THE UNIVERSITY OF SYDNEY

SAFE WORK PROCEDURE

Use this form to document Safe Work Procedures for hazardous activities and processes. The information in your Safe Work Procedure (SWP) should be supported by a risk assessment.

Faculty/School:	Faculty of Science — School of Physics (SAIL Labs)		**Initial Issue Date: 2020-06-17** **Next Review Date: 2027-07-16**
SWP Reference Number:	SWP-A28-SAIL-116C-formlabs-form3	**Version: 2.0**	**Version Issue Date: 2026-07-16**
SWP Title:	Operation Maintenance Of Formlabs Form 3 SLA 3D Printer		
Prepared by:	Chris Betters, Justin Digweed		
Responsible supervisor/s:	Chris Betters, Sergio Leon-Saval		

List the Hazards and risk controls as per risk assessment		
Associated risk assessment reference:	**Hazards**	**Risk controls**
RA-A28-SAIL-116C-formlabs-form3	Hot surfaces within the system cabinet	- NEVER reach inside the unit while it is in operation or in its cooling down phase - Protective gloves and safety glasses MUST be worn when working with the printer
RA-A28-SAIL-116C-formlabs-form3	Moving parts	- NEVER reach inside the unit when the system is in operation - Interlock system fitted - do not open the cover until the touchscreen indicates the print is complete - Disconnect the power cable before maintenance - moving parts and lead screws present crushing and tangling hazards
RA-A28-SAIL-116C-formlabs-form3	Chemical contact with uncured Formlabs photopolymer resin	- Resin MUST NOT come into contact with the skin - Gloves MUST be worn at all times whilst using any Formlabs process (signage in place) - Safety glasses MUST be worn - Read the SDS for the specific resin before use
RA-A28-SAIL-116C-formlabs-form3	Chemical contact with isopropyl alcohol (IPA), and IPA flammability	- Part washing MUST only be performed inside the fume hood - IPA is HIGHLY FLAMMABLE - keep away from heat, fire or sparks - Keep IPA containers closed or covered when not in use - Safety glasses and gloves MUST be worn - Refer to SAIL-RA-SWP-02 (Use, storage and disposal of flammable liquids)

List resources required including personal protective clothing, chemicals and equipment needed

PERSONAL PROTECTIVE EQUIPMENT (PPE):
- Protective gloves (MANDATORY for all Formlabs processes)
- Safety glasses (MANDATORY for all Formlabs processes)
- Closed-toe shoes

TODO: The source document has no dedicated PPE list - the above is drawn from the control measures. Confirm the correct glove material against the resin and IPA SDS.

CHEMICALS:
- Formlabs photopolymer resin (see SDS for the specific resin in use)
- Isopropyl alcohol (IPA) - highly flammable

EQUIPMENT:
- Formlabs Form 3 printer, resin tank, build platform and resin cartridge
- Form Wash or Finish Kit (part washing)
- Curing unit
- Fume hood (part washing MUST be performed inside it)
- PreForm software (formlabs.com/tools/preform)

TODO: Confirm the specific wash and cure units installed at SAIL - the source names Form Wash or the Finish Kit and refers only generically to curing.

SAFETY EQUIPMENT:
- Nearest suitable fire extinguisher (locate before starting)
- Emergency stop button on the lab wall
- SDS for all chemicals listed above

List step by step instructions or order for undertaking the task

PREPARATION AND PRE-START CHECKS:
- Ensure you have met all SAIL booking rules
- Read the SDS for the chemicals listed above
- Check that no maintenance sign is erected on the fume hood
- Check the exhaust is operational and that the light is switched on
- Check the ergonomics of the level of the worktop relative to your height; use the stainless-steel steps if necessary
- Check that the wet bench is clean and free from contamination and there is enough space for the activities to be safely carried out
- Locate the nearest suitable fire extinguisher
- If you note any issues with any of the above points, inform a SAIL staff member immediately - DO NOT proceed to processing

CHECK THE OPERATING ENVIRONMENT:
- The operating temperature for Formlabs printers is 18-28 degrees C (64-82 degrees F)
- For optimal printing, DO NOT exceed this range

PREPARE THE PRINT FILE:
- Open the PreForm program (download the latest version from formlabs.com/tools/preform)
- Use PreForm to process STL or OBJ files
- Prepare, save, and upload FORM files to the printer
- Tutorials are available in the software menu; for detailed guidance search support.formlabs.com

POWER THE PRINTER ON:
- Connect the power cable - the printer initiates automatically

PRE-PRINT CHECKS (performed automatically by the printer before each print job):
- Accessories - sensors check for the proper installation of the resin tank, build platform, and resin cartridge
- Temperature - the print chamber and resin heat to around 35 degrees C. A heating fan blows air across the heater into the resin tank to heat the resin
- Resin - resin flows from the cartridge into the tank when the cartridge dispense arm squeezes the valve open. The volume of resin in the tank is regulated through the LevelSense sensor located behind the resin tank. The printer begins to fill the resin tank once a print starts and maintains the level during the print. Printing begins automatically when LevelSense detects the proper amount of resin

START OR STOP A PRINT:
- To start a print, select the job on the touchscreen and follow the prompts
- To stop a print in progress, select pause, then abort the print
- MOVING PARTS: DO NOT open the printer cover until the touchscreen indicates the print is complete

FINISHING - WASH (wear gloves and safety glasses):
- Use Form Wash or the Finish Kit to rinse the remaining liquid resin from the printed parts' surfaces

- Washing MUST only be performed inside the fume hood
- Keep the IPA container closed or covered when not in use

FINISHING - DRY:
- Allow at least 30 minutes for IPA to fully evaporate after washing

FINISHING - CURE:
- Cure the washed and dried parts according to the manufacturer's recommendation to achieve the maximum strength

MAINTENANCE - GENERAL REQUIREMENTS:
- The printer shall only be maintained by a qualified and trained person
- DO NOT open the printer and/or investigate internal components unless under the guidance of Formlabs or a certified service provider
- Unauthorised disassembly or repair procedures may damage the printer and void the warranty
- Wear personal protective equipment when performing maintenance tasks
- Use tools only as described
- Disconnect the power cable before maintenance - moving parts and lead screws present crushing and tangling hazards
- Contact Formlabs or a certified service provider for any additional guidance

MAINTENANCE - BEFORE EACH PRINT:
- Resin cartridge bite valve - inspect the bite valve
- Resin tank interior - maintain the resin tank

MAINTENANCE - MONTHLY:
- Protect the ID chips on the resin tank and resin cartridge
- Resin tank spring fingers - protect the ID chips on the resin tank and resin cartridge
- Resin tank exterior - maintain the resin tank

MAINTENANCE - EVERY 3 MONTHS:
- Inspect the display
- Drip catcher - inspect the drip catcher
- Inspect the shells
- X- and Z-axis lead screws - inspect and lubricate the X- and Z-axes

POWER OFF:
- Power the printer off as described in the Form 3 manual when work is complete

TODO: The source document refers to a Power Off section that was not reproduced in the body text. Insert the manufacturer's power-off steps here.

List emergency shutdown procedures

There is an emergency stop button on the wall in the lab.

If there is a power outage, leave the building immediately and assemble on the sports oval on Physics Road. If it occurs after hours, call one of the listed Emergency Contacts.

If the evacuation alarm sounds, leave the room immediately and assemble on the sports oval on Physics Road.

List Emergency procedures for how to deal with fires, spills or exposure to hazardous substances

FIRE:
If the fire emergency alarm system is activated, you may be required to evacuate the building. The alarm operates in two stages:
- A BEEPING sound of increasing loudness will be heard: secure your workplace by turning off all non-vital equipment and securing all dangerous processes; collect or lock away your personal belongings and get ready to evacuate
- A WHOOPING noise and an EVACUATION message will be heard over the system: move directly to your nearest exit, or proceed as directed by a warden; DO NOT use the lifts

The assembly area during working hours (8am to 6pm) is the sports oval in front of the Physics Building on Physics Road. DO NOT re-enter the building until clearance is provided by the Emergency Warden.

SPILLS - STANDARD CHEMICALS:
- If a small, contained spill occurs of less than 100 mL, wipe off the spill with a dampened cleanroom wipe / chemical wipe and dispose of it in the solvent waste container / acid waste bin
- If a minor spill occurs of more than 100 mL but less than 2.5 L, alert others in the local area and evacuate the local area as appropriate
- Any spill larger than this is considered to be major: notify a SAIL staff member and evacuate the lab. Clean up should only be performed by authorised personnel according to SDS guidelines

SPILLS - HIGH RISK CHEMICALS:
- If a small, contained spill occurs of less than 20 mL, wipe off the spill with a dampened cleanroom wipe / chemical wipe and dispose of it in the solvent waste container / acid waste bin
- If a minor spill occurs of more than 20 mL but less than 100 mL, alert others in the local area and evacuate the local area as appropriate
- Any spill larger than this is considered to be major: notify a SAIL staff member and evacuate the lab. Clean up should only be performed by authorised personnel according to SDS guidelines

EXPOSURE:
- See the SDS for the chemical and apply the first aid measures it specifies
- Seek medical attention if irritation persists
- Report the incident via RiskWare

EMERGENCY CONTACTS:
- Emergency services: 000
- USyd Security: 9351 3333
- Supervisor: Chris Betters

TODO: Confirm the emergency contact list posted in A28-116C and reproduce it here.

List Clean up and waste disposal requirements

TODO: The Clean up and waste disposal requirements section was EMPTY in the source document. The content below is derived from the spill and finishing text elsewhere in that document and is INCOMPLETE - it MUST be reviewed and completed before approval.

AFTER EACH USE:
- Wear gloves and safety glasses until all uncured resin has been dealt with
- Keep the IPA container closed or covered when not in use
- Wipe up any resin drips with a chemical wipe and dispose of it in the solvent waste container
- Leave the fume hood and wet bench clean and free from contamination for the next user

WASTE STREAMS:
- Resin-contaminated wipes and gloves: solvent waste container
- Used IPA: solvent waste - refer to SAIL-RA-SWP-02 (Use, storage and disposal of flammable liquids)
- Uncured resin MUST NOT be poured down the sink

TODO: Confirm each waste stream and the disposal route for spent resin tanks and empty resin cartridges with the process owner and USyd chemical waste guidance.

List references used in the development of this SWP, e.g. codes of practice

Work Health and Safety Act 2011 (NSW)

Work Health and Safety Regulation 2017 (NSW)

Formlabs Form 3 Quick Start Guide (support.formlabs.com/s/article/Quick-Start-Guide-Form3)

Formlabs Form 3 Manual (media.formlabs.com/m/5a3f3cadc639b857/original/-ENUS-Form-3-Manual.pdf)

Safety Data Sheet - Formlabs Clear V4.1 Resin

Safety Data Sheet - Formlabs Black V4.1 Resin

Formlabs resin technical specifications and data sheets (formlabs.com/3d-printers/resin/tech-specs/#data-sheets)

SAIL-RA-SWP-02 - Use, storage and disposal of flammable liquids

ChemAlert report - isopropyl alcohol (University of Sydney)

ChemSupply isopropyl alcohol SDS (shop.chemsupply.com.au/documents/PA0131CH5R.pdf)

Risk Assessment RA-A28-SAIL-116C-formlabs-form3

List competency required – qualifications, certificates, licensing, training - e.g. course or instruction:

Training by SAIL staff and certification of competency by the process owner / equipment engineer is required before this process can be performed / this tool can be operated independently.

Maintenance tasks shall only be performed by a qualified and trained person. DO NOT open the printer and/or investigate internal components unless under the guidance of Formlabs or a certified service provider.

Staff approved to assess competence for this SWP

SAIL staff process owner, equipment engineer and/or technical staff

SWP Sign off sheet	
SWP name and version:	**Operation Maintenance Of Formlabs Form 3 SLA 3D Printer (Version 2.0)**

In signing this section the assessor agrees that the following persons are competent in following this SWP.

Name	Signature	Date Competent	Name of Assessor/Authoriser	Assessor/Authoriser signature

Risk Matrix

			Potential Consequences				
			Class 3	Class 2	Class 2	Class 1b/1c	Class 1a
			Minor injuries or physical discomfort. Short-term psychological impact (isolated or one-off event).	Injury or illness requiring medical treatment and/or short-term impairment (less than 2 weeks). Psychological impact requiring support.	Injury or illness requiring hospital admission and/or temporary impairment (less than 6 months). Psychological impact requiring medical treatment.	Injury or illness (physical or psychological) resulting in long-term or permanent impairment (more than 6 months). Injury or illness resulting in temporary impairment to multiple people.	One or more fatalities. Injury or illness resulting in long-term or permanent impairment to multiple people.
			Insignificant	**Minor**	**Moderate**	**Major**	**Severe**
Likelihood	Expected to occur regularly under normal circumstances	**Almost Certain**	**Medium**	**High**	**Very High**	**Very High**	**Very High**
	Expected to occur at some time	**Likely**	**Low**	**Medium**	**High**	**Very High**	**Very High**
	May occur at some time	**Possible**	**Low**	**Medium**	**Medium**	**High**	**High**
	Not likely to occur in normal circumstances	**Unlikely**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Could happen, but probably never will	**Rare**	**Low**	**Low**	**Low**	**Medium**	**Medium**