Yale *Environmental Health & Safety*

Shop Safety Procedure

Equipment/Task Name:	COMBINATION BELT AND DISC SANDER
Equipment/Task Hazard Class:	4 http://ehs.yale.edu/sites/default/files/files/tool-classification-matrix.pdf
Shop Name:	
Shop Hazard Class:	

Purpose

Stationary belt and disc sanders utilize abrasive coated cloth or reinforced paper to remove material from work pieces. Typically, shops will designate what materials can be used on a particular machine (metals, plastics, and wood the most common designators). The belt and disc are the machining surfaces where the abrasive coated belt moves in a downward direction towards the work table. Always note the direction of rotation of the abrasive disc as you only want to put work pieces in contact with the disc on the downward motion side (See attached diagram).

Hazards

As with all shop tools, there are many potential hazards associated with their use and exposure. Combination belt and disc sanders with 120 volt motors greater than ½ horsepower are Class 4 tools (http://ehs.yale.edu/sites/default/files/files/tool-classification-matrix.pdf). There are a number of particular hazards associated with the operation and use of stationary belt/disc sanders (See attached diagram).

Cuts and Laceration

- Abrasive on belts and discs will remove skin and bone if contact is made with them.
- Edges on belts and discs will act like cutting tools to you if contact is made with them.
- Belts should be tight and tracking on center so that there are no exposed abrasive moving edges.
- Discs should be firmly attached and centered on backing disc so that there are no exposed abrasive edges.
- Gloves should not be worn as they will grab and pull you into the abrasive surface.

In-running Nip Pinch Point

- Tables and guards must be set less than 2mm away from moving belt or disc at in-running nip points so that you cannot get caught.
- Work pieces must not be held in such a way that they can get pulled into nip points. Always keep work pieces flat on the table. Tilt the table if needed or use miter guide to maintain an angle.

Hazards (cont'd)

Hot Objects

- Abrasive cutting causes significant heat buildup in work pieces.
- Allow cooling breaks and always keep work piece moving along belt/disc to distribute heat and wear.

Projectiles

- Work pieces can easily become dangerous projectiles.
- Always keep work pieces securely held flat on the tables. Do not freehand above the surface.
- Work pieces must be large enough to be held while keeping body parts away from moving abrasive.

Dust

Dust generation produced from the abrasive surface and machining of the work piece may present physical and health hazards. Minimization practices may include dust collection equipment and general housekeeping practices. Proper operation and maintenance of dust collection equipment is essential to effective dust minimization.

Limitations

- Only sand/machine materials designated acceptable for the particular machine (i.e. wood machines/ metal machines…).
- "Hold Tight, Push Light"-Let the abrasive do the work. Do not force work piece into belt/disc.
- Do not use pliers or locking pliers to hold parts.
- If the work piece is oddly shaped and difficult to hold securely, consider alternative methods such as a vice and hand file to sand the piece by hand. Small parts can grab the abrasive surface and jam the belt or disc or be made into dangerous projectiles.
- Do not freehand above the surface. Keep the part on the table at all times when machining/sanding. Elevated parts will grab and pull you into the abrasive
- Always note the direction of rotation of the sanding disk and ONLY use the side of the disc with downward travel direction. Engaging on the "upward motion" side of the disk will cause the work piece to become a projectile.

Required Personal Protective Equipment

- Refer to the Shop Safety Postings and instructions provided by the Shop Supervisor.
- Safety glasses
- Shop specific required PPE:

Required Training

- Applicable Shop Rules
  - **Student Shop Rules** (http://ehs.yale.edu/sites/default/files/files/student-shop-rules.pdf)
    - **Professional Shop Rules** (http://ehs.yale.edu/sites/default/files/files/shop-guidelines.pdf)
- For Class 2 through 5 Student Shops, review and signing of the **Yale University Shop/Tool Use Safety Agreement** (http://ehs.yale.edu/sites/default/files/files/shop-tool-safety-agreement.pdf).
- Shop Supervisors or Instructors must evaluate the tool user based on successful demonstration of the Training Competencies listed below as applicable.

  Training Competencies:

  □ Be able to evaluate sanding surfaces (belt and disc) for wear and tear prior to sanding operations.

  □ Be able to recognize acceptable running conditions of belt and disc prior to sanding operations.

Required Training (cont'd)

- □ Exercise good judgment in work piece orientation, holding, placement and choice of sanding surface(s).
- □ Demonstrate appropriate work piece sanding movement and pressures during sanding operations.
- □ Clean and prepare the sander for the next user.
- □ Demonstrate all the above training competencies for sanding operations for the types of materials they will be using.

  Metal sample:
  - □ Deburring operations
  - □ Edge shaping/rounding – significant material removal, managing heat buildup
  - □ Edge breaking

  Wood/plastic samples:
  - □ Edge breaking
  - □ Edge shaping/rounding
  - □ Fixed angle edge/end treatment- where the end of the part starts out square and needs to be shaped to a specific angle (requires use of miter gauge or table angle adjustments)

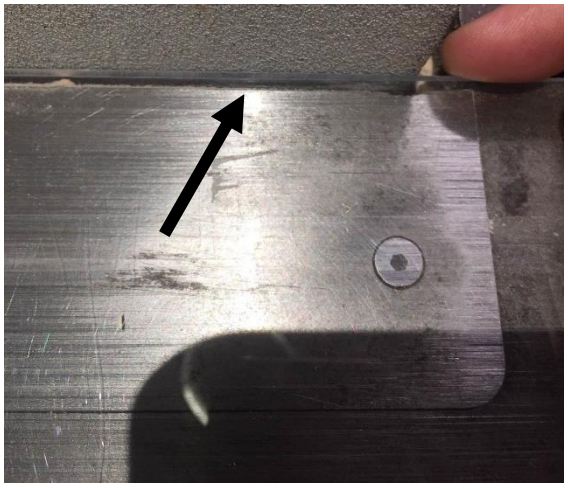
- Shop specific training requirements:

Authorized Tool Users

Shop Supervisor, Shop Monitors and those authorized by shop supervision to operate the tool.

Tool Safety Rules

- Observe and follow all Yale Professional or Student Shop Rules as posted.
- Understand and follow manufacturer operating procedures.
- Inspect the tool for damage prior to use.
- Verify all guards are in place and adjusted properly.
- Do not bypass any safety devices.
- Only use the tool when it is secured to the floor via a pedestal or work bench.
- Always stay at the machine while it is running.
- Always work in a well-lit area.
- Clean the tool after use.
- Report any malfunction or damage to the Shop Supervisor after tagging the tool "Out of Service, do not use".
- Only sand/machine materials designated acceptable for the particular machine.
- Minimize the gap between the sander and the table. Consider using a jig made of acrylic to achieve an even smaller gap (see image to right).
- The sander should only be used for sanding small amounts of material such as deburring. A cutting tool should be used for removing larger quantities of your work piece.



Tool Safety Rules (cont'd)

- If the work piece is oddly shaped and difficult to hold securely, consider alternative methods such as a vice and hand file to sand the piece by hand. Small parts can grab the abrasive surface and jam the belt or disc or be made into dangerous projectiles.
- Do not freehand above the surface. Keep the part on the table at all times when machining/sanding. Elevated parts will grab and pull you into the abrasive
- Always note the direction of rotation of the sanding disk and ONLY use the side of the disc with downward travel direction.
- Don't store anything on the work table such as wrenches, hammers, or tools.
- "Hold Tight, Push Light"-Let the abrasive do the work. Do not force work piece into belt/disc.

Shop specific rules:

Proper Setup and Use

Prior to approaching the sander you should have determined:

- Work piece material type
  - Some materials notably certain metals should not be sanded- consult with shop supervisor.
  - Certain machines may be designated for different types of materials.
- What are you trying to accomplish?
  - Shape change- clearly marked?
  - Edge breaking?
  - Deburring?
- How can the work piece be oriented and held to accomplish your goals?
- Do you need to change the table angle or use the miter gauge/guide to obtain your desired results?
- Are you dressed appropriately and do you have all the appropriate personal protective equipment?
- Are dust controls needed and functional?

At the sander:

- Engage dust collection system if available
- Test the holding/movement of the work piece with sander OFF to ensure that you will be able to safely hold and accomplish your sanding goals.
- Are all guards/guides in place and available for your work?
- Are there any tears, flaps, damage visible on the belt or disk?
  - Is the belt flat and tight?
  - Is the sanding disc secure?
  - If not contact supervisor for replacement.
- Start the sander and listen and watch operation as it comes to operating speed
  - Is the belt tracking in the center of the track?
  - Is the disc centered and running true?
  - Observe rotation direction of disc and ensure use only on downward face of rotating disc.
  - Is either belt or disc hitting the work table as it moves?
  - If any of the above are observed shut off the machine and contact the shop supervisor.

While sanding:

- Engage work piece with sanding surface as pre-planned.
- Be sure to keep work piece in motion across sanding surface.
- Observe heating of work piece and adjust pressure and movement to keep part cool.

Proper Setup and Use (cont'd)

Completion:

- Shut off sander and allow it to come to a complete stop.
- Disengage dust collection system (if available and as directed by the shop supervisor).
- Clean up machine for next user.
- Report any issues to the shop supervisor.

Shop specific procedures:

Diagram/Illustration

Typical Combination Belt and Disc Sander

Creation/Revision Dates:	October 27, 2016

Suggestions, questions, or comments? Please contact your shop supervisor or EHS.