ADJUST MODEL FOR 3D PRINTING

Printability Checks

Tutorial_V4: 14,0200,1599,1024(SP2)

Introduction

3DXPert for SOLIDOWRKS includes several Analysis Tools, available from the 3DP Analysis menu
This exercise discusses **Printability Check**.
The Printability Check is an analysis tool that validates objects for potential printing problem to check whether they are ready for printing.

When invoking this function, the system automatically checks whether objects are ready for printing.

|		
! **Notice/ Remember**		Left mouse button name is "**_pick_**"
		Middle mouse button name is "**_Exit_**"

Exercise

1. Open a new 3DP project and pick 'Add 3DP Component' tool.
   The 3DXpert for SOLIDWORKS explorer opens up. Browse to the part '3DXpert-Printability Checks-V1.elt' and pick the 'Select' button.
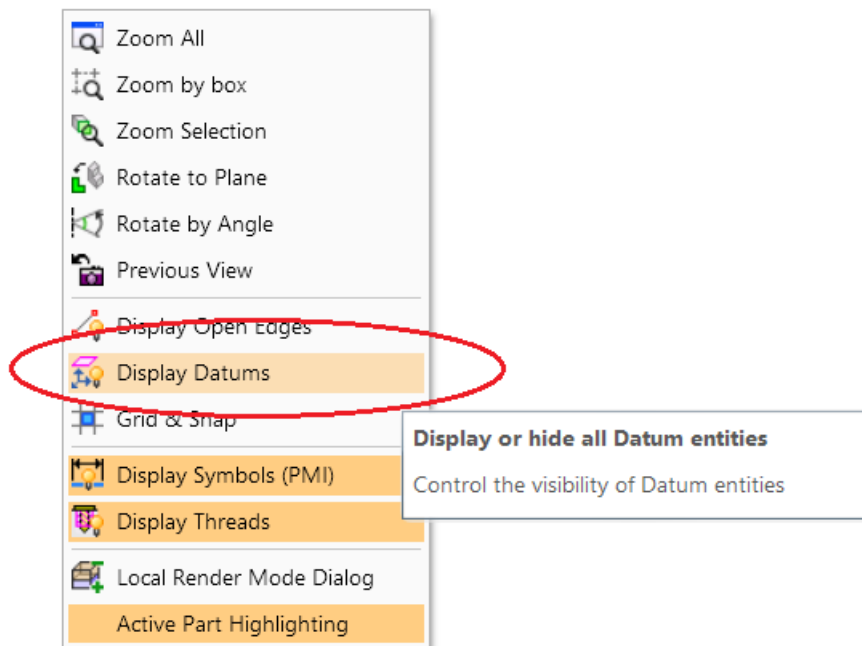2. Pick the option 'Keep Original Orientation' and then pick 'OK'.
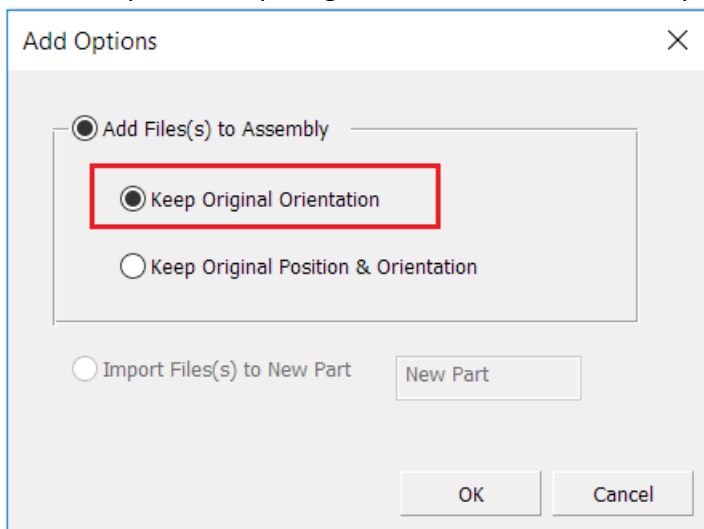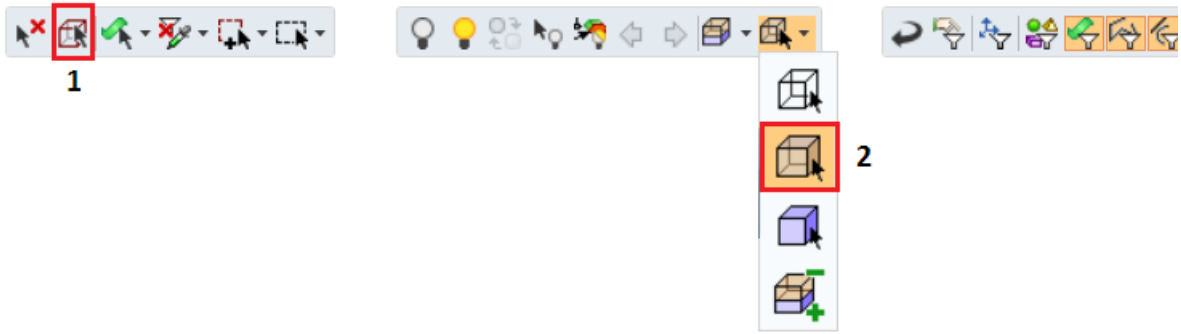
The part will be positioned on the tray:
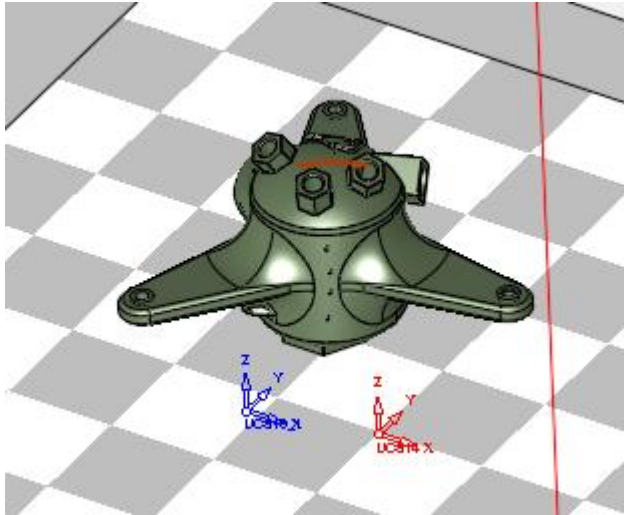
Pick the light bulb from the features tree to Hide the tray
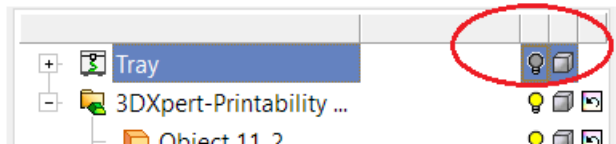
When the cursor hovers above the display area, click the Right Mouse and Middle Mouse buttons together and from the context menu pick 'Display Datum' to hide all datum.
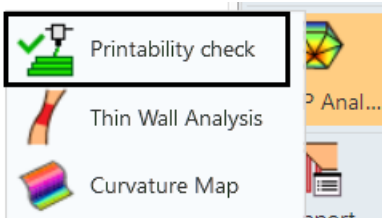

From the floating menu, pick 'Select All' and then pick 'Transparent'
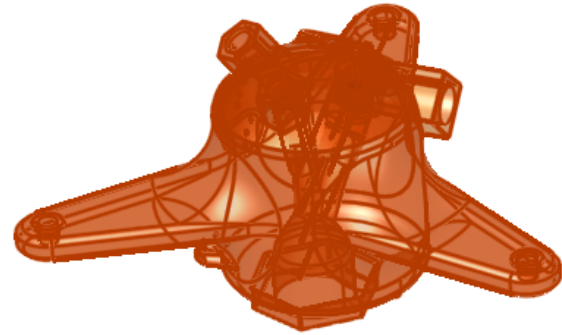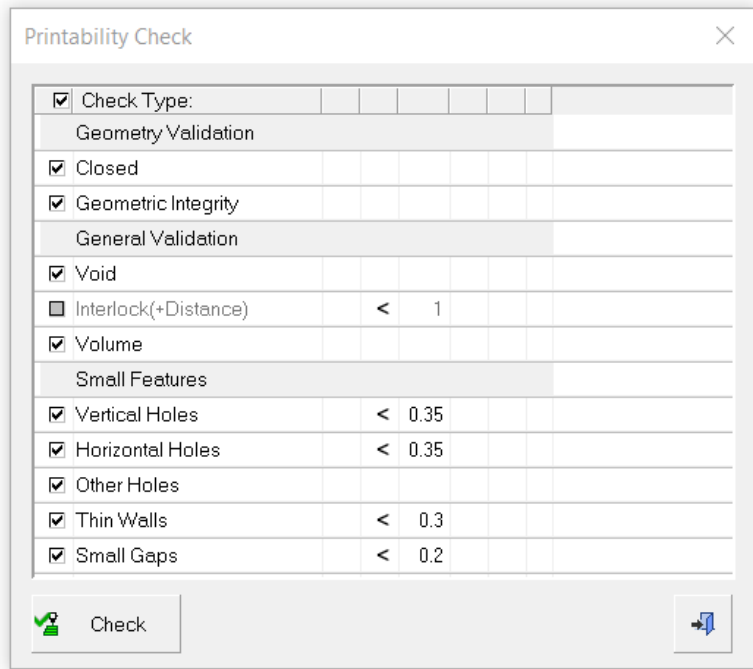
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The model is now shown in transparent display mode and with no datum:
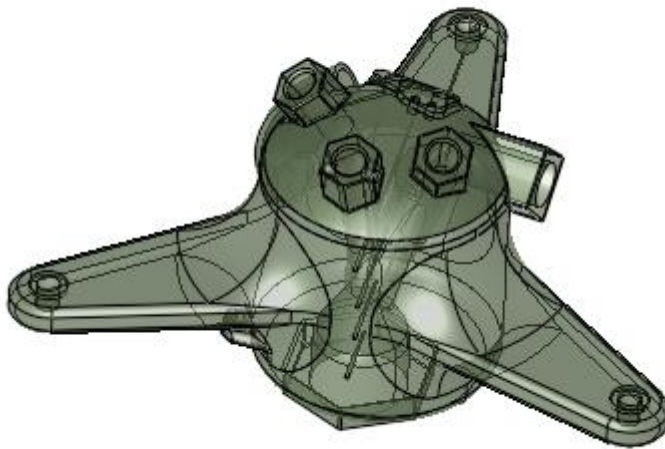
3. From the Guide pick the 'Printability Check' button.

Once Printability Check is invoked, entire model is automatically selected and the dialog opens up:

Printability Check			
☑ Check Type:			
Geometry Validation			
☑ Closed			
☑ Geometric Integrity			
General Validation			
☑ Void			
☐ Interlock(+Distance)	<	1	
☑ Volume			
Small Features			
☑ Vertical Holes	<	0.35	
☑ Horizontal Holes	<	0.35	
☑ Other Holes			
☑ Thin Walls	<	0.3	
☑ Small Gaps	<	0.2	

!	Please note that in this project we have a single part. In general **all** parts in the project are automatically selected and we can unselect and select while inside the interaction.

All the analysis checks are presented, grouped into three sections: 'Geometry Validation', 'General Validation' and 'Small Features'.

Each check type is shown in a separate row and has a checkbox next to it that can be checked or unchecked (Checking ON means to check this type and checking OFF means not to check).

At the top area, there is a checkbox named 'Check Type' that collectively checks or unchecks all the analysis checks together.

Let's explain what each analysis checks:

Closed – checks that the body is closed.

Geometric Integrity - checks that the body is geometrically OK.

Void - checks that there are no areas with internal volume, where powder can be locked without the ability to remove it.

Interlock - checks for interference between parts, if more than one part are positions on the tray.

!	Please notice that in our case this check is greyed out because we have only a **single** object on the tray.

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Volume - checks that all parts are inside the tray's volume.

Vertical Holes - checks for vertical holes that are smaller than the value that is set in the column next to it.

> **!**
>
> For example, here we are looking for holes that are smaller than 0.35:
>
> ☑ Vertical Holes   <   0.35
>
> Those minimum values can be modified in Printability Check dialog.

Horizontal Holes - checks the same as previous check but for horizontal holes.

Other Holes - checks the same for other holes that are not horizontal and not vertical.

Thin Walls - checks for areas with wall thickness that is smaller than the defined value.

Small Gaps - checks for gaps smaller than the defined value.

4. Keep all checks checked ON and pick 'Start Analysis'
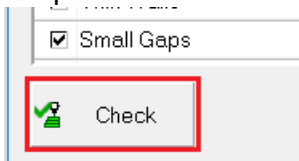
☑ Small Gaps

✔️ Check

After the analysis is calculated the results are shown in the dialog and on the model:
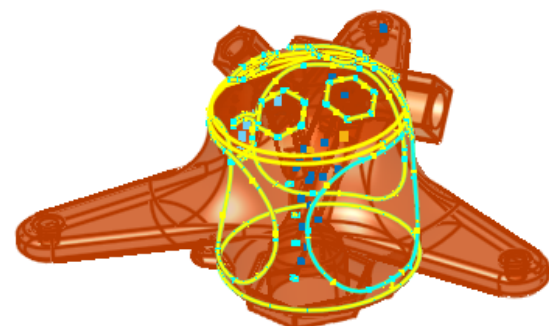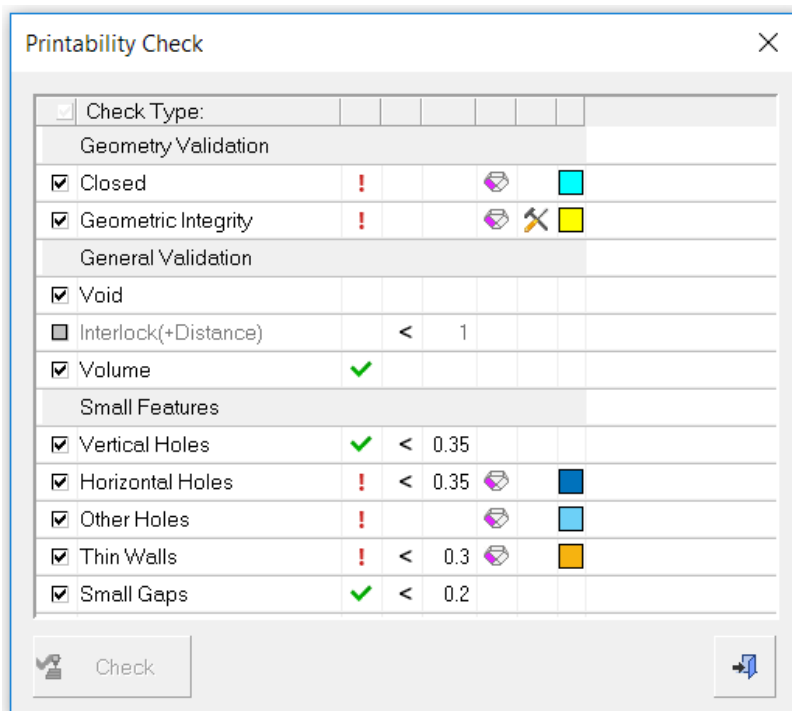
When a check does not find a problem, a green checkmark appears next to it. Here, Vertical Holes and Small Gaps were not found, so we know that we are okay there.

When a check finds a problem (Like in Closed, Geometric Integrity, Horizontal Holes, Other Holes and Thin Walls), a red exclamation mark appears next to it and an additional column with color appears next to the check type. The color is also highlighted in the model.

5. Rotate and zoom the model to view the areas that are marked as "problematic".

6. From the dialog, pick the button indicated below (next to Horizontal Holes check)

See how the model is switched to wireframe mode and hide all marking except horizontal holes:
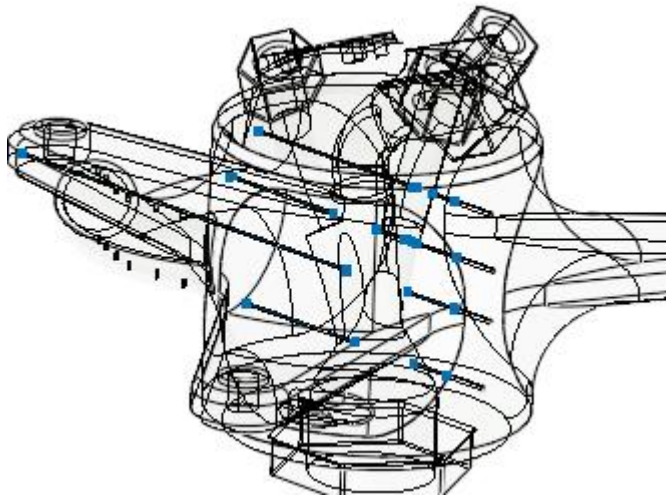
You can zoom closer to view them.

Another pick on this button switch back to the previous state where all check marking are displayed.

Repeat this step in all of the problematic checks and review the results.

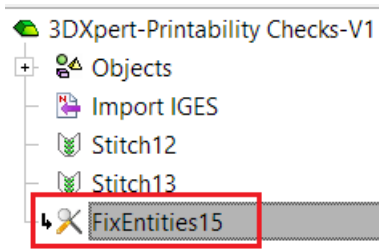7. Next to Geometrical Integrity, pick the button indicated below:

The mark next to Geometrical Integrity turns to ✔ :

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Close the Printability Check dialog and activate the part (By double clicking it on the features tree)

See that a new feature has been created:

End of Exercise.

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