

Knowledge Domain: Plumbing
Unit: Filters
Skill: Fabrication

Tools and Parts Required:

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|---|-------------------|
| 1) Dirty/damaged disc filter | 5) Scissors |
| 2) Small plastic bottle (film canister, pill bottle, spice bottle, etc) | 6) Utility Knife |
| 3) Cotton | 7) Pen |
| 4) Gauze | 8) Epoxy |
| | 9) Soldering iron |

Introduction

It is important for medical equipment to have clean filters because dirty filters can reduce air flow and reduce the performance of medical equipment.

This unit demonstrates how to make a disc filter. This disc filter is made of gauze and cotton. The pore size is large. The filter is only suitable to trap dust from air. This filter is NOT suitable for liquids. This filter can prevent liquid from entering the machine. This replacement disc filter is NOT suitable as a bacterial filter.

There are many ways to fabricate your own filter if you cannot replace a filter. You can also substitute a filter. Follow the guidelines in the Substituting Filters unit!

Example

Below is a picture of a new disc filter (left) and a fabricated disc filter (right).



Identification and Diagnosis

If you have a machine that has a damaged or dirty filter that cannot be cleaned, replaced or substituted, you may have to fabricate a replacement filter.

If the flow of air through the machine is reduced, remove the filter and test the air flow. If the flow of air increases substantially when the filter is removed, the filter is clogged and should be replaced.

If the machine gives an error such as “clogged filter” or “blocked air line,” try replacing the filter.

Some machines may sense that the filter has been removed. This sensor is usually mechanical. You can defeat the sensor with tape when determining if a new filter is needed.

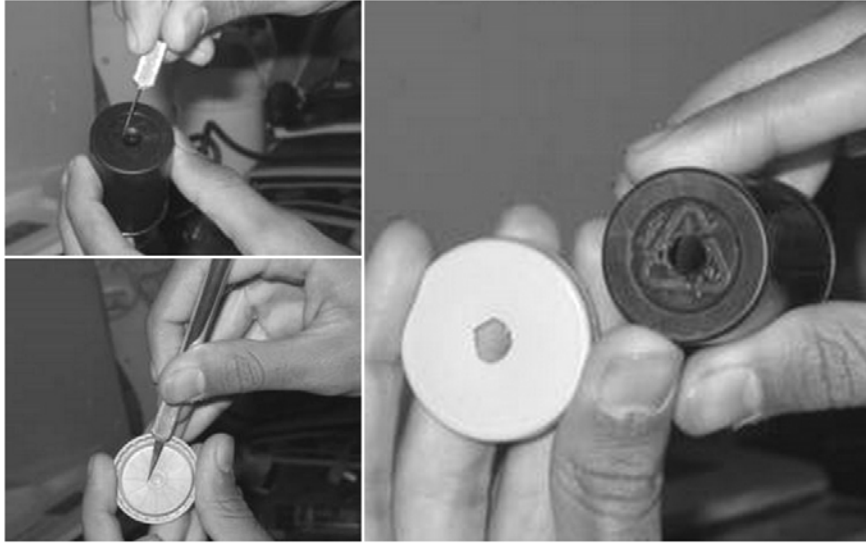
Procedure

In this demonstration, a film canister is used. Any container approximately three centimeters long and one centimeter in diameter could work. You can use very small water bottles, pill bottles, or any other very small bottle. The bottle must be plastic. The lid must fit tightly. Shorter and wider bottles are preferable because there will be more surface area for the air to be filtered and less decrease in air flow. Do not use a standard drink bottle. It is too long and thin.

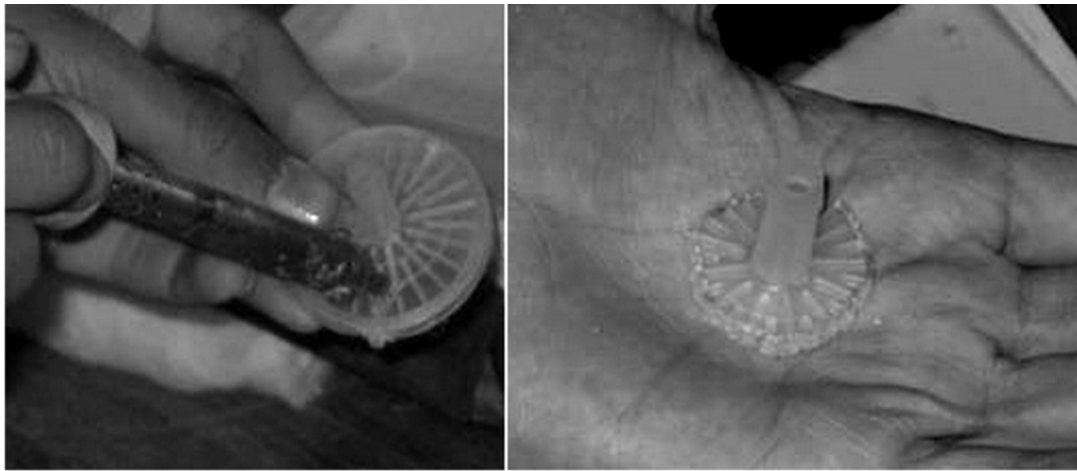
1. Fold a piece of gauze in fourths. Use a pen to trace the circumference of a film canister onto the gauze. Cut out two circular pieces of gauze.



2. Using a utility knife, cut out a small hole in center of the bottom of the film canister. Cut another small hole in the center of the canister's lid. These holes should be big enough for the hose connections of your disc filter.



3. Separate the two sides of the disc filter using pliers. (If you cannot separate them, you may need to use a soldering iron to melt the outer edges first.) Discard the damaged or dirty filter paper. Use scissors or a soldering iron to trim the discs small enough so they fit in the canister. Be careful to leave the hose connection intact.



4. Glue the trimmed disc filter inside of the film canister using epoxy. Glue the second trimmed disc filter inside the lid of the canister. Use enough epoxy that no air will leak around the connections. After the epoxy has cured, check your connections for air leaks by closing one end with your finger and blowing in the other. No air should leak out.



Using the gauze circles you cut out, make a stack of gauze, cotton, and gauze. Put the stack inside the film canister. Fill the entire canister. Use multiple stacks if needed.

5. Put on the lid. The filter is complete.



Exercise

Make a disc filter. Your instructor must verify your work before you continue. Explain to your instructor what your disc filter can and cannot be used for.

Preventative Maintenance and Calibration

Always verify proper operation of every medical device before returning to use.