



3DXpert™ for SOLIDWORKS®

PRINT ESTIMATION

Tutorial_V5 - Updated: 14,0200,1599,1024(SP2)

With 3DXpert, it is possible to get an estimation of cost and time at any stage during the design, also before slicing is executed.

On screen real-time material and time estimation are displayed as you work, values dynamically updating as you add material, supports and lattices.

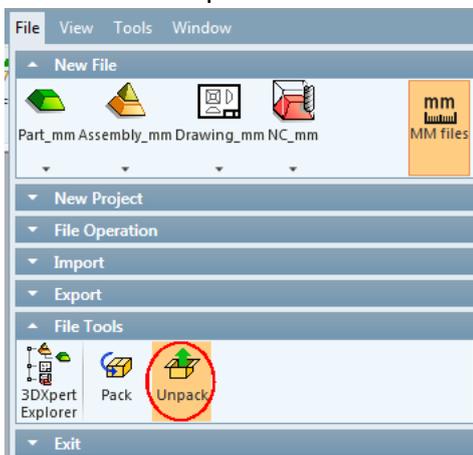
In this exercise, you will learn how to setup the Print Estimation based on your printer and other requirements.

<p>! Notice/ Remember</p>		Left mouse button name is " <i>pick</i> "
		Middle mouse button name is " <i>Exit</i> "
		Right mouse button name is " <i>Click</i> "

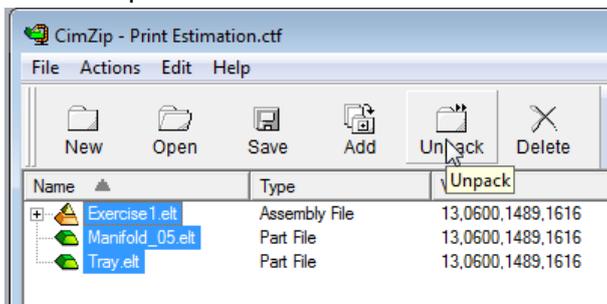
Disclaimer:

The parameters used in this guide are fictive and serve for training purposes only. These should not be regarded as recommended settings for actual printing estimation.

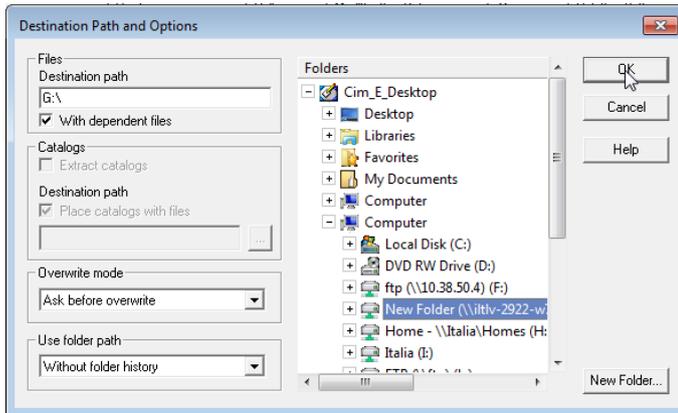
1. Unpack the file 'Print Estimation.ctf'
 - a. Select File>>Unpack and select the file 'Print Estimation.ctf'



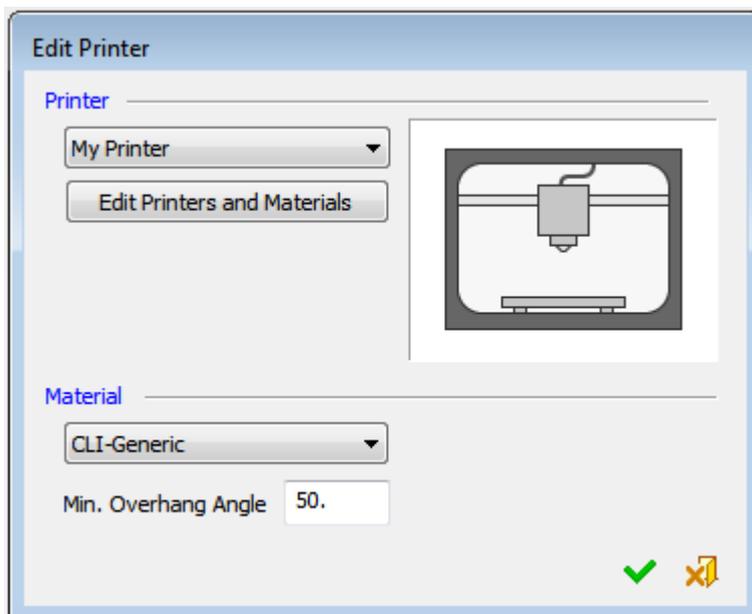
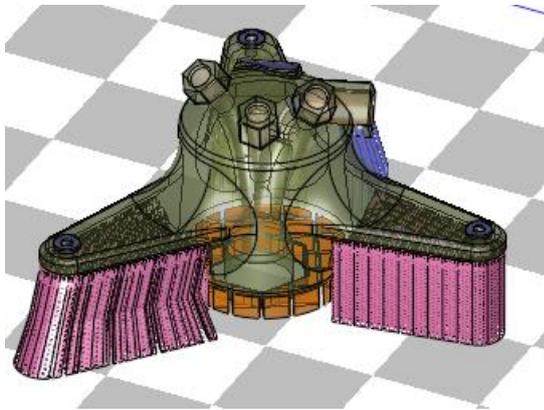
- b. Select Unpack

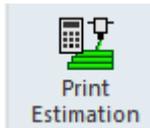


c. Set the destination and select ok



2. Load the project Exercise 1.elt
3. In this project we already defined the printer and the supports and did the calculation





4. Select Print Estimation

The following dialog shows the material volume, which is required to produce the part, the supports, the lattice or any other printable, the time to produce these volumes and the cost. While volumes are calculated by the system, the time is calculated based on predefined build rates. These are therefore, estimations.

Part 1 – Types of Print Estimation

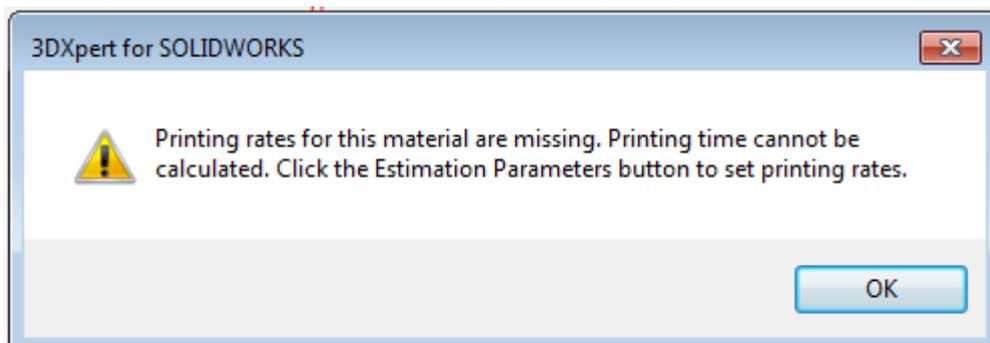
Volume Based Calculation

Some of the data is colored red; this indicates that the values are estimated. The values for Time are calculated based on published build rates of the printer.

Note: You can manually change the printing rates as we will see later on this document.

	Material [cm³]	Time [hh:mm:ss]	Cost [USD]
Parts	81.96		737.65
Supports	17.79		160.08
Lattices	2.08		18.72
Between Layers		04:47:33	
Machine Time			43.13
Total	101.83	04:47:33	959.59
Powder Volume	3,594.45		

Entering Print Estimation the following message pops up



This message will not show up after we enter build rates values.

Scanpath Based Calculation

This option is available if a scan path exists in the file.

Meaning, we already calculated the slicing and this resulted in a full scan path.

In this case the estimation can be more accurate.

Note:

This option disabled here, since the slicing calculation of 3DXpert for SOLIDWORKS results in the outer boundary of the model (CO contours).

Let's see what are the parameters that are displayed in this dialog:

Parts - Indicates the volume of all bodies that are printed (not including supports or lattices) the time it will take to print them, and the material cost.

Supports - Indicates the volume of all supports, the time it will take to print them, and the material cost.

Lattices - Indicates the volume of all lattices, the time it will take to print them, and the material cost.

Between Layers - Indicates the accumulated time of recoating (between layers time X amount of layers)

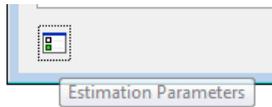
Machine Time - Indicates the cost of the machine time (machine time cost per hour X total time).

Total - Indicates the sums of all three columns.

Powder Volume - Indicates the total volume of powder required for this print. See formula below

Part 2 –Estimation Parameters

5. Select 'Estimation Parameters'



6. The following dialog pops up:

Estimation Parameters

Currency:

Material:

Material Cost: USD per cm³

Machine:

Default Layer Thickness: μm

General Printing Rate: mm³ per sec.

Part Printing Rate: mm³ per sec.

Support Printing Rate: mm³ per sec.

Lattice Printing Rate: mm³ per sec.

Machine Time Cost: USD per hour

Time between Layers: sec.

Present on 3DXpert projects :

Printer Name

Material Name

Material Time Cost

Parts

Supports

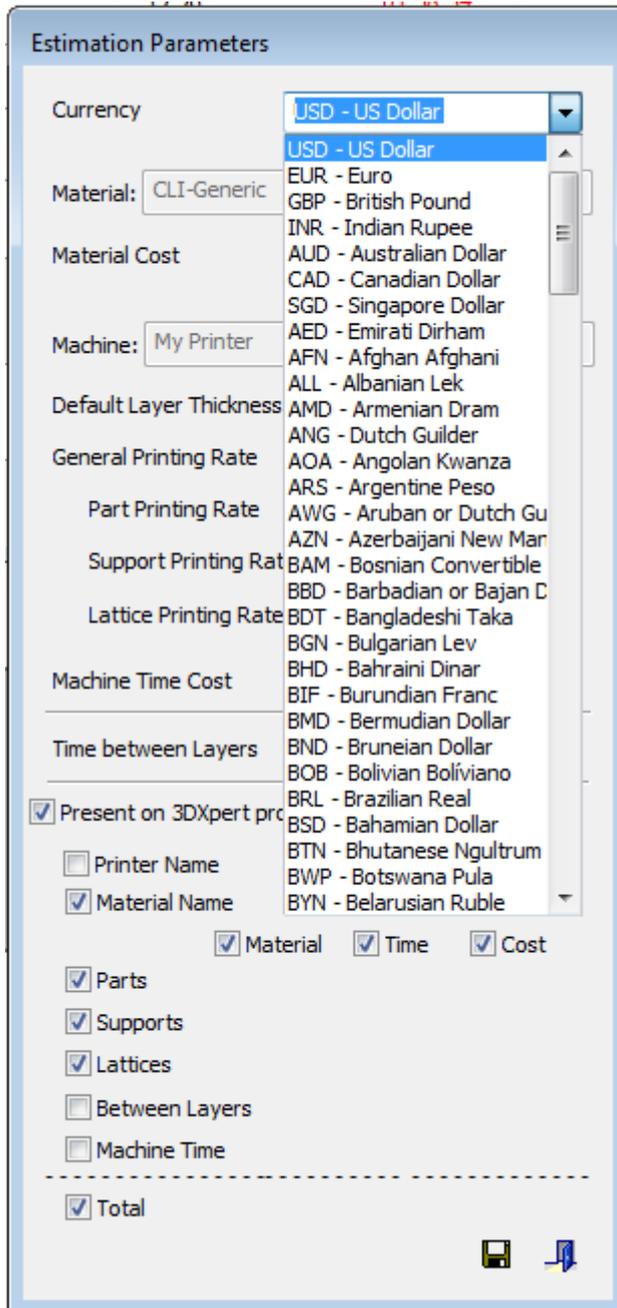
Lattices

Between Layers

Machine Time

Total

Currency - Select a currency from a drop down list



The Parameters:

Material - This value is shown for reference. The material is set through the 'Edit Printer' dialog

Material Cost – The cost is based on volume (per cm^3)

Machine – This value is shown for reference. The machine is set through the Edit Printer dialog

Default Layer Thickness – The default value is **30 μm** . This default value is inherited from the default as set in Edit Printer >>Edit Printer Parameters

General, Part, Support and Lattice Printing Rate - values defined in mm^3 per sec.

Time Between Layers - Presents the **Recoating Time**



7. Set the values as in the image below and select 'Save_Close'

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Estimation Parameters

Currency: USD - US Dollar

Material: CLI-Generic

Material Cost: 6.00 USD per cm³

Machine: My Printer

Default Layer Thickness: 30.00 μm

General Printing Rate: 1.00 mm³ per sec.

Part Printing Rate: 2.00 mm³ per sec.

Support Printing Rate: 2.50 mm³ per sec.

Lattice Printing Rate: 0.80 mm³ per sec.

Machine Time Cost: 2.50 USD per hour

Time between Layers: 2 sec.

Present on 3DXpert projects :

- Printer Name
- Material Name
 - Material
 - Time
 - Cost
- Parts
- Supports
- Lattices
- Between Layers
- Machine Time

Total

8. See that the costs and times changes accordingly

	Material (cm³)	Time (hh:mm:ss)	Cost (USD)
Parts	81.96	11:23:00	491.77
Supports	17.79	01:58:34	106.72
Lattices	2.08	00:43:19	12.48
Between Layers		01:03:54	
Machine Time			37.87
Total	101.83	15:08:49	648.84
Powder Volume	3,594.45		

Present on 3DXpert projects:

Present on 3DXpert projects :

- Printer Name
- Material Name
 - Material
 - Time
 - Cost
- Parts
- Supports
- Lattices
- Between Layers
- Machine Time
-
- Total

If the checkbox is turned off – all other checkboxes below it keep their status but are disabled, and nothing is shown on the screen, and the **calculation** process stops.

The calculation process updates the on screen values whenever performing a geometrical change.

If nothing is presented on the screen – the calculation stops

Printer Name

Material Name

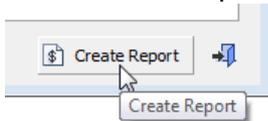
All 3 columns and 6 rows mentioned above

The volume and the resulting time and cost estimations are updated after every geometrical change

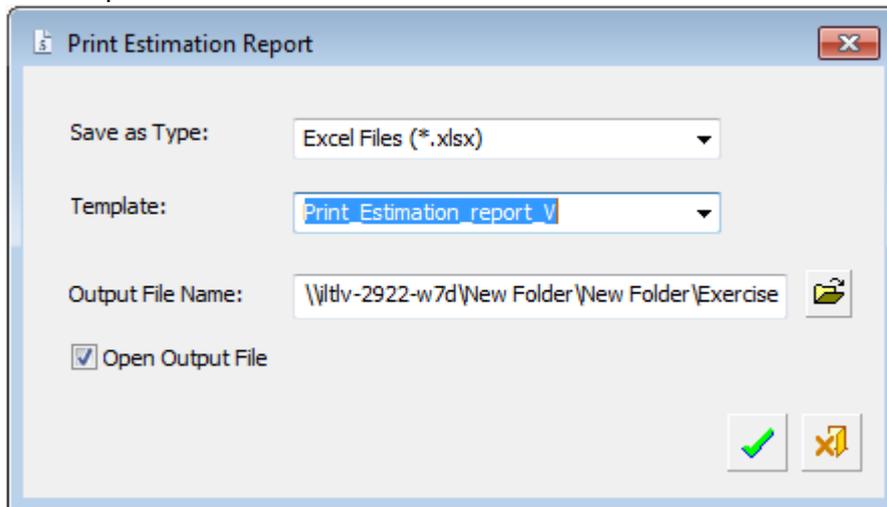
Printer:	ProX DMP Training		
Material:	Ti6Al4VGrade5		
	Material (cm^3)	Time (hh:mm:ss)	Cost (USD)
Parts	67.86	07:46:05	491.77
Supports	7.32	00:11:12	106.72
Lattices	1.84	00:00:00	12.48
Total	101.83	09:01:09	646.17
Temporarily active Units: mm			

Part 3 – Print Estimation Report

9. Select Create Report



10. Set the parameters as below and select ok



11. A report with two sheets is opened

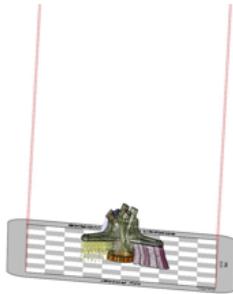
Raw Data

Description	Tag name	Value
Project Name	Project Name	Exercise1
Report Date	Modified	28-Jan-18
Comment	Comment	
Approved By	ApprovedBy	
Created By	CreatedBy	BenvenisteG
Revision	Revision	
Project units	Units	mm

Print Estimation



Print Estimation Report - Volume Based Estimation - Exercise1



Printer Name: **My Printer**
 Material Name: **CLI-Generic**
 Project name: **Exercise1**

Material (cm ³)		Time (hh:mm:ss)		Cost (USD)	
Part Material:	81.96	Part Time:	11:23:00	Part Cost:	491.77
Support Material:	17.79	Support Time:	01:58:34	Support Cost:	106.72
Lattice Material:	2.08	Lattice Time:	00:43:19	Lattice Cost:	12.48
		Between Layers Time:	01:03:54	Machine Time Cost:	37.87
Total Material:	101.83	Total Time:	15:08:49	Total Cost:	648.84

Sizes		General Parameters	
Total Build Height (mm):	57.51	Currency:	USD
Tray X (mm):	250	Material Cost per cm ³ :	6
Tray Y (mm):	250	Layer Thickness:	0
Tray Z (mm):	400	General Printing Rate (mm ³ per sec.):	1
Powder Layer Height (mm):	0	Part Printing Rate (mm ³ per sec.):	2
Powder Volume (cm ³):	3594.5	Support Printing Rate (mm ³ per sec.):	2.5
		Lattice Printing Rate (mm ³ per sec.):	0.8
		Recoating Time (sec.):	2
		Machine Time Cost per hour (USD):	2.5

End of Exercise.