

jonspaceharper's DryBox V2



jonspaceharper

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Summary

An effective, affordable drybox solution.

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Tags: [spool](#) [drybox](#) [spoolholder](#) [filamentbox](#) [rubbermaid](#)
[dryboxspoolholder](#) [21cup](#)

Elegantly simple Drybox design centered around a [Rubbermaid 21 cup dry storage container](#).

Goals

- Affordability: ~\$20/ea when building 5 or 10 at once*
- Availability: widely available parts
- Effectiveness:
 - Desiccant is included near the top for better absorption
 - Spool roller is self-centering
 - Spool roller handles spool widths between 50 and 80mm
 - No spool width adjustments, no ball bearings

This assumes a price for the container of \$10/ea. Rubbermaid regularly changes the price up and down; this is the lowest recent price.

BOM

Part list is per drybox.

Part	Qty	Note
Rubbermaid 21 Cup container	1	Also sold at Wal-Mart and Ace's Hardware
PTFE Tube, 4mm OD/2mm ID, 30mm	4	28mm+, can be cut down later if long
Digital Hygrometer, 45x26mm	1	Alternative source
PC4-M10 Passthrough Coupler	1	OR PC4-M10 Bulkhead coupler
PTFE Tube, 4mm OD/3mm ID	1	1ft/30cm
Re-usable Desiccant Packs, 50g	4	Alternative source
PC4-M6 Quick Disconnect Coupler	1	Optional; for filament end cover
M3 Heat Set Inserts, 5mm OD / 4mm L	6	
M3 x 6mm button head cap screws	6	8mm will also work

Individually, these dryboxes are expensive. With some shopping, we can build quite a few affordably:

Rubbermaid Containers

These are available on Amazon, Ace Hardware, and Wal-Mart. Wait for prices around \$10, then swoop in and buy what you need.

PTFE Tube and Couplers

These can sometimes be purchased in packs on Amazon [here](#). Note that you'll still need some 3mm ID tube to pass your filament through (you can use 2mm for this, but 3mm is better for reverse Bowdens over long runs).

Desiccant and Hygrometers

Twenty (20) packets on Amazon is around \$20, but sixty (60) is \$50. Likewise, Hygrometers can be found in quantity at prices approaching \$1/ea.

The more dryboxes you build at once, the more you can leverage bulk purchasing.

Adding It Up

Here's a shopping list for building five and ten containers using the above information

Item	Cost (5)	Cost (10)
Rubbermaid 21 Cup container	\$10+/ea (\$50+)	\$10+/ea (\$100+)
Re-usable Desiccant Packs, 50g	\$20 (pack of 22)	\$40 (2pk of 22)
2mm ID PTFE Tubes and PTFE Couplers	\$10 (1pk of 8ea)	\$12 (1pk of 10ea)
3mm ID PTFE Tube	\$8 (6.6ft)	\$9 (10ft)
Digital Hygrometer	\$9 (1pk of 6)	\$17 (1pk of 12)

For 5 units, our cost is \$97, or \$19.40 each. For 10 units, our cost is \$178, or \$17.80 each.

Fasteners are left out of this shopping list since many will have these parts on hand already.

Printing It

Most filaments are suitable, though I use ABS as my cheapest option.

Print at either 0.2 or 0.25mm layer heights. No supports are needed.

You will need, per container:

- 1x Basket.stl
- 1x Hygrometer Mount.stl
- 1x Spool Roller.stl
- 1x Drill Template v1.stl (optional)
- 1x Filament Cover.stl (optional)

Building it

Hardware

You will need for assembly:

- 1x PTFE flush cutter (or a knife, it's fine)
- 1x cordless drill
- 1x 7/64" or smaller drill bit (less than 3mm)
- 1x 1/8" OR 9/64" OR 5/32" drill bit (3-4mm)
- 1x 3/8" drill bit (for PC4-M10 couplers only)

- 1x 1/2" drill bit (for bulkhead couplers only)

Drilling the Container

1. Set the 7/64" or smaller drill bit in your cordless drill's chuck.
2. Set a Rubbermaid container in front of you. We're going to drill the narrow front face, so set the back face down.
3. Center the Drill Template at the top of the container's front face with the long "arrow" end of the template up.
4. Press the template against the lip for the lid. Use the flat upper edge to square the template against the container lip.
5. Drill out the three (3) holes.
6. Repeat this process for the remaining containers.
7. Use your medium-sized drill bit (1/8" to 5/32", 3-4mm) to drill out the upper two holes on each container.
8. Use your large drill bit (either 3/8" or 1/2") to drill out the bottom hole on each container.
9. If using a PC4-M10, bore out the hole to approximately 10mm, until the coupler can be threaded in.

Drilling the Lid

1. Set the 7/64" or smaller drill bit in your cordless drill's chuck.
2. Line up the Basket printed file in the center of a lid.
3. Drill through the holes in the Basket and into the lid, just enough to mark the hole.
4. Repeat 1-3 for each lid.
5. Install your medium-sized drill bit to your cordless drill.
6. Use the drill to widen all four (4) holes in each lid.

Heat Set Inserts

1. Install two (2) heat set inserts into the Hygrometer mount. Be sure to install them through the **larger** holes!
2. Install four (4) more heat set inserts into the top of the Basket.

Coupler Installation

For bulkhead connectors, insert the bare coupler in the 1/2" hole, then screw the nuts back on each side to "capture" it.

For a PC4-M10, thread the coupler in the bored-out hole.

Hygrometer and Basket Installation

1. Use M3 x 6mm screws to install the hygrometer mount inside the container, above the coupler.
2. Push a hygrometer into the mount from above.
3. Repeat for the remaining containers.
4. Use four (4) M3 x 6mm screws to install a basket to the underside of a lid.
5. Insert two (2) desiccant packs into the basket.
6. Repeat for the remaining containers.

Spool Roller and Bottom Desiccant Installation

1. Cut four (4) 30mm lengths of 2mm ID PTFE for each container.
2. Install four (4) pieces into a printed Spool Roller.
3. Set the Spool Roller inside a container.
4. Add two (2) desiccant packs: "sit" on in the front, and "sit" another in the rear.

Finishing Up

1. Add 1ft/30cm of PTFE tubing to the coupler. If using a bulkhead container, cut 25mm of tubing and insert it on the inside, as well.
2. Add a roll of filament to the container and thread the filament through the coupler until 50mm/2" sticks out beyond the end of the PTFE.
3. Twist a PC4-M6 coupler onto the the end of a Filament Cover.
4. Slip the extra filament into the assembled Filament Cover, then press-fit the PTFE tube into the Cover's coupler.
5. Repeat for the remaining containers.

That's it!

Tips

- Be sure to weigh your desiccant packs to determine when to reheat them. When they weight 60g or more, it's time to reheat.
- Be careful not to burn your desiccant packs when reheating.
- Hygrometers are not long-term investments. They will break easily.
- Replacement batteries for your hygrometers are LR44/AG13 button batteries

Model files



hygrometer-mount.stl

☐ Mounts a rectangular hygrometer.



filament-cover.stl

☐ Covers filament ends to prevent moisture absorption



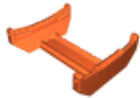
basket.stl

☐ Holds desiccant packs in the lid



drill-template-v1.stl

☐ Helps evenly space the hygrometer and PTFE coupler.



spool-roller.stl

☐ Simple spool roller that uses PTFE as bearings

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