



# Modmike's Ultimate No Drill Dry Box System

 **ModMike**

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## Summary

The ultimate filament organizer and dry box storage system for your precious filament!

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Tags: [drybox](#) [filament](#) [dryer](#) [spoolroller](#) [thingiverse](#)  
[filamentdrybox](#) [cerealbox](#)

### Updates:

23.10.15 - I re-uploaded the covers and tray because I forgot to clearance them when I red-did them.

23.11.06 - Added a hygrometer frame for round hygrometers with vertical mounting tabs.

### Introduction

In my 7 years of 3D printing, I struggled to find a filament storage system to fit my needs. Like most people, I used large air tight tubs to store multiple rolls but they have some serious shortcomings:

1. Opening a box repeatedly to access a roll lets in a fairly large volume of air that had to be dried out again, which rapidly saturates desiccant.
2. It was impossible to read the filament type on the labels of rolls packed shoulder to shoulder.
3. Using dedicated boxes for each filament type took even more room because many were not optimally packed. I would literally end up with 1 large box for a single roll.
4. Even when full of rolls, there was a lot of unusable space which added to their already considerable bulk.
5. Full boxes were heavy making stacking and unstacking a real chore when looking for a roll or trying to remember what I had.
6. There was no elegant way to store the boxes. The ever present pile of ugly boxes were always in the way and a blight in my shop.
7. Multi filament dry box storage and feed systems are especially useless when you have an AMS.

Fun fact: My current Ikea book shelf will fit up to 84 rolls of filament. 56 face forward as seen in the picture and another 4 behind them. I usually put repeat colours or unopened boxes behind the front ones but I suggest reinforcing the shelf using a piece of wood screwed to across the bottom of the shelf.

Fun story: everytime I showed the new system to friends, they would pull out their huge boxes with a very proud and superior attitude as if they were educating me. They were also the first converts.

## **Design Goals**

My original design goal was to design an affordable single roll storage system that fit rolls tightly and was as hardware free as possible. As usual, scope creep set in and the design expanded to include:

1. A component to support round hygrometers which I think look better but also fit neatly between the dry box mold lines, making them easy to read. They are also ridiculously cheap in bulk.
2. Eliminate the need for screws and avoid having to drill holes to make it accessible to more makers.
3. A simple, inexpensive and reliable roller system that used minimal hardware to reduce complexity and print time.
4. A replacement lid that integrates a bowden PTC fitting to feed the filament.

5. A filament hook to secure the filament without opening the box after use.
6. A cap to seal the box when not in use.
7. My favorite part was developing an easy to use filament identification system. Each filament class has it's own shape that is modified for variants. Ex: The PLA tag is a square while all PLA derivatives are square with rounded corners.
8. Color changes are at the layer level meaning anyone can enjoy 2 color tags.

## **The Parts**

Before you start we need to discuss tolerances. This project has some tight tolerances in relation to each other. They should work fine if you follow a few rules:

- Print the parts on the same printer
- Use the same filament
- Print the tray cover and tray in the same direction

If anyone has issue with the tolerances please let me know in the comments.

There are 2 covers to choose from, standard or roller. I am exclusively printing the roller because even if I don't intend to box feed, it holds the reels nicely.

1. Cover (Standard or roller)
2. Silica tray
3. Hygrometer frame
4. Filament Tag, Please note that I didn't want to re-do my normals in Fusion 360 so they are all facing backwards. Use the 3D viewer to see them in full.

If you need a filament tag that I haven't included, please let me know in the comments.

## **Optional Parts**

If you want to box feed will also need:

1. Lid
2. PTC fitting (Bowden coupler) mount
3. Gasket (TPU)
4. Cap

## Printing:

- In order for the threads **to work properly**, print all the lid components at .12.
- All other parts can be printed at .2 layer height and Bambu sport mode speed.
- Print the gasket with TPU, beveled side up, on a non textured plate to get a smooth interface surface that will ensure a good seal.
- If printing multi color without an AMS or similar, create a plate of the filament tags you want and paint the top 1 mm with your contrast color of choice. Add a pause at the color layer and swap the filament manually

## Assembly

1. If you opted for the roller cover, insert bowden tubing into the front and trim. Repeat for rear.
2. Use the measuring cup included with the containers to measure out 50ml of beads and gently pour them into the dessicant tray from the side of the cup to avoid runaway beads.
3. Slide the cover on, making sure to first insert the side locks properly in the slots and then sliding forwards to lock the front.
4. Install a hygrometer into the Hygrometer frame.
5. Pick a filament tag and place it text side up on a table with sharp edges. Now push the hygrometer frame tag slot down on the tag pin and rock left and right until the tag is is flush with the tag standoff.
6. Slide in the the tag and hygrometer assembly to clamp everything together.

## Optional Lid Assembly

1. Screw the PTC bowden connector into the PTC Fitting mount. You can use teflon tape to get a better seal.
2. Screw the assembly into the bottom of the lid and all the way though to ensure the threads don't jam when you glue it.
3. Unscrew the PTC Fitting mount down to expose about 4mm of threads below the bottom of the lid plate.
4. Apply super glue and screw back until flush and the filament clip is pointing straight away from the back of the container. There is a tiny bevel you can fill with glue to make it air tight. Practice before you glue!
5. Remove the lid of the container completely and push in the assembly. You can put teflon on the round part of the lid to enhance the seal, if you feel so inclined.
6. Insert the TPU gasket into the cap.
7. Feed the filament through the cover and insert in the filament keeper across from the PTC fitting.

8. Screw on the cap.

## Additional Material Requirements

1. **4 Litre cereal storage container**. The system is designed for a very specific 4 litre cereal storage container available from multiple vendors so make sure it exactly matches the one in the picture in case this link expires or the vendor discontinues it.
2. **Round Hygrometer**. Be sure to buy in bulk, you will save up to 30% on each one!
3. **Dry & Dry brand of desiccant** 3-5 mm size. Anything smaller will fall through the screen.

I initially purchased a cheaper brand but many of the beads were spilt or unevenly sized and fell through the cover slots. I also like the fact that **ALL** the beads indicate humidity by changing from orange to green rather than cheaper versions that are white and have indicator beads mixed in.

To calculate how much to buy, determine how many how many boxes you will need and multiply by 50 ml, which is what I put in each one. The **5 pound** size contains 3,785 ml or enough for about **75 units**. The **2 lbs** container conatins 946ml which should fill about **19 units**.

1. **10mm PTC Bowden fitting**
2. Budget **PTFE Bowden tubing**. A 2 meter piece will

## Per Unit Cost Breakdown

- Container: \$4.25 USD
- Hygrometer: \$1.75 USD
- Silica gel (based on 2 lb size) \$0.90 USD
- \_\_\_\_\_
- Sub Total \$6.90

Optional parts for box feeding:

- Bowden tubing, based on 2 meter piece: \$0.75 USD
- 10mm PTC fitting \$0.50 USD
- \_\_\_\_\_
- Total BOM \$8.15

Watch for coupons and buy in bulk where possible, it makes a huge difference in price.

## Consideration

I put a lot of time and effort into designing and publishing this. If you like it would you consider tipping me a buck that I can put in my filament slush fund? Thanks!

# Model files



**roller-cover.stl**



**std-cover.stl**



**tray.stl**



**hygrometer-frame-offset.stl**



**hygrometer-frame-vertical.stl**



**small\_reel\_adapter\_front-x-2.stl**

☐ You will need 2 each



**small\_reel\_adapter\_rear-x-2.stl**

☐ You will need 2 each



**plug.stl**



**ptc\_fitting\_mount.stl**

☐ For 10mm PTC bowden fitting



**gasket.stl**

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**cap.stl**

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**pla.stl**

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**pla.stl**

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**pla\_silk.stl**

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**pla-wood.stl**

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**abs.stl**

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**abs.stl**

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**abs\_green\_glow.stl**

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**abs\_blue\_glow.stl**

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**asa.stl**

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**tpu.stl**

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**petg.stl**

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**nylon.stl**

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**pa-cf.stl**

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**cleaner.stl**

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**pva\_support.stl**

[Find source .stl files on Thingiverse.com](#)

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