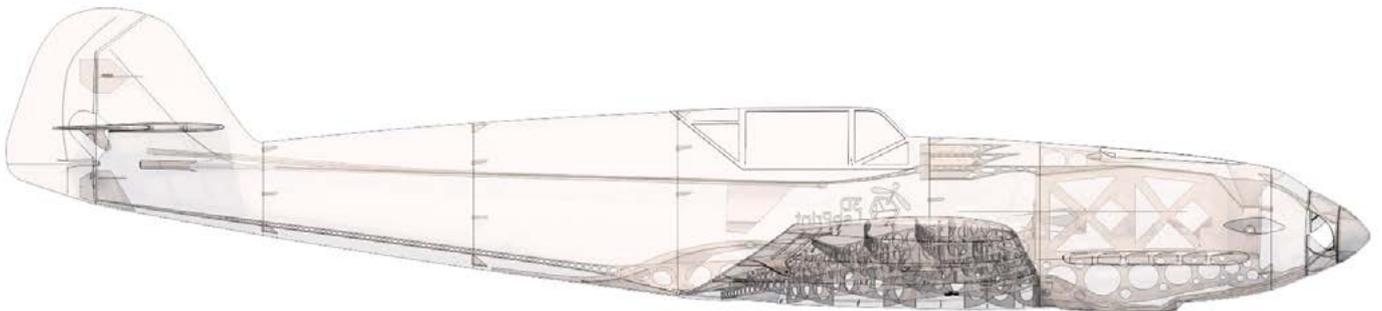# User Guide  rev. 2016/09

Fully 3d printable

# Messerschmitt Bf 109 T

scale 1:12, wingspan 978mm (38.5in)

# 3D Lab Print Messerschmitt Bf 109 T – fully printable R/C plane for your home 3Dprinter

**Future of flying - Print your own plane**

We still trying move things further, so this project is again full of other improvements for better durability , easier assembly , better geometry solution and so on..., we hope you enjoy it, although this print may test your competencies to and quality of your printer (welcome to the thin wall printing)

## The first fully printable airplanes with suitable files prepared for your 3Dprinter.
Flight charecteristics are comparable or even better than classic build model airplane.
Simply download and then print it anytime you need only for $10 (filament cost).
This is not a dream, now you can print this HI-TECH .... at home, print spar parts, and so on...

## Extensive hi-tech 3d structural reinforcement which makes the
model very rigid while still maintaining lightweight airframe and exact airfoil even when it is made only from plastic. This perfect and exact 3d structure is possible only due to aditive 3dprinting technology. So welcome to the 21th century of model flying. Be The first at your airfield.

## Easy to assembly, you do not need any extra tool or hardware, you only need to
glue printed parts together and make pushrods for control. The rest of the assembly is very easy.Simply add brushless motor, ESC, servos and radio system. Don´t worry, detailed step by step PDF/VIDEO is included.
You will get superb performance airplane with High efficient powerplant which let you fly 7+ minutes at full throtle with the speed exceeding 150 kph (HP setup). On the other hand low stall speed is achived for easy landing.
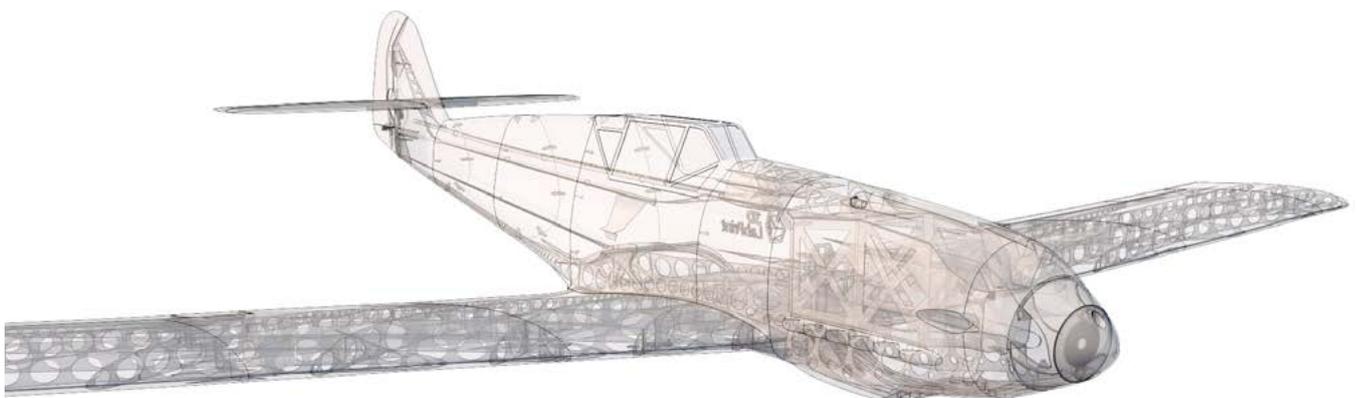
# General specifications Me 109 T

| | |
|---|---|
| Lenght: | 771mm,  30.35in |
| Wingspan: | 978mm,  38.5in |
| Height: | 170mm,  6.7in |
| Wing  area: | 17.5  dm2 |
| Wing  loading: | 51.0  g/dm2 |
| Airfoil: | aircombat  modificated |
| Print  weight: | 410g(14.5oz) |
| Takeoff  weight  (6s  1300  lipo): | 821g(28.9oz) |
| Max  takeoff  weight: | 960g(33.8oz) |
| Never  exceed  speed,  VNE: | 205km/h |
| Design  maneuvering  speed,  VA: | 165km/h |
| Stall  speed,  VS: | 33km/h |

## Powerplant

| | |
|---|---|
| Propeller: | aeronaut ELP 9/6 or APC 9/6 − 9/7.5 |
| Motor: | AX-4008Q/620KV, 22pole brushless HE electric motor |
| ESC: | Castle Creations TALON 25 |
| Battery: | Turnigy nanotech 1300 mAh/6s/22.2V, 206g, 25C |

## Performance measurment

Max RPM and Amps (static):      12 000/min with APC 9/6, current 19A
11 550/min with APC 9/7.5, current 21A

Max RPM and Amps (level flight):    13 700/min with APC 9/6, current 12A
12 400/min with APC 9/7.5, current 13.5A

Max speed VH (level flight):     135 km/h − 67.5kn − 78 mph with APC 9/6
150 km/h − 73kn − 84 mph with APC 9/7.5

Rate of climb:      29 m/s (5 373 ft/min) with APC 9/6
32 m/s (5 728 ft/min) with APC 9/7.5

Flight time (6s 1300mAh/full):      7:40 with APC 9/6
5:30 with APC 9/7.5
7:40 with aeronaut ELP 9/6
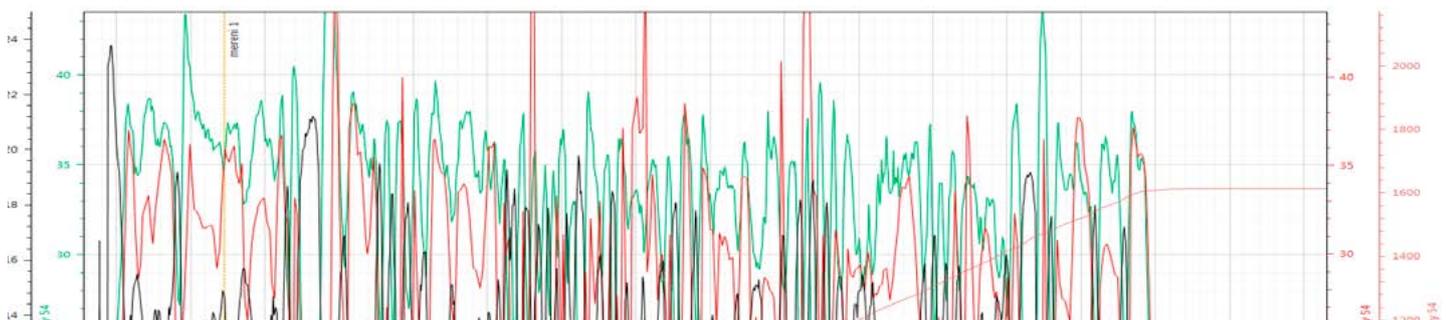
# Messerschmitt Bf 109 T, History

The Messerschmitt Bf 109, commonly called the Me 109 (most often by Allied aircrew and even amongst the German aces themselves, even though this was not the official German designation), is a German World War II fighter aircraft designed by Willy Messerschmitt and Robert Lusser during the early to mid-1930s.The "Bf 109" designation was issued by the German ministry of aviation and represents the developing company Bayerische Flugzeugwerke (at which the engineer Messerschmitt led the development of the plane) and a rather arbitrary figure. It was one of the first truly modern fighters of the era, including such features as all-metal monocoque construction, a closed canopy, and retractable landing gear. It was powered by a liquid-cooled, inverted-V12 aero engine.

The Bf 109 first saw operational service during the Spanish Civil War and was still in service at the dawn of the jet age at the end of World War II, during which time it was the backbone of the Luftwaffe's fighter force.From the end of 1941, the Bf 109 was steadily being supplemented by the superior Focke-Wulf Fw 190.

The Bf 109 was flown by the three top-scoring German fighter aces of World War II, who claimed 928 victories among them while flying with Jagdgeschwader 52, mainly on the Eastern Front. The highest scoring fighter ace of all time, Erich Hartmann of Germany, flew the Bf 109 and was credited with 352 victories (and also survived the war).

Tony version:
Seven earlier versions (Bf 109 B, Bf 109 C, Bf 109 E) were converted to test carrier equipment. This included, adding a tail-hook, catapult fittings and increasing the wingspan to 11.08 m (36.35 ft). The ailerons were increased in span, as were the slats, and flap travel was increased. The wings were not modified to be folding since the ship Graf Zeppelin was designed around the intended aircraft, so the lifts could accommodate the Bf 109T with its 11 m (36 ft) wing-

span.

# Included:

## 1.STL 3d files

universal STL files designed for use with desktop FMD 3d printers and slicer software as

Simplify3D (recommend) CURA or MatterControl (this STLs are not compatible with Slic3r).

## 2.Factory files for Simplify3D slicer
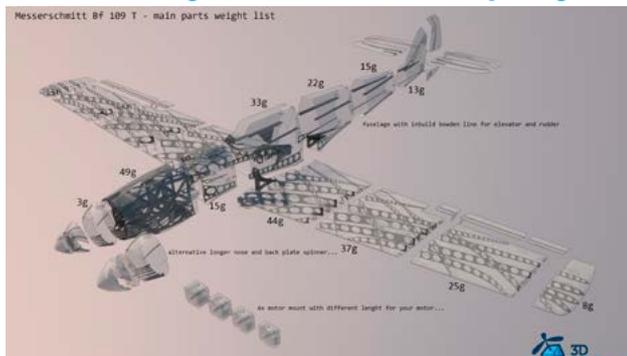


with all our setting, this Factory files included all you need, note: we use PRUSA i3 ORIGINAL printers so you may need adjust the basic printing parameters to match your printer or use it

as a start point for you, please give a look to Simplify3D

## 3.Step By Step PDF/VIDEO userguides
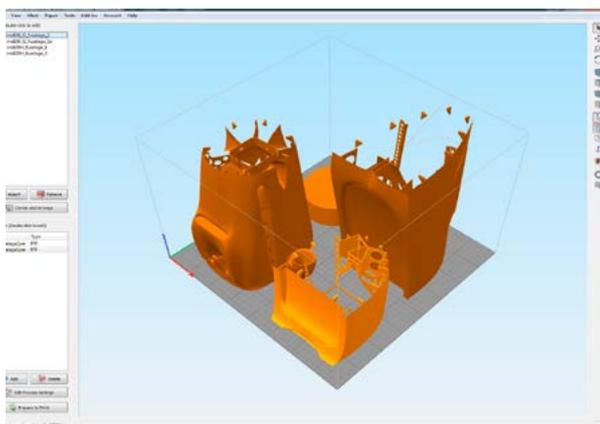


Apart from this userguide, please give a look to the Printing Guide with some Tips and Advices for airplane printing (Thin Wall Printing)

## 4.Gcodes

Basic Gcodes prepared for direct use, so universal as is possible. Should work with i3 style printers, you can try it out, but We can not guarantee that it will work with your printer. 100% works with PRUSA i3 ORIGINAL 3d printers...
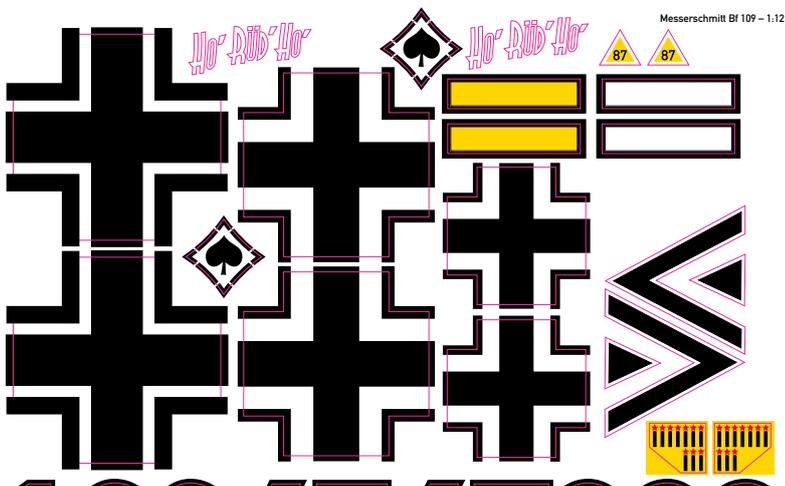
# 5.Prepared settings for CURA and MatterControl slicers

If you dont like Simplify3D for any reason, there is always possibility to use another free slicer you can use our basic setting (setting files) as a start point and edit it as you need.
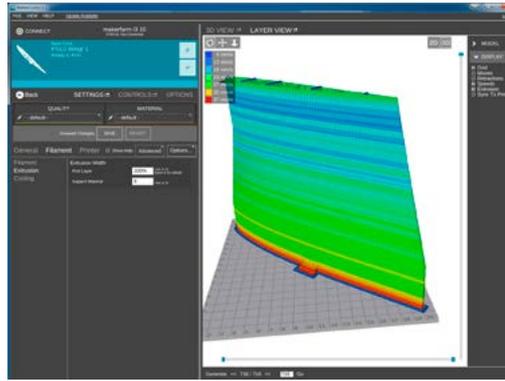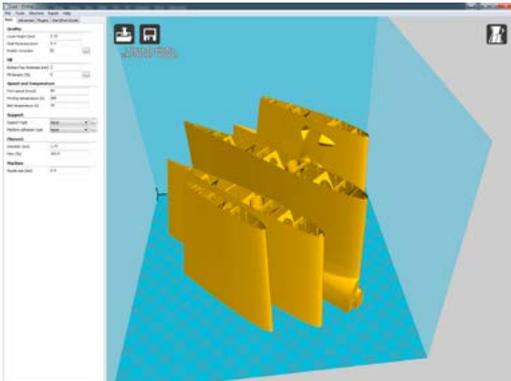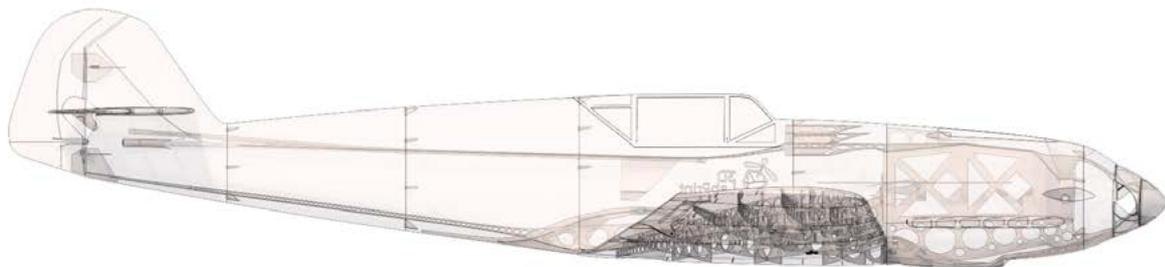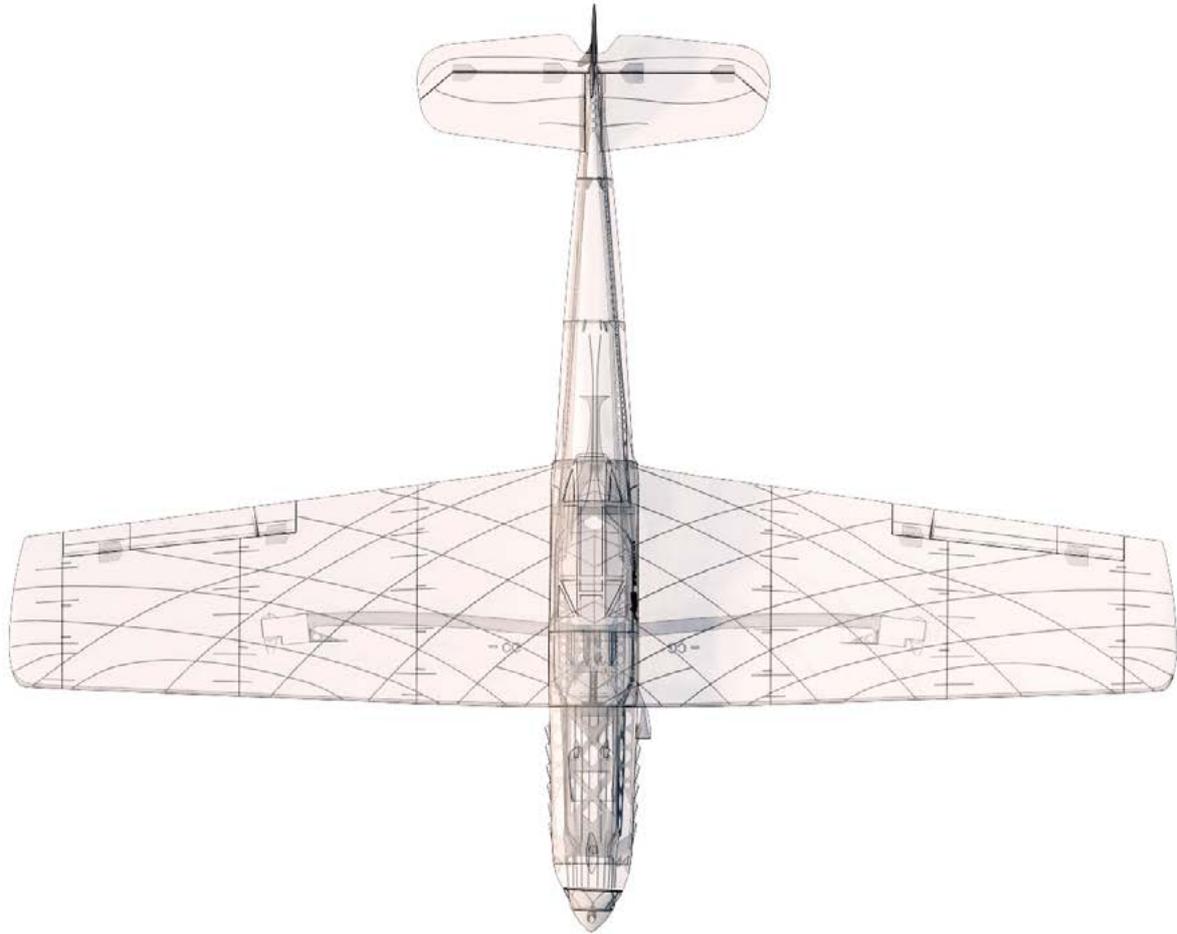


# 6.Scale markings PDF

Let print on thin adhesive foil and place on the model as needed, violet cut lines included...



# 7.Stand

If you need this plane just for decorative or demonstrative reason...

771mm(30.55in)

T version 978mm(38.5in)

# Step By Step PDF/VIDEO userguide

## 1. Choose airplane at www.3Dlabprint.com, our Facebook for live information...

Basic requirments (Me 109 T ):
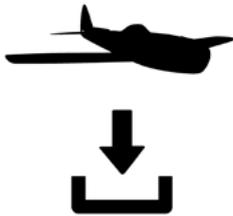min volume 195/195/150mm (250/120/150)
nozzle 0.4mm recommended (0.35 or 0.5mm alternatively)
Heated Bed recommended
PLA filament (or PETG, APLA, htPLA, PC-max....) not ABS

If you feel a little bit confused you can download wing test part from our websites or thingi-verse, (the biggest part). Or contact support@3dlabprint.com

## 2. Create account, download

You will get download link for all files to your email (zipped) or you can log in to your account and download directly from our websites.

## 3. Gcodes preparing

options A Gcodes:
if your printer is i3 comptatible you can directly use prepared gcodes, simply save each to SD card and let 3d printer do his job, HE temperature is set  to 230 for best layer bonding, you can  edit speed and temperature on your printer LCD only. If Gcodes does not work please proceed to the next options.
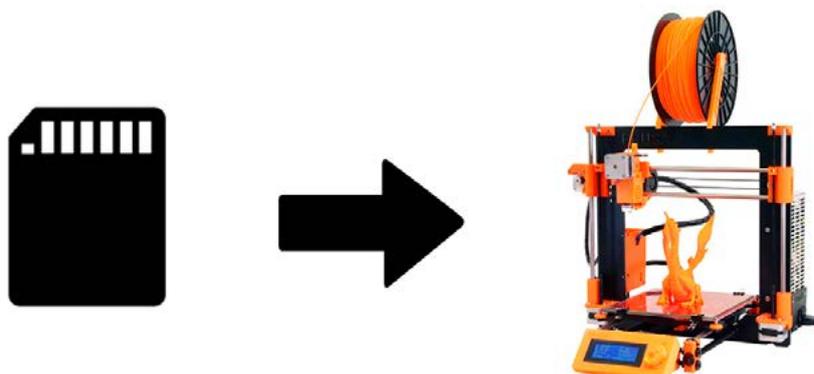
## options B Factory files Simplify3D (recommended)

We prepare all you need in this files (basic FFF, parts arranged and so on...)
You can use this our setting as a start point and edit it as you need (adapt it for your printer), print only parts you need and so on... On moust 3d printers it should work as it is, but please give a look to the setting and edit it if is different to your printer, we are not liable for damages resulting from the use of our settings. If this does not work please proceed to the next option.
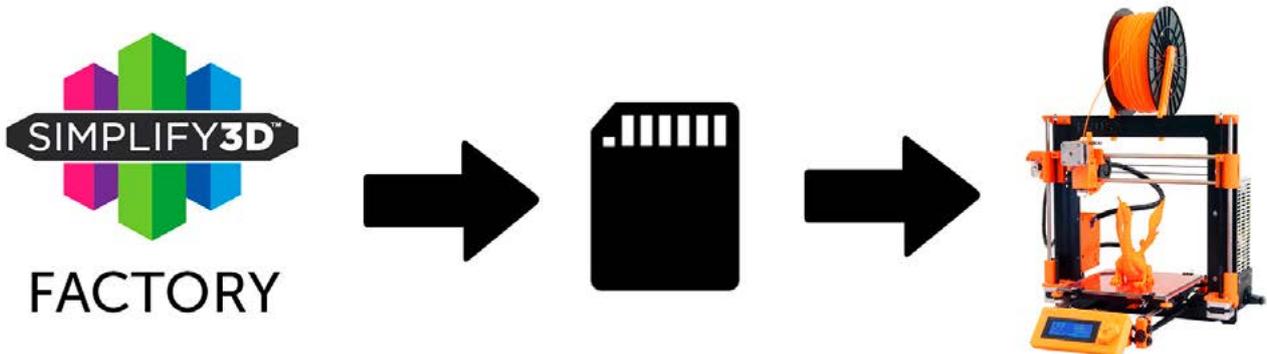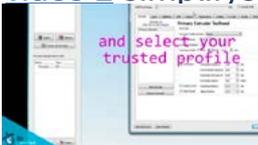


## options C Simplify3D manual setting (watch and learn)

Use our video guide 2 for proper setting... this is very good option and you will learn a lot about Simplify3D and become an 3d expert. Of course you spend a lot of time and youtube pause button will become your friend.
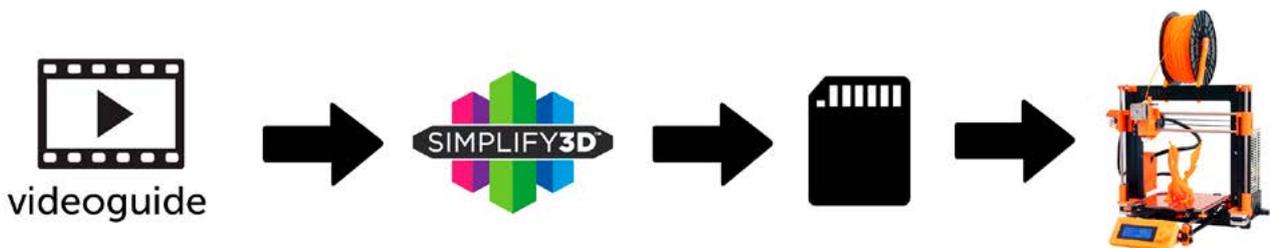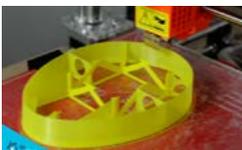


## AND... please give a look to VideoGuides:

video 2 Simplify3D setting



video 2.1 before start printing



video about Thin Wall Printing

## options D CURA or MatterControl

MatterControl and CURA are free :-) and also gives very good results and airframe is still strong enough, slicer setting is very easy.

Please try find right extrusion multiplier and temperature for good weight and bets layer bonding, give a look to parts weight list for proper multiplier setting.

You can also use our predefined CURA or MC slicer setting file included in package (always adapt it for your printer, change build volume, filament diameter and so on... depends on your printer!!!):

CURA_wing_fuse.ini      (wing and fuselage and so on... parts)
CURA_ailer_elev.ini   (only ailerons, elevator and rudder parts)
CURA_thick.ini           (motor mount, battery holder, spinner)
OR
MC_wing_fuse.slice       (wing and fuselage and so on... parts)
MC_ailer_elev.slice     (only ailerons, elevator and rudder parts)
MC_thick.slice            (motor mount, battery holder, spinner)
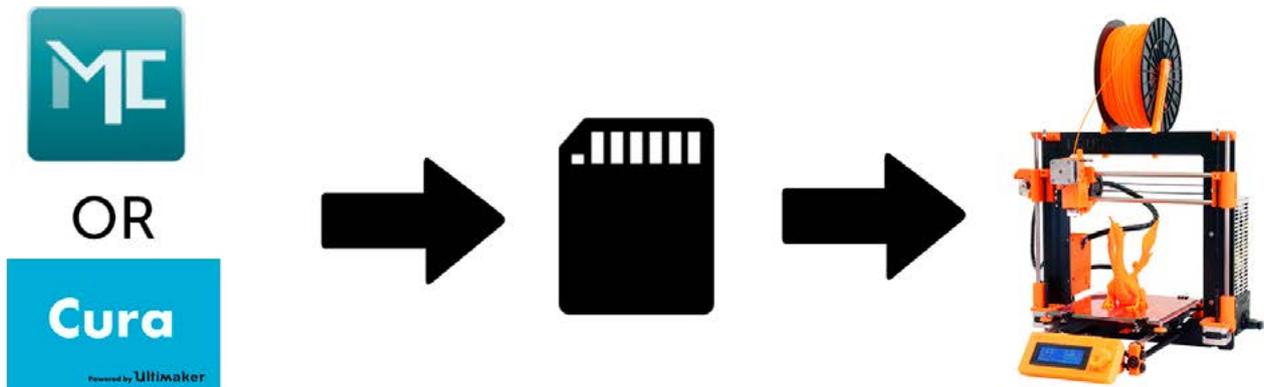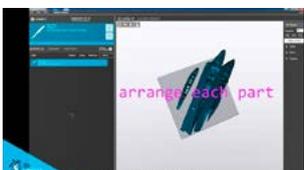


AND... please give a look to VideoGuides:

video CURA slicer setting
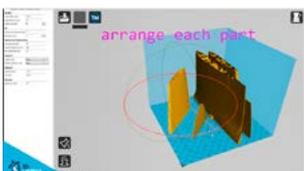


video CMatterControl slicer setting

# 4. Print it

Save generated Gcodes and insert SD card to your printer, prepare your printer and start printing, we prefer to use SD than direct connection via USB Note: ABS filament is not suitable for this...

Scaling the model will lead to unusable result!

video guide about printing

you will need: PLA filament - good quality and strong PLA (we need good layer bonding)

Strong hair spray (or your favorite adhesive bed surface)

Razor blade
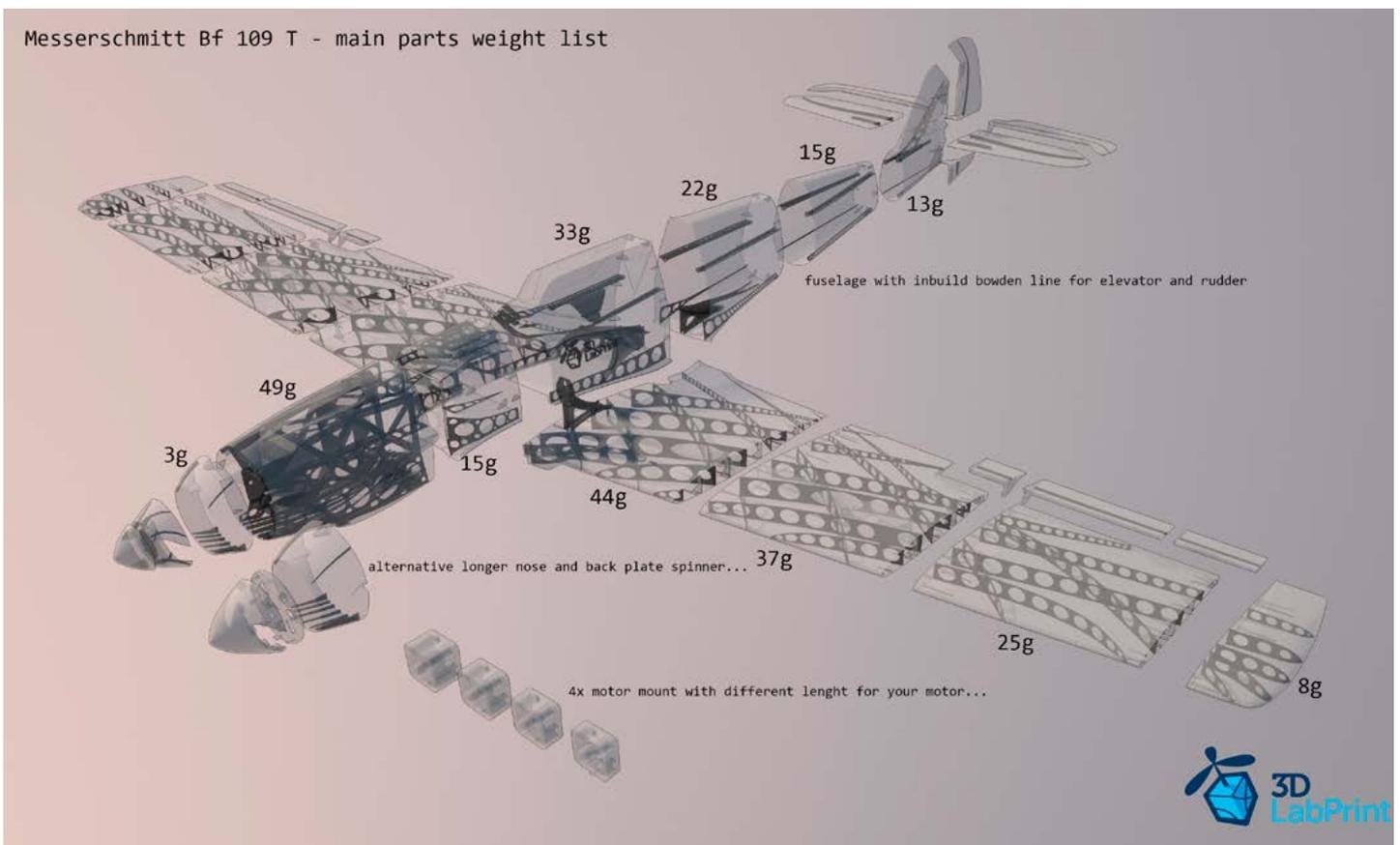
AND... please give a look to VideoGuides:

video printing guide



## Main parts weight list:



Messerschmitt Bf 109 T - main parts weight list

15g

22g

33g

13g

fuselage with inbuild bowden line for elevator and rudder

49g

3g

15g

44g

37g

alternative longer nose and back plate spinner...

25g

8g

4x motor mount with different lenght for your motor...

## Basic Typs and Advices

Plese Experiment with your extrusion multiplier...
Also HotEnd temperature is very important for strong result, please try increase tempera-
ture to find the best value (200 up to 260 celsius)
Turn OFF cooling fan for better layer adhesion (HE fan of course ON) we dont need it for
our thin wall printing...
We try lot of filaments and so far PLA is still the best for our models (2016).
You can try aslo PETG  and PC-max from polymaker is very promising filament.

HEATED BED is very recommended, 60-70celsius (print without warping ends)
Looks like any standard quality PLA is OK for our planes, BUT it always depends on combi-
nation PLA vs. Extruder vs. HotEnd.
We find that some color of filament has lower layer adhesion also.
Nowadays there is lot of 3dprinters on the market, very most of them is OK for printing our
aircrafts (specific thin wall printing...) suficient volume, heated bed, 0.4mm nozzle.

## Please give a look to Printing Guide:

# 5. Assembling printed parts

## 5.1 Wing assembling
Glue wing parts with CAglue together, use activator and instal ailerons...
See video guide #4
you will need: CA Glue  - medium or similar medium viscosity CA glue
Activator for CA Glue or similar, but not-mechanical is better
AC Hinge Sheet or similar
Scissors
Snap knife
Some cloth for wiping CA glue...
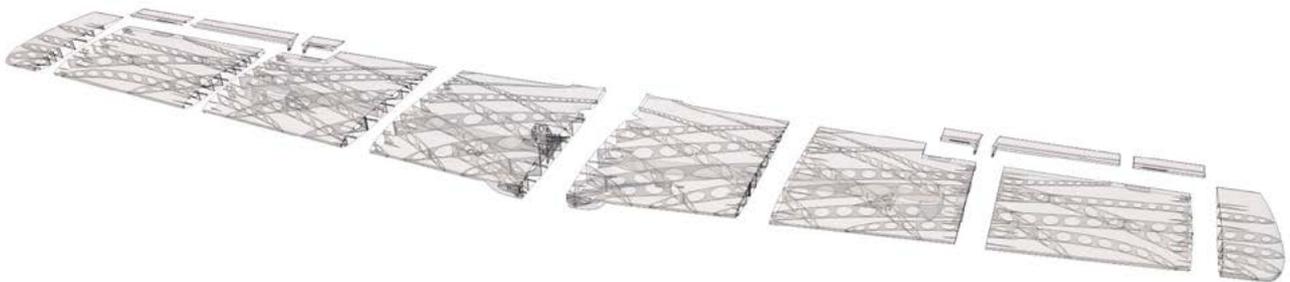


## 5.2 Fuselage assembling
Glue with CAglue fuselage parts together, use activator, instal elevator, fine tune parts shape with knife or sandpaper. Assembly wing and underfuselage part. When gluing part 1 and 2 remember there is on the upper side air outcome.
See video guide #5
you will need: CA Glue  - medium or similar medium viscosity CA glue
Activator for CA Glue or similar, but not mechanical is better
AC Hinge Sheet or similar
Scissors
Snap knife or Sandpaper
Optionaly some cloth for wiping CA glue...
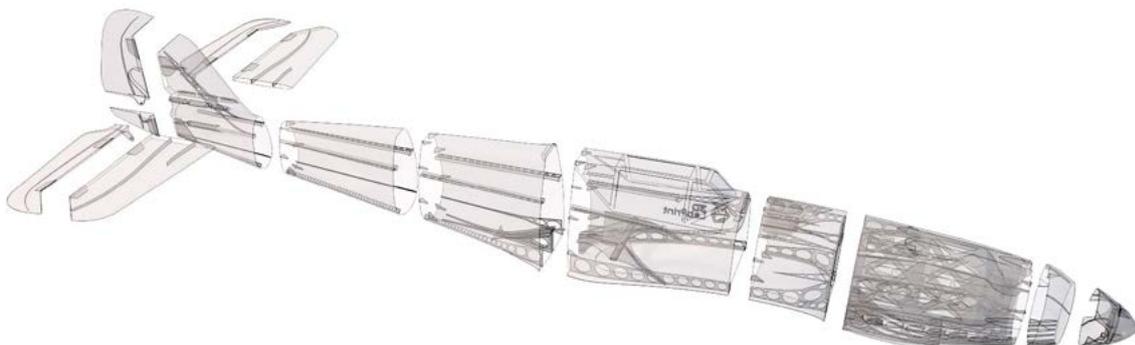
# 6. R/C equipment

## 6.1 motor setup

HIGH PERFORMANCE SETUP (if you like it hot, yeah)prop 9/6, 9/7 fast:
See video guide #6 (for HP setup)
you will need: Motor – AX-4008Q-620KV
            Speed controler (ESC) – CC Talon 25 or similar 25A/6s
            3x PAIRS, 3.5mm Gold Connectors - optional
            Battery 1300mAh/6s – or 2x 1300/3s (use 2to1 serial connector)
            Male XT60 connector
            Shrink Tube black
            Solder wire and Soldering Iron
            Hands free Holder - optional
            printed motor mount (25/25)

ECO PERFORMANCE SETUP(spent only 30 bucks without any soldering)prop 9/6 10/5:
you will need: Turnigy D3530/14 1100KV or similar 3530-35 1100kv
            30A Electronic Speed Controller or similar 30-40Amps

            Turnigy 2200mAh 3S 20C or similar 1500-2400/3s

            printed motor mount, find the one which fits... (25/19)

## 6.2 servos

Test and center all servos with servo tester or transmitter, then instal horns in midle position and cut wing Servos mount... use HXT900 or any 21x21x23mm
See video guide #7
you will need: 4x 9g Servo HXT900
            2x Servo Lead Extension or similar
            Snap knife
            Soldering Iron or Small handsaw or Dremel

# 7. R/C Equipment instaling

Instal prepared RC equipment: Motor, ESC, Servos...
Nose and motor mount are already in angle for compensating rotating propeller stream.
See video guide #8
you will need: Printed motor mount, find the one that fits for your motor...
2-4x Screw 3/12-30mm depends on motor-mount
Small screwdriver+
Your earlier prepared R/C equipment
3x Self Tapping Screw M3x8mm or similar

# 8. Pushrods

Made steel pushrod for ailerons, elevator, rudder and connect within servo arms...
See video guide #9
you will need: Steel pushrod, diameter 1.0mm
Pliers
CA Glue  - medium
Activator for CA Glue or similar, but not mechanical is better

# 9. Finalization

Instal your reciever, connect batery, setup servos and etc. with your trasmitter, lock servo position, then instal propeller...
!!!Make sure that the battery is placed properly and secured with wing battery holder, if battery moves during flight it can shifts the center of gravity backwards and aircraft will be uncontrollable!!!
See video guide #10
you will need: Your own Rx/Tx system
Battery for your setup...
2xRubber rings
Foam strip for Li-Pol battery
Scissors
Propeller + printed spinner
Small screwdriver+
CA Glue  - medium + activator
Scale markings printed to adhesive foil

!!!Never set ESC with instaled propeller, this is very dangerous!!!

# 10. Go flying

Before flight check: center of gravity is very important (move it forward for the first flights see CG markings and chapter 11 bellow), battery properly charged, ailerons and elevator deflection check, your own flying skills or RC simulator training...
Then go flying: set full throtle, put the elevator little upwards (1-2mm) and throw it energetically to the wind approx 10 grades up, wait till plane gain speed, then fly it in your manner...
See video guide #11

# 11.Pilots Please Attention!!!

For the first flights we recommend set center of gravity of the airplane by about 5 mm forward of the CG tag (nose heavy, this increases the stability) is also good to increase expo settings on your transmitter for elevator and ailerons to 80 % (this calms response from your stick inputs)
Also you can decrease elevator and ailerons deflection.
Make sure the battery is well fixed in proper possition if it moves during flight it will cause move CoG aft and will lead to uncontrolable flight behavior...

You can then return to the center of gravity (balance aircraft)the CoG points and expo set to 60 % as stated in the video/instructions... this gain back extra maneuverability when you will be sure with flying your airplane.

!!!Never fly aft positioned CoG!!!

And Please, use this files only for your own purpose, do not send further... Thank you very much