

Operating the Dremel (Model 160) 16” Variable Speed Scroll Saw

STANDARD OPERATING PROCEDURE (SOP)

Type of SOP: Process Hazardous Chemical Hazardous Class

All personnel who are subject to these SOP requirements must review a completed SOP and sign the associated signature page. Completed SOPs will be kept in the laboratory or otherwise be readily available to all personnel. Electronic access is acceptable. SOPs will be reviewed as revised as necessary.

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|-------------------------------|---------------|-------|------------|
| SOP Prepared By: | Russell Evans | Date: | 01/25/2016 |
| SOP Reviewed and Approved By: | Robert Vitale | Date: | 05/16/2006 |

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|--------------------------------|---------------------------------------|-------|--------------|
| Department: | Baskin Engineering Lab Support (BELS) | | |
| Faculty Supervisor/PI: | Robert Vitale | Work: | 831-459-3794 |
| Laboratory Supervisor: | Robert Vitale | Work: | 831-459-3794 |
| Laboratory Safety Coordinator: | Russell Evans | Work: | 831-459-2812 |

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|--------------------------------|---|
| Locations covered by this SOP: | Jack Baskin School of Engineering Room BE-138 |
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| Emergency Contacts | |
|--|--|
| In a medical emergency or an incident that poses an imminent threat to persons or property | CALL 911 |
| Robert Vitale | Work: 831-459-3794 Cell: 831-596-5360 |
| Russell Evans | Work: 831-459-2812 Cell: 408-657-7877 |
| Christian Monnet | Work: 831-459-3103 Cell: 831-332-4879 |

1. OVERVIEW

The Dremel (Model 160) 16” Variable Speed Scroll Saw is a used mostly for freehand cutting of intricate curves and shapes usually in thin wood. The blades used by a scroll saw are very narrow allowing for very small radius curves. One of the main benefits of this saw is that the blades can be quickly removed and reinserted though a pilot hole. This coupled with the blades ability to cut small radius curves allows for intricate interior cuts in relatively thin materials.





Figure 1: Dremel Model 160 Scroll Saw.




Figure 2: Scroll Saw (side view)

2. POTENTIAL HAZARDS

| Flying Debris | | |
|--|--|---|
|  | <p>What Could Happen</p> <p>The operation of this scroll saw can result in debris to be thrown into the eyes, which could result in a serious injury.</p> | <p>Mitigation Steps</p> <p>The user and others in the immediate vicinity of the scroll saw must wear safety glasses compliant with the ANSI Z87.1-2010 standard.</p> |

| Contact with Point of Operation | | |
|---|--|--|
|  | <p>What Could Happen</p> <p>Contact with the moving blade can result in a serious injury.</p> | <p>Mitigation Steps</p> <p>Keep fingers and hands at least 3 inches away from the moving blade at all times.</p> <p>Be careful not to place fingers and hands at awkward angles or positions that could cause a sudden change of position resulting with contact with the moving blade.</p> |

| Entanglement | | |
|---|---|--|
|  | What Could Happen | Mitigation Steps |
| | Loose clothing, long hair, and jewelry could potentially get caught in the moving parts of the scroll saw and pull the user into the blade resulting in a serious injury. | All long hair, loose clothing and jewelry should be tied back or removed to avoid contact with all moving parts. |

3. ENGINEERING CONTROLS

None

4. ADMINISTRATIVE CONTROLS

Do not use any materials or thicknesses in the drill press unless they are listed in this table below. **ONLY USE THE SETTING RANGES SHOWN. ANY deviation from this approved list (including equipment settings) must be approved in writing by the PI or BELS Staff PRIOR to use. IF NOT ON THE LIST DO NOT USE.**

Approved Materials Matrix.


| Material | Max Thickness | Use | Settings | Hazards |
|----------|---------------|-----|---|--|
| Plastics | 1/4 inch | | Speed: medium Cutting Rate: conservative | |
| MDF | 1/4 inch | | Speed: medium Cutting Rate: conservative | |
| Acrylic | 1/4 inch | | Speed: medium Cutting Rate: conservative | Remove plastic wrap before beginning to drill/cut to avoid it causing a binding hazard |
| Plywood | 3/4 inch | | Speed: high Cutting Rate: consistent | |
| Hardwood | 3/4 inch | | Speed: medium Cutting Rate: conservative | |



A detailed list of operational safety rules can be found on page 2 through page 4 of the attached Dremel Scroll Saw manual. These rules must be followed. The user must carefully read these pages of the manual before signing this SOP. Additionally, the following elements listed below are required.

1. Complete EH&S online “Laboratory Safety Fundamentals” class available through the UC Learning Center (<http://learningcenter.ucsc.edu/>);
2. Review and sign BE-138 Training Checklist with the PI, Lab Safety Representative, or other designated person.
3. Each proposed user of the scroll saw will receive individualized or small group training from the Faculty Instructor/Principal Investigator/BELS Staff. Trainers will supervise all individuals using the scroll saw user until they are satisfied that the proposed user is skilled enough to use the scroll saw unsupervised. IT IS ONLY AFTER THIS QUALIFICATION HAS BEEN MET THAT THIS INDIVIDUAL WILL BE APPROVED FOR UNSUPERVISED USE OF THE SCROLL SAW.
4. Implement good laboratory practices, including good workspace hygiene;
5. Inspect all equipment and experimental setups prior to use;
6. Ensure blade is securely in place;
7. The blade should cut on the down stroke. Always make sure blade teeth are oriented toward the table;
8. Do not feed the material too fast while cutting;
9. KEEP FINGERS AND HANDS AWAY FROM ALL MOVING PARTS;
10. Hold the work firmly against the table;
11. Use caution when cutting off material which is irregular in cross section, it could pinch the blade before the cut is completed;
12. Use caution when cutting off round material such as dowel rods or tubing. They have a tendency to roll while being cut, causing the blade to “bite”;
13. Never leave the scroll saw running unattended. Turn the saw OFF, and make sure the saw has come to a complete stop, before leaving the work area;

14. If the operator needs to remove the blade to make an interior cut, or change the blade for operational reasons, the power should not only be turned off, but the power cord **MUST ALSO BE UNPLUGGED** from the socket to avoid the accidental powering on of the scroll saw;
15. Do not deviate from the instructions described in this SOP without prior discussion and approval from the PI, Laboratory Supervisor, or Laboratory Safety Coordinator;
16. Notify the PI, Laboratory Supervisor or Laboratory Safety Coordinator of any accidents, incidents, or near-misses;

5. PERSONAL PROTECTIVE EQUIPEMENT (PPE)

| Eye Protection | |
|--|---|
|  | <p>The user and others in the immediate vicinity of the scroll saw must wear safety glasses compliant with ANSI Z87.1-2010.</p> |

| Body Protection | |
|---|--|
|  | <p>All individuals must wear closed toed shoes and long pants.</p> <p>Lab coats are made available for those wearing loose fitting clothing.</p> |
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6. SPILL AND EMERGENCY PROCEDURES

In an emergency CALL 911.

UCSC Emergency dispatch will take your call and get you the appropriate immediate assistance.

Report all serious injuries to EH&S as soon as possible.

For minor cuts & scrapes, a first aid kit has been installed in the lab near the door. There should be first aid cleaning supplies and small bandages and gloves in the kit. Due to possibility of blood borne pathogens, if you are helping someone who is bleeding, use gloves or have the injured party clean themselves.

For larger cuts, have injured party apply pressure with large bandage, towel or clean cloth to the wound and a second person should call **9-1-1** on the lab phone.

For all burns, injured party should seek medical attention. Burns can quickly become infected.

If smoke is inhaled, stop what you are doing, secure the equipment and move into fresh air outside immediately.

If during operation, particles of material impact anyone, stop the equipment at once and address the injury if any. Notify TA's and PI.

All users must be informed on the nearest fire alarm pulls and first aid kit.

Use of the scroll saw is not expected to result in any type of hazardous spills.

7. WASTE MANAGEMENT

It is not expected that use of the scroll saw will result in hazardous waste products.

8. DESIGNATED AREA

The Dremel scroll saw is located in the Baskin School of Engineering room BE-138. This room has an Omnilock security system that limits access to only approved individuals.

9. DETAILED PROTOCOL

All users must be trained and certified before attempting to use the scroll saw. This document must be displayed and the binder containing the current list of authorized users must be available in the laboratory where the scroll saw is located. Below is an outline of the use of the scroll saw. **Detail operational instructions can be found pages 10 to 14 in the Dremel Model 160 Scroll Saw manual attached to this SOP. The operational overview outlined below is not meant as a substitute to the detailed instructions found in the attached manual. The user should always consult the manual with any question about the safe operation of the Dremel scroll saw.**

1. Best results are achieved when cutting wood less than one inch thick.
2. The drop foot should always be lowered until it just rests on top of the work piece.
3. Turn the scroll saw on, and roughly cut around the pattern. Depending upon the type of wood you're using, you may want to use a blade with few teeth for this part.
4. Adjust the speed of the blade. For hard wood, use a slower speed. Soft woods, such as maple or popular, can take faster speeds.
5. Aim the scroll saw blade toward the first line to be cut.
6. Use both hands to gently guide the wood into the blade. Use your forefingers of both hands and the thumb of 1 hand to move the work through the blade. Hold down the piece, and push it forward along the cut line.
7. As you push the piece forward, lift 1 finger at a time out of the way. Do not lift 1 hand or both fingers, or the piece may jump and create a jagged cut.
8. Adjust the feed rate into the scroll saw to what feels right to you. Watch the blade, and listen to the saw to determine if you need to slow down.
9. You must feed the wood into the blade slowly because the teeth of the blade are very small and they can only remove wood when they are on the down stroke. The blade will flex backwards when applying feed pressure. Too much feed pressure will cause blade breakage.
10. Make gradual turns with the scroll saw by slowing turning the wood as needed.
11. To get accurate cuts be prepared to compensate for the blade's tendency to follow the wood grain as you are cutting.
12. Very fine, narrow blades should be used to scroll cut in thin wood (1/4 inch thick or less). To cut thicker wood, use wider blades with fewer teeth per inch.
13. Most blade packages state the size or thickness of wood, which that blade is intended to cut, and the radius (size of curve), which can be cut with that blade. Wider blades can't cut curves as tight or small as thinner blades.
14. This saw uses 5-inch long, Pin or Plain-End type blades only.

15. Blades wear faster when (1) cutting plywood, which is very abrasive, (2) when sawing wood which is thicker than the 3/4 inch blade stroke, and (3) when sawing hardwood, or when side pressure is placed on the blade.

10. SOP APPROVAL

As the SOP Approver/Principal Investigator, it is your responsibility to ensure that all individuals conducting this protocol are taught the correct procedures for safe handling of the hazardous materials involved. It is also your responsibility to ensure that your personnel complete Laboratory Safety Training and other applicable safety training courses.

- Prior to conducting any work with, the SOP Approver/Principal Investigator or designee must provide training to his/her laboratory personnel regarding the specific hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The SOP Approver/Principal Investigator must provide his/her laboratory personnel with a copy of this SOP.
- The SOP Approver/Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last year.

I have reviewed and approve this Standard Operating Procedure.

SOP Approver Signature

Date

I have reviewed and approve this Standard Operating Procedure.

PI Signature

Date