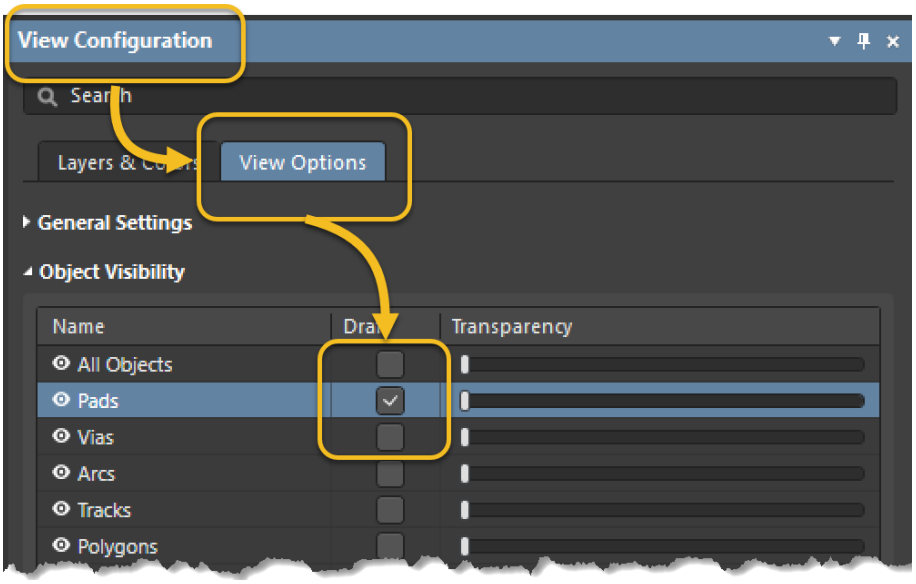


Figure 4. View Configuration Dialog

19. Setting objects into draft mode will change the appearance of an object from solid to outline view. See Figure 5 below.

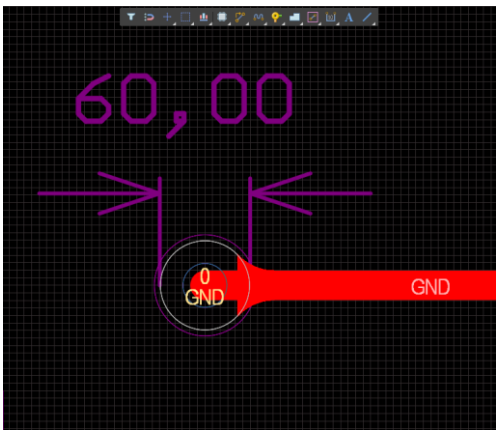


Figure 5. Draft Mode View

20. To measure the teardrop length and width accurately, set the snap grid to 0.1mil. You can set this by pressing **Ctrl+Shift+G » 0.1mil**.
21. Zoom in towards the circular Through-hole Pad.
22. Access **Reports » Measure Distance**.
23. The mouse cursor will now turn into a crosshair. Begin selecting the top tip of the arc as your first point and then the bottom tip of the arc as your second click, Figure 6 below. Pressing **Ctrl** during Measure Distance allows you to temporarily deactivate the Snap to Grid, to position the cursor at the top tip and bottom tip of the arc.

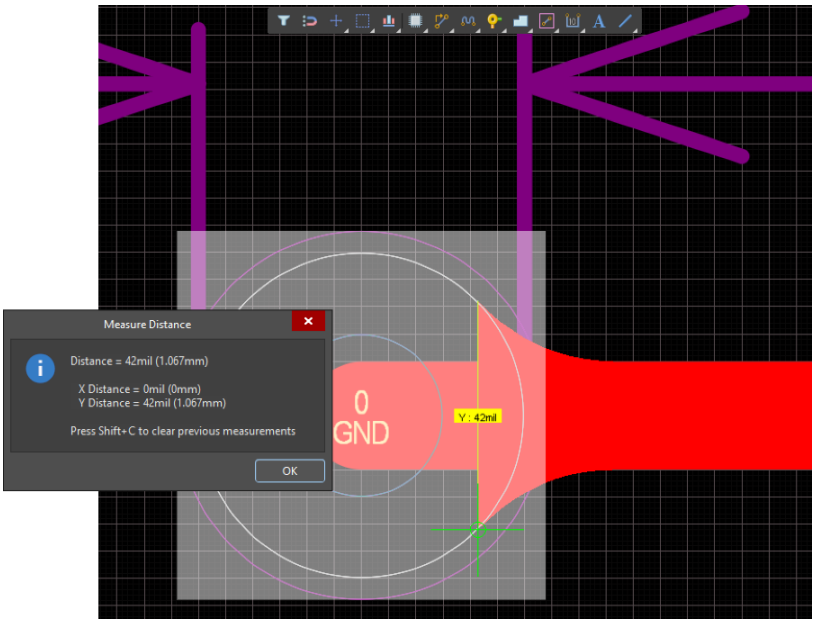


Figure 6. Measuring Teardrop Height

24. The diameter of the Pad is 60mil. By default, the value for Via or Through-hole Pad teardrops is set to 70% for width and 30% for the length. Confirm if the measurement from teardrop tip-to-tip is at least 70% of the width.
25. Set Object for Snapping back to snap for all objects.
26. Press **Shift+C** to remove the overlay information from the measure command.

5 Removing Teardrops

27. Access **Tools » Teardrops** to open the Teardrop dialog.
28. Select the **Remove** radio button in the *Working Mode* section to remove the teardrops you created in this exercise.
29. Select the **All** radio button in the *Objects dialog* to have all teardrops removed.
30. Select the **OK** button.
31. Ensure that you have completely remove all teardrops in the design.

6 Generating Teardrop Report

32. Access **Tools » Teardrops** to open the Teardrop dialog.
33. Select the **Add** radio button in the *Working Mode section* to initiate the generation of teardrops in the next example.
34. Select the **All** radio button in the *Objects* section to add teardrops to all applicable objects on the PCB.
35. In the *Options* dialog, enable **Adjust teardrop size** and **Generate report**, Figure 7.

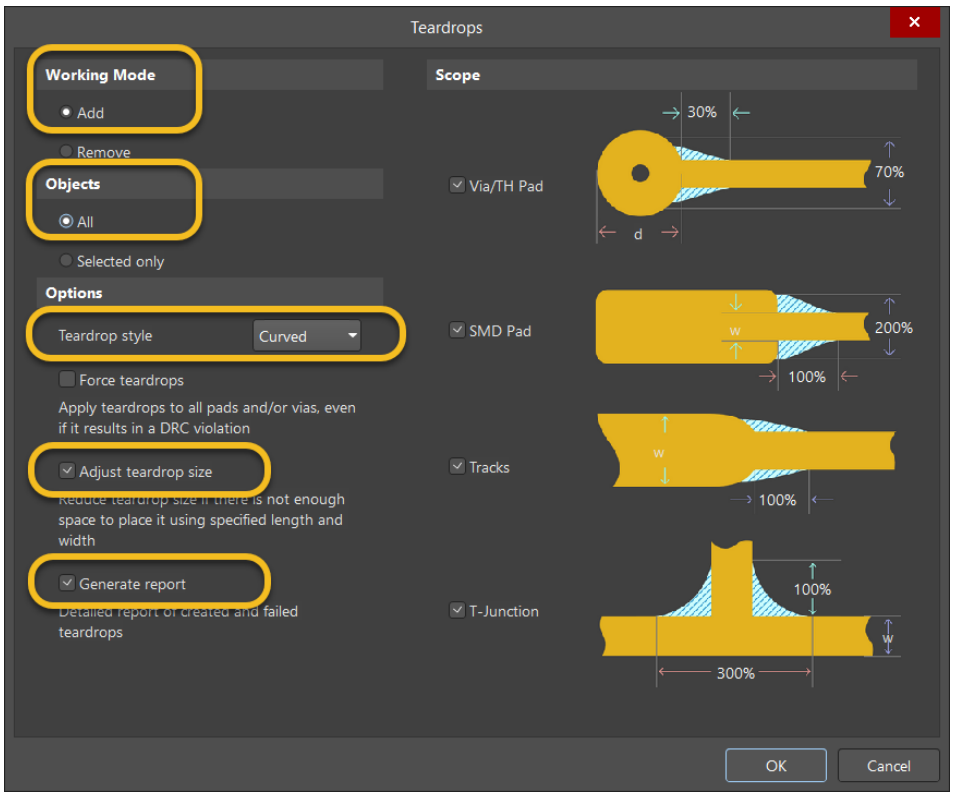


Figure 7. Generating a Teardrop Report

36. Select **OK**.
37. After executing the Teardrop command, a text report is generated. The report indicates how many vias and pads were modified by the tear-dropping algorithm. Also, it displays a detailed list of failures.

38. Moreover, the report provides the X & Y coordinates of all modified Pads or Vias in the workspace, Figure 8.

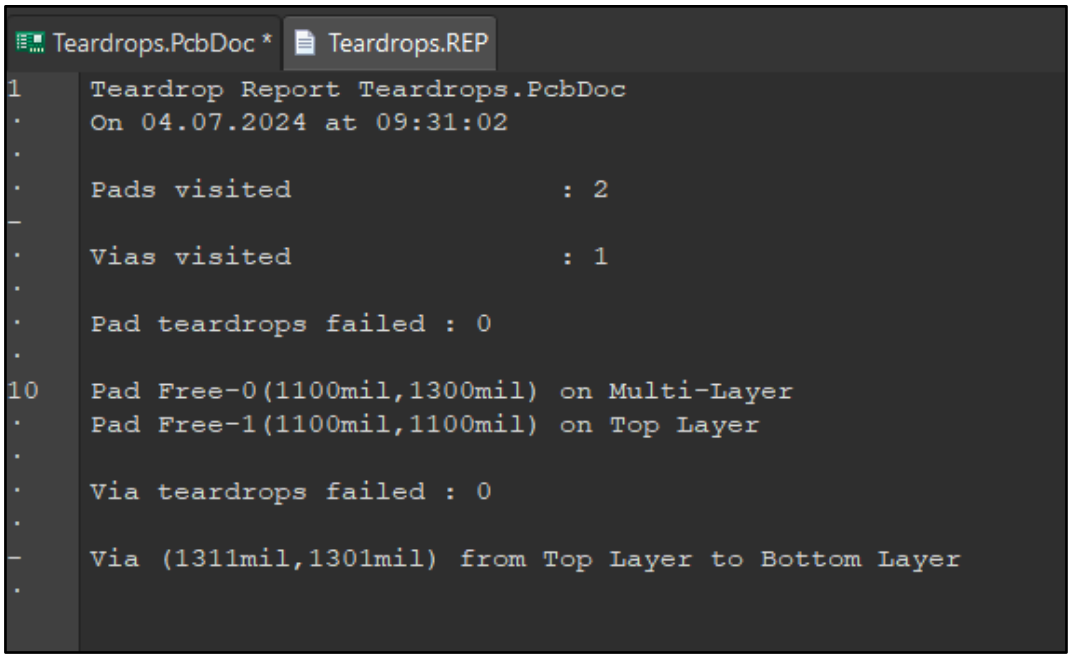
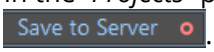


Figure 8. Teardrop Report

39. Save all documents using **File » Save All**.
40. Save the modifications to the server:
    a) In the *Projects* panel, next to the Project name you find the command **Save to Server**  .
    b) Select **Save to Server**.
    c) In the dialog *Save [Project Name]:*
        i) Add the comment `Teardrops - [Add Your Name] - Finished`.
        ii) Select **OK**.
41. When ready, close the project and any open documents, **Window » Close All**.

Congratulations on completing the Module!

Teardrops

from

Altium Designer Advanced Training with Altium 365

Thank you for choosing **Altium Designer**