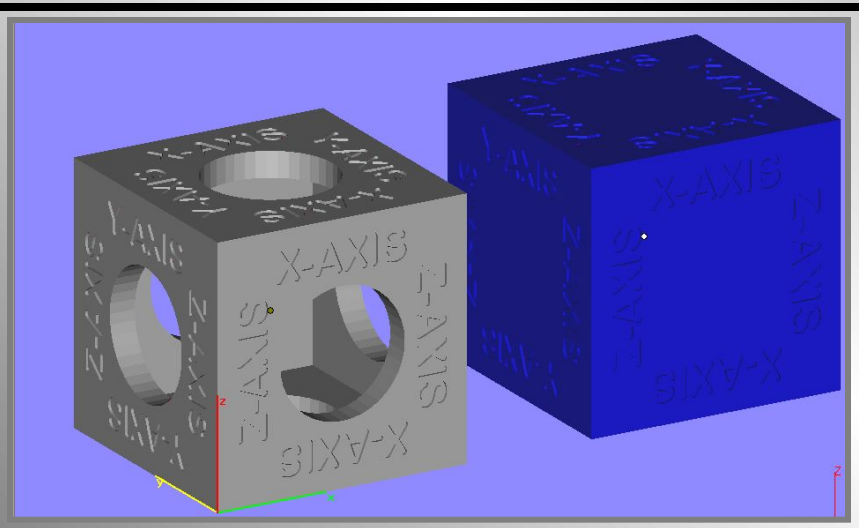
Shrink Compensation



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Application Summary

Material shrinkage occurs in thermoplastics as they transition from liquid state to solid state during the curing process.

The ProJet Accelerator Client Software has features that allow the user to compensate for the natural shrinkage of the material in order to fine tune the accuracy of a part.

The following instructions will explain the process for entering shrink compensation and calibrating a machines using standard calibration cubes. This process can be used for measuring and dialing in accuracy for any geometry.

Shrink Compensation Values for VisiJet Materials

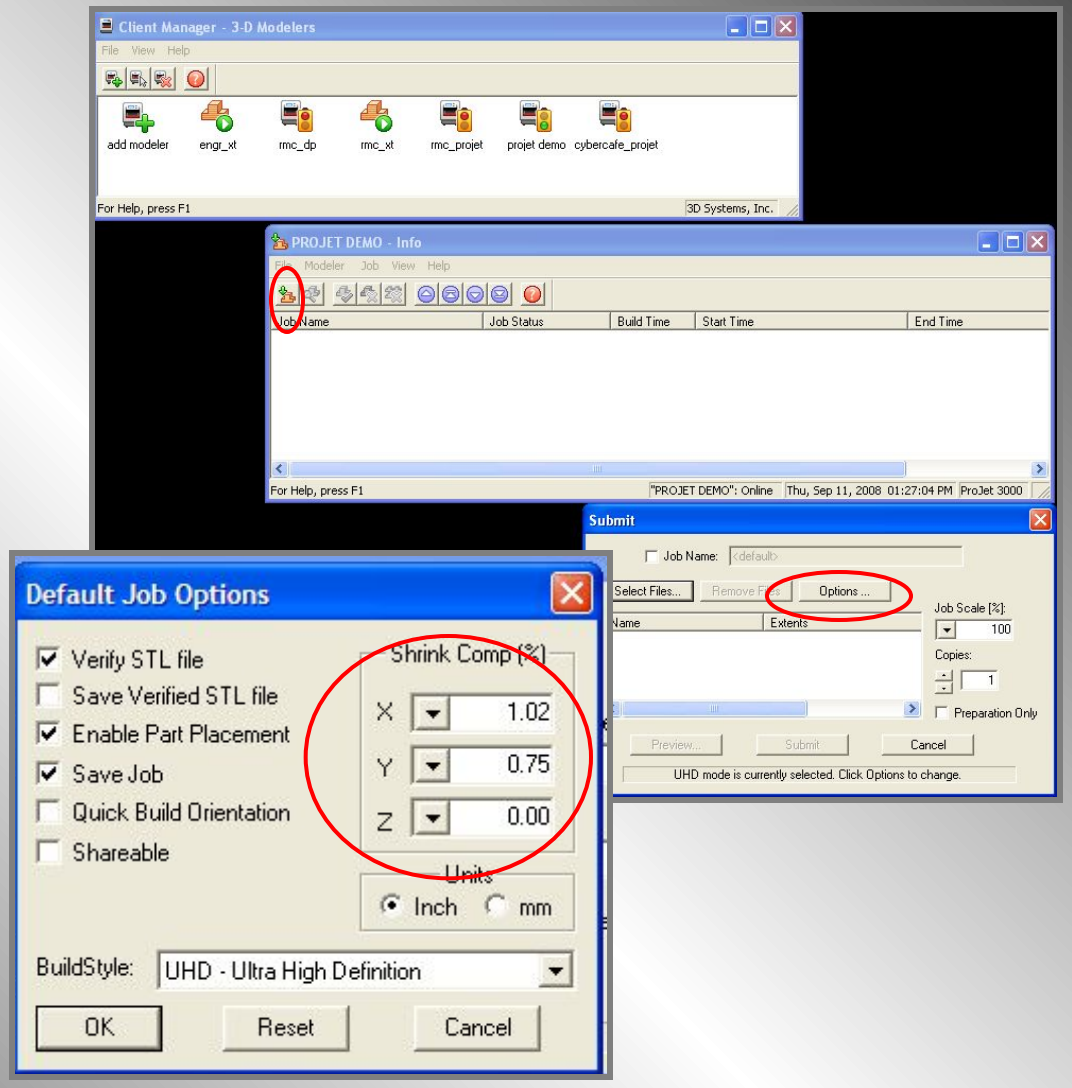
These shrink compensation values serve as general guidelines to setting shrink compensation. Part building and cleaning in a controlled process will best determine the optimal shrink compensation values for a particular geometry.

Material	X value	Y value	Z value
SR200	1.01%	1.01%	0.00%
HR200	1.01%	1.01%	0.00%
EX200	1.01%	0.75%	0.00%
MX	0.60%	0.60%	0.00%
DP200	1.01%	1.01%	0.00%
MP200	1.01%	0.75%	0.00%

Enter Default Shrink Comps for Material in Use

- Open ProJet Accelerator Client software and select the desired printer.
- Select the "Submit" icon to start a build session.
- Select the "Options…" icon as indicated.
- Within the "Options" panel, enter shrink compensations values for X or Y or Z

- SEE TABLE ABOVE FOR SHRINK COMP VALUES FOR THE MATERIAL BEING USED.



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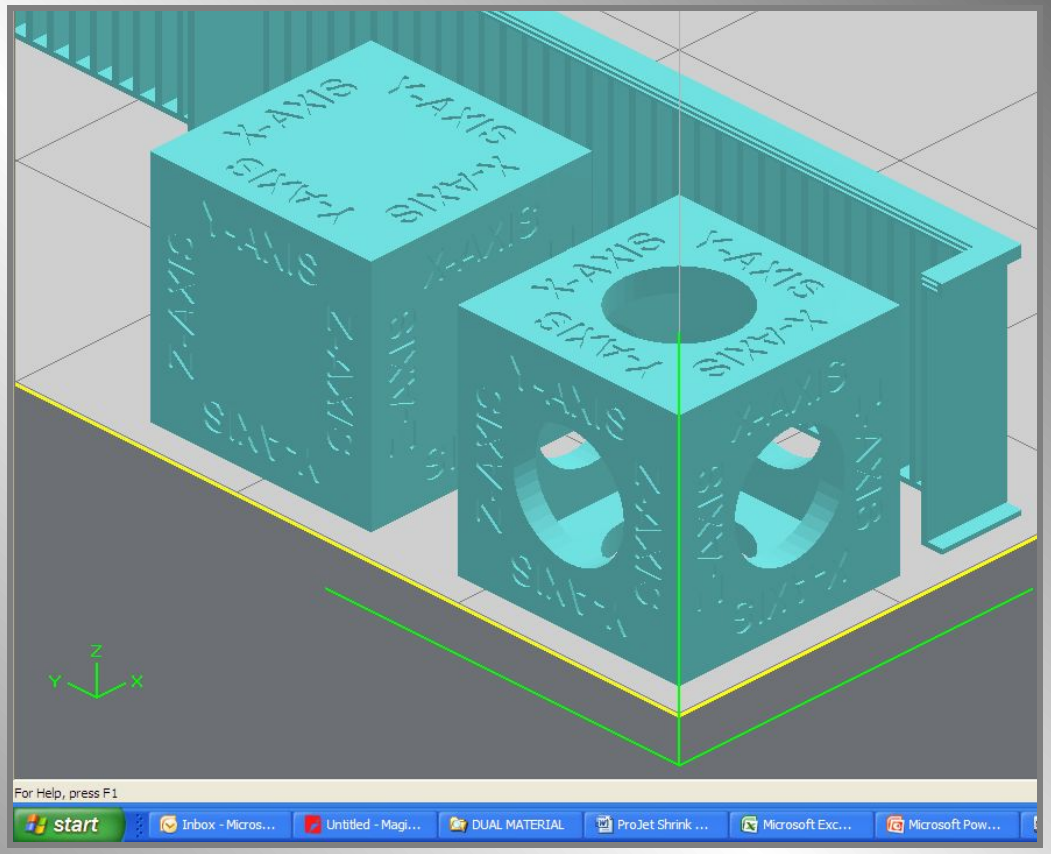
Build Calibration Cubes (1st Iteration)

- Use the two calibration cubes (solid and hollow) that accompany this manual.
- Set up build with one of each calibration cube in the correct orientation.
- Build and post process calibration cubes using standard cleaning methods.



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Take Measurements and Determine Scaling Factor

Use the calculation spreadsheet that accompanies this manual to determine the required scaling factor OR do calculation by hand using the following formulas:

X Scaling Factor = $(X_{CAD} - X_{PART})/ X_{CAD} * 100\%$ (answer will be as a percentage)
Y Scaling Factor = $(Y_{CAD} - Y_{PART})/ Y_{CAD} * 100\%$ (answer will be as a percentage)

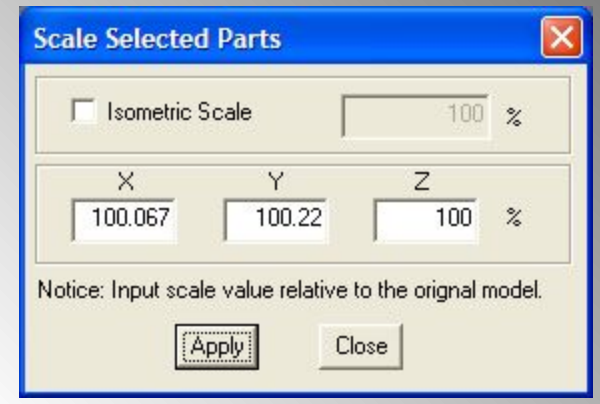
EXAMPLE:
X measurement of CAD model = 3.000”
Y measurement of CAD model = 5.000”

X measurement of printed part = 2.998”
Y measurement of printed part = 4.989”

X Scaling Factor = (3.000 – 2.998)/3.000 *100 = 0.067%
Y Scaling Factor = (5.000 – 4.989)/5.000 * 100 = 0.22%

Enter "Scaling Factor" for Repeat Build (2nd Iteration)

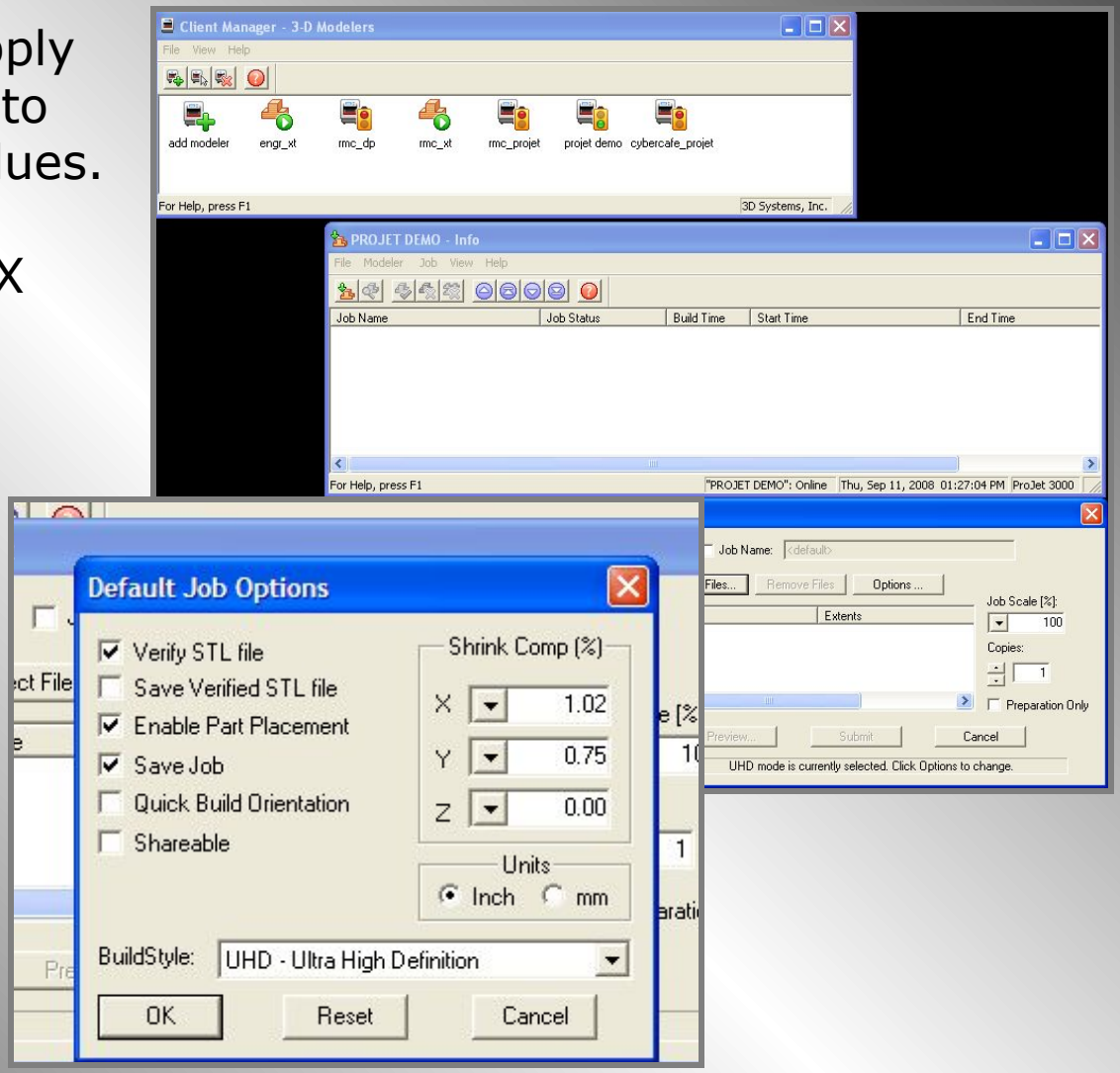
- Open ProJet Accelerator Client software and select the desired printer.
- Load the calibration cubes.
  - Open Print Preview to view the models. Select the models (color should be yellow)
- Select the "Scale" Icon
- Uncheck the "Isometric Scale" button. This allows user to make individual x and y adjustments.
- In the previous example, the x scaling factor should be 100% + 0.067% = <u>100.067%</u>
- The y scaling factor should be 100% + 0.22% = <u>100.22%</u>
- Enter these two numbers in the corresponding scaling boxes for x and y.



Modify Default Shrink Comp Values

Another alternative is to apply the x,y or z scaling factors to the default shrink comp values.

For Example - Change the X shrink comp to: 1.02% + 0.067% = <u>1.087%</u>



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FINAL NOTES AND TIPS

- Once the calibration cubes have been used to determine optimum shrink compensation values, these values can remain in the software to be used with all builds.

- 1- 2 iterations should be sufficient to achieve the desired dimensional accuracy based on a controlled part cleaning process.

- This process should be performed in both HD mode and UHD mode to fully understand how parts may behave in the different modes.