

Resin 3D Printing

- [Resin Waste Workflow Analysis](#)

Resin Waste Workflow Analysis

Basics

Each use of our Wash & Cure unit requires 6000ml (1.5 gallons) of 90%+ IPA to reach the fill line.

IPA costs:

~\$16 locally (for now)

\$25 online (cheaper may be available)

Each use contaminates the IPA. The more remaining resin, the more contamination. Surface area matters to an extent, but any print area that allows for pooling: "bucket" shapes, dense textures, or other areas where surface tension will make resin more difficult to drain. It's possible for a small mini-fig to contaminate more than a large smooth object.

Support material can also separate during wash, depositing larger chunks of resin in the IPA, along with "particulate" contamination, which presents (in the extreme) as sludgy/colored IPA.

IPA Reclamation

There are processes to clean the IPA, but they are all imperfect, and do not return to the purchased purity levels. e.g. 90% IPA after some amount of use will effectively become more impure, even after fine particle filtering. At a certain point, distillation (☐☐) is required to achieve high purity levels. As distillation is both dangerous and laborious, OR expensive \$\$\$\$ to buy a dedicated solvent reclaiming unit, let's not do it.

I've seen read that many people who think they're filtering their IPA are removing pigment, while leaving the monomers in the IPA. The only real way to check for IPA purity is apparently a specific gravity test. [Formlabs has an entire page dedicated to this.](#)

IPA Workflow Options

Assuming a 10-print cycle is tolerable:

- No reclaiming/no filtering
 - ~\$40 per 10-print cycle - \$4/print, not including resin cost.
 - Dirty IPA is (magically) returned directly to IPA storage
 - By print #10 it's maybe hard to see your print in the bath.
 - Waste:
 - 6000ml liquid waste per 10-print cycle with possible supports and other condensed chunks and ooze.
- Paint strainer filtering with 1000 fresh refill
 - ~\$40 per 10-print cycle - \$4/print, not including resin cost.
 - 5500ml pump-decanted from *top* of wash and cure through coffee filter to IPA storage
 - Wash and cure bucket is rinsed with remaining 500ml + 250ml fresh IPA, dumped to 1 quart deli container.
 - Deli container is cured, and set open in tent near airflow for evaporation.
 - Or set outside (where? Future Space? Basement member home?)
 - Coffee filter is bagged (along with paper towels?), cured, put in upstairs or outside garbage cans.
 - Gloves?
 - Waste:
 - 750ml liquid waste with chunks and ooze per print (deli container)
 - 6000ml dirty IPA at end of cycle.

Rough particulate filtering

Rough particulate filtering can be done with paint filters.

<https://www.harborfreight.com/pack-of-100-60-to-70-mesh-paint-strainers-91376.html>

In theory it could just be poured from the wash & cure container, though it might be nice to have something more foolproof and less prone to any sort of accidental spill.

Fine particulate filtering

It's unclear to me if fine particulate filtering matters, as it might be mostly pigment that's being removed.

It could mean a faster path to a print that feels "clean" to the touch, but may still have reduced solvent effect.

Options for fine particulate filtering:

- Coffee filters (these micron ratings are highly suspect, due to AI bullshit and manufacturer bullshit)

- Paper: 10-20-30 microns
- Metal 100-200 microns
- Filter paper
 - Down to 1 micron (in flat filter form), depending on material (cellulose, fiberglass, PTFE), though it seems vary. Hard to find cone filters below 10/20 microns. [McMaster has one.](#)

Filtering funnel

<https://www.etsy.com/listing/942134536/filtering-funnel-downloadable-stl-file>

Offers more surface area for pour.

Decanting via peristaltic pump

Whichever method we choose, we'll need to be transporting 1000s of ml of IPA. If we depend on people lifting buckets, it seems only a matter of time till we have a dramatic spill.

A peristaltic pump will allow for more controlled transfer. Peristaltic pumps have the benefit of being able to have the tubing replaced at low cost.

\$85 - 1000ml/min

<https://ankoproducts.com/products/a200dx>

\$27 - 1000ml/min

<https://www.foreshinefluid.com/products/bp1000-1000ml-min-12v-24v-oem-peristaltic-pump-long-life>

\$44 - 3100ml/min

<https://www.foreshinefluid.com/products/bp3000-high-flow-peristaltic-pump-3100ml-min>

Some McMaster options: <https://www.mcmaster.com/products/peristaltic-pumps/flow-rate~less-than~50~gal-day/for-use-with~alcohol-3/for-use-with~isopropyl-alcohol/pump-type~peristaltic/>

6000ml cleanout

Future Space use

Leaving containers in back yard... Depending on how laissez-faire we want to be, could be a bucket with a lid with holes drilled in it, set in the corner.

Tent evaporation

IF we have sufficient tent ventilation, along with maybe sealing the tent a bit better, could get away with this. With this amount of intentional tent evaporation, we might want to double check that roasting use doesn't cause resin fumes to enter room.