

**Are you breathing dust
unnecessarily?**

YOU CAN FIX THAT PROBLEM

SHOULD YOU WORRY ABOUT DUST?

- TRADITIONAL DEFINITION OF DUST REFERS TO CHIPS AND DUST (IE. FLOOR SWEEPINGS)
- BILL PENTZ PREFERS "FINE DUST" MEANING BOTH FINE DUST AND CHIPS

SHOULD YOU WORRY ABOUT DUST?

- FINE DUST CAN BE DUST PARTICLES $.01\mu$ to 100μ IN SIZE AND ARE INVISIBLE
- FINE DUST IS AIRBORNE AND CAN STAY THAT WAY FOR HOURS
- FINE DUST CANNOT BE FILTERED BY THE BODY AND IS TRAPPED IN LUNGS
- EFFECTS OF PROLONGED EXPOSURE ARE ALL BAD
- OSHA STANDARD IS NO MORE THAN 5 mg's OF 10μ OR SMALLER PARTICLES PER CUBIC METER OF AIR OVER 8 HOURS

SHOULD YOU WORRY ABOUT DUST?

- HOW DOES THAT EQUATE TO A GARAGE WORKSHOP?

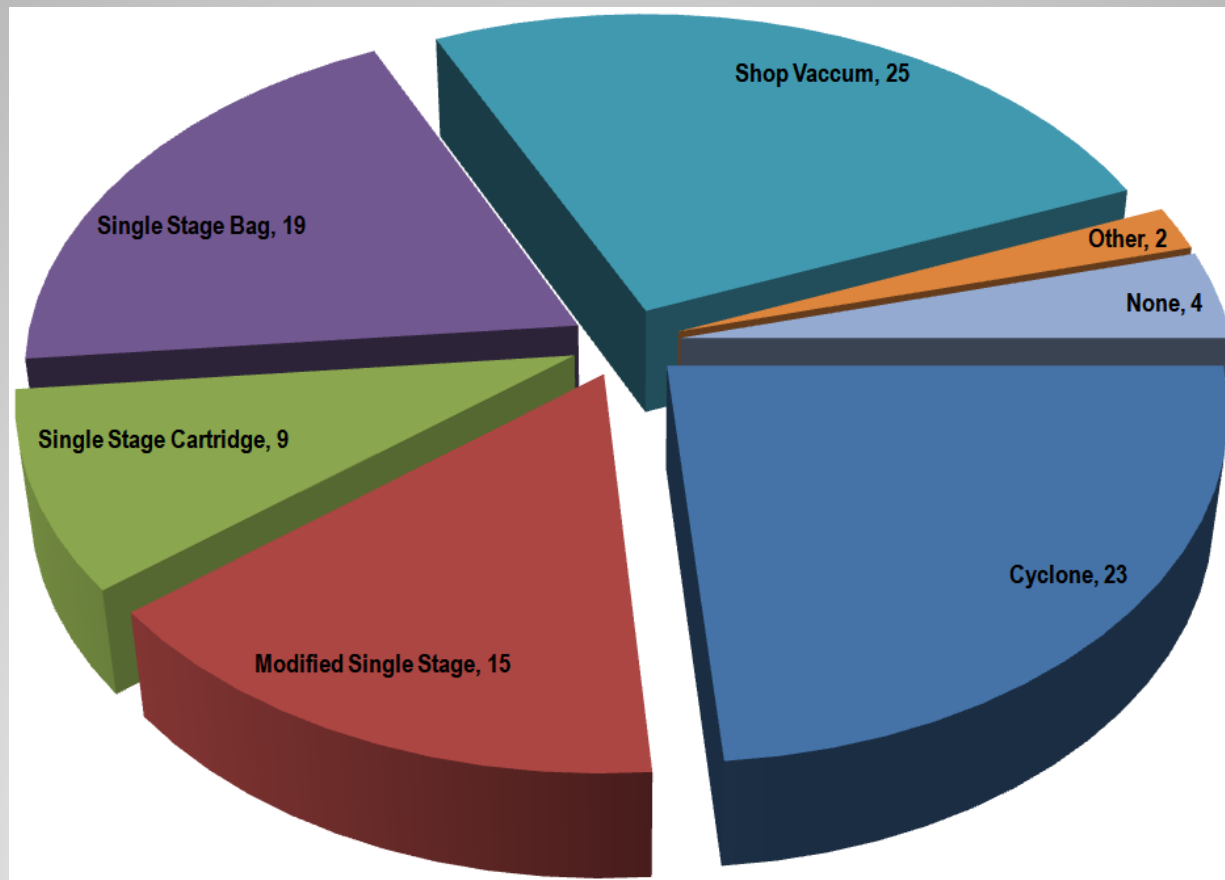
"In a garage-size shop, this translates to less than 150mg(1/8 tsp.) of dust for every 10 hr. of shop time." - Sandor Nagyszalanczy

SO WHAT ARE WE DOING?

- A SURVEY WAS SENT OUT TO SEE WHAT WE WERE DOING
- BY NO MEANS COMPREHENSIVE
- SOME RESULTS WILL BE SHOWN DURING PRESENTATION

DUST COLLECTION SURVEY

Type of Dust Collection - 71 replies

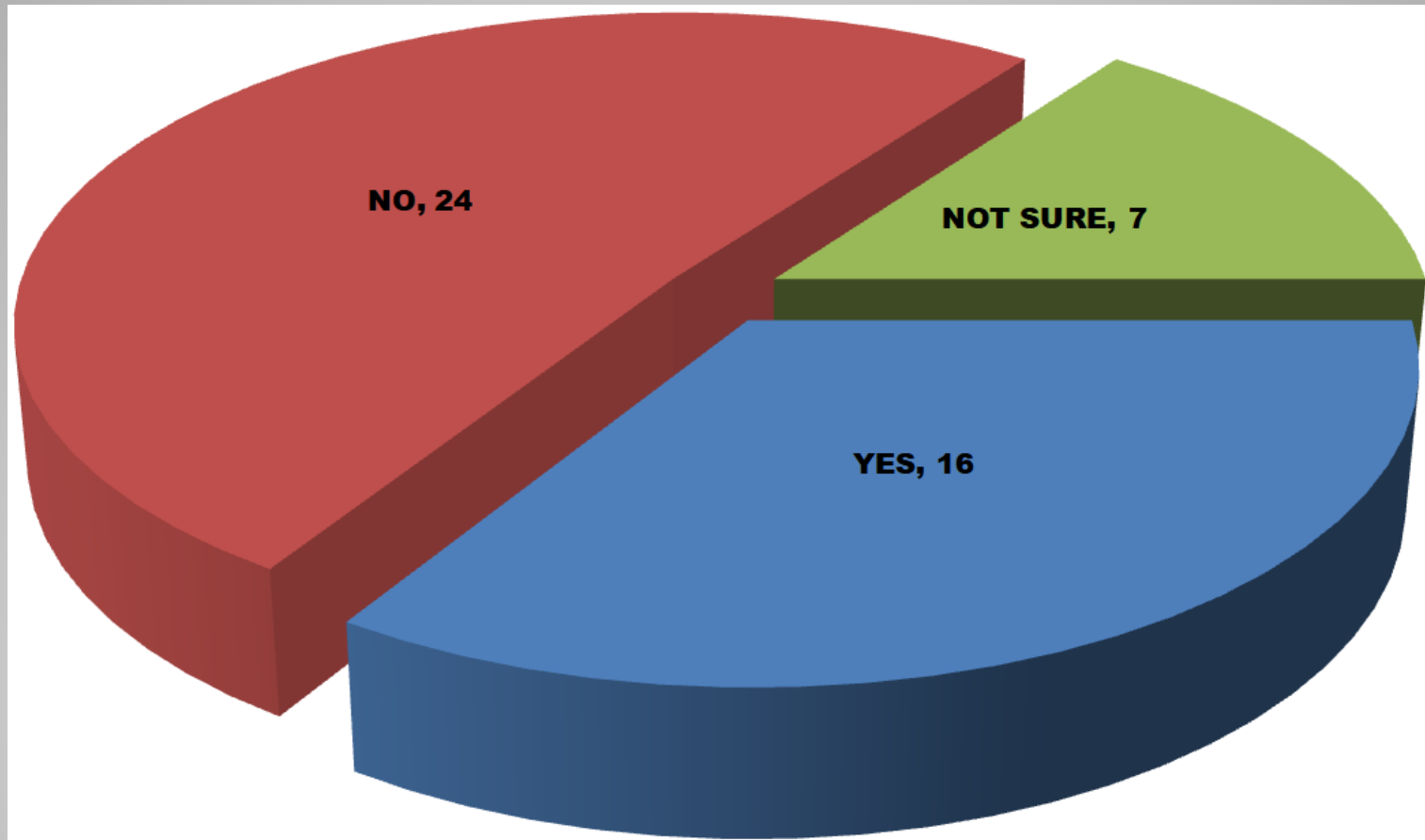


Shop Vacs

- LOWEST COST CHOICE
- BEGINNING WOODWORKERS
- HIGH VELOCITY - LOW VOLUME OF AIR
- WORKS FOR CHIPS AND VISIBLE DUST
- NOT AS EFFICIENT FOR AIRBORNE DUST
- BEST WITH SMALLER POWER TOOLS OR FOR SWEEPING

DUST COLLECTION SURVEY

SHOP VAC HAS HEPA FILTER - 47 replies



Shop Vacs

- USE HEPA FILTERS IF FILTERS ARE AVAILABLE FOR VAC BRAND. THESE FILTER THE AIR BEFORE IT IS DISCHARGED INTO ROOM



Shop Vacs

- USE FINE DUST BAGS RATED FOR DRYWALL, CEMENT, ASH



Shop Vac Type J High Efficiency Filter Bags for 15-22
Gallon Vacs 90673 - 1 Package of 2

- *SHOP-VAC SAYS BAG NOT NECESSARY WITH HEPA FILTER. USING BOTH AFFORDS MORE DUST PROTECTION*

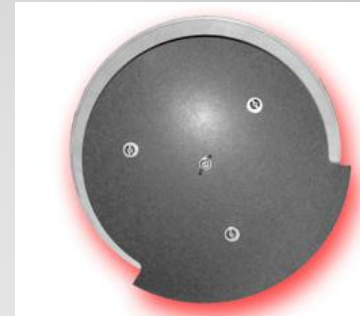
Shop Vacs – Chip Separators

- Dedicate to wood dust
- Cyclone Separators - Dust Deputy or Clearvue Mini



Shop Vacs – Chip Separators

- Shop Made - Trash Can Separator
- Thien Baffle keeps chips in the can and allows fine dust to be captured in filter



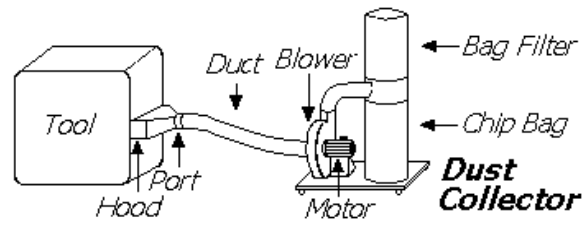
- *A number of examples of both on YouTube*

DUST COLLECTORS

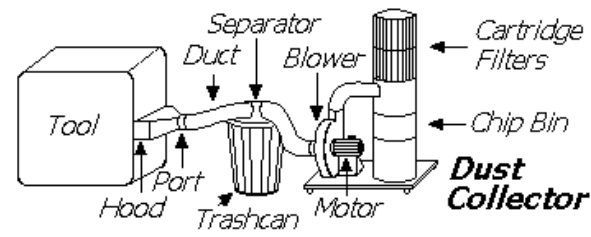
- SINGLE STAGE AND TWO STAGE
- HIGH VOLUME OF AIR – LOW VELOCITY
- USUALLY ADVERTISED BY THEIR CFM
- FILTER BAGS AND CARTRIDGES
- CAPABLE OF CAPTURING FINE DUST
- CAN BE CONNECTED TO MULTIPLE SHOP TOOLS
- LARGE RANGE OF SIZE AND PRICE

TYPICAL DUST COLLECTORS

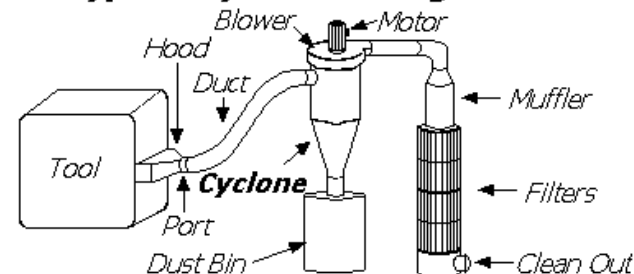
Typical Dust Collector Configuration



Cartridge Dust Collector Configuration



Typical Cyclone Configuration



SINGLE STAGE DUST COLLECTORS

- STYLES OF SINGLE STAGE DUST COLLECTORS



SINGLE STAGE DUST COLLECTORS

- STYLES (Cont)



SINGLE STAGE DUST COLLECTORS

- ALL DUST IS MOVED THROUGH IMPELLER
- USES BAG OR CARTRIDGE FOR FILTER
- FILTER DUST FROM .1 MICRON(μ) TO 30 MICRONS (μ)
- CANISTER OR PLASTIC BAG FOR CHIP COLLECTION
- AIR FLOW RATINGS CAN BE 400 TO 1200 CFM (NOT A REALISTIC NUMBER)

SINGLE STAGE DUST COLLECTORS

- ONLY IMPORTANT AIR FLOW NUMBER SHOULD BE AT THE END OF THE HOSE OR DUCT
- BEST CASE IS AT LEAST 1000 CFM AT THE TOOL
- SHOULD BE ABLE TO PULL AIRBORNE DUST FROM 15-25 INCHES AROUND HOSE OR COLLECTOR

SINGLE STAGE DUST COLLECTORS

- DUST COLLECTORS WITH DUST BAGS ARE LIMITED TO 5μ to 30μ
- FINE DUST BAGS SHOULD BE SHAKEN TO DISLODGE DUST PERIODICALLY.
- CAN BE REMOVED AND VACUUMED
- NEVER WASH DUST COLLECTION BAGS
- DUST COLLECTION BAGS ARE CONSIDERED THE WEAKEST CHOICE

SINGLE STAGE DUST COLLECTORS

- PLEATED CARTRIDGES ARE BETTER FOR FINE DUST
- PLEATED CARTRIDGES CAN BE RATED AS HIGH AS MERV 15 (Filters down to 0.3–1.0 micron particle size)
- IF YOUR USING A BAG FILTER, CONSIDER MODIFYING YOUR DUST COLLECTOR TO ACCEPT A CARTRIDGE FILTER

SINGLE STAGE DUST COLLECTORS



How a bucket and a donut changed my dust collector
<https://www.youtube.com/watch?v=oosMqnORR6k>

SINGLE STAGE DUST COLLECTORS

- WYNN ENVIRONMENTAL HAS A WHOLE LINE OF DUST CARTRIDGES.
- THERE ARE ALSO CHEAPER CARTRIDGES ON AMAZON
- THERE ARE PLANS ON THEIR WEBSITE FOR MODIFYING BAG TYPE DUST COLLECTORS UNDER THE WOODWORKING TAB
- CHECK YOUTUBE FOR ADDITIONAL INFORMATION

SINGLE STAGE DUST COLLECTORS

- FINE DUST COLLECTION CAN BE AIDED BY A TRASH CAN OR CYCLONE SEPARATOR
- CFM TO MOVE AIRBORNE DUST CAN BE REDUCED BY SEPARATOR SO BE SURE YOUR DUST COLLECTOR HAS ENOUGH POWER
- HAVE THE DUST COLLECTOR AS CLOSE AS POSSIBLE TO SOURCE OF DUST
- USE FIXTURES TO CONFINE DUST AS CLOSE TO SOURCE AS POSSIBLE

TWO STAGE DUST COLLECTORS



TWO STAGE DUST COLLECTORS

DO IT YOURSELF TWO STAGE DUST COLLECTOR



DIY TYLER

TWO STAGE DUST COLLECTORS

- 1.5, 2.0 AND 3 HP MOTORS TURNING LARGER IMPELLERS
- MOVING MORE AIR UP TO 1000 CFM AT TOOL
- PRE-SEPARATING CHIPS FROM DUST
- LARGER FILTERS CAPABLE OF CLEANING $.1\mu$ OR SMALLER
- CAN BE VENTED OUT SIDE
- ARE NOISIER THAN SMALL SHOP UNITS

TWO STAGE DUST COLLECTORS

- CAN BE VERY EXPENSIVE FOR SMALL SHOP
- ALTERNATIVE CAN BE TO BUILD YOUR OWN.
- CAN SUPPORT EXTENSIVE DUCT WORK
- NOT RECOMMENDED FOR SMALL TOOLS EXCEPT AS AREA DUST EXTRACTION

DIY TWO STAGE DUST COLLECTORS



LTL 2 Stage DC Modification

<https://www.youtube.com/watch?v=5BoF0gLm6hI>

LTL Let's Talk Dust Collection Filters

<https://www.youtube.com/watch?v=75SkuQ9oS0w>

AIR FILTERS



AIR FILTERS

- CLEAN AIR BY PULLING AIRBORNE DUST THROUGH FILTERS
- OUTER FILTER 5 MICRON PARTICLES
- INNER FILTER 1 MICRON PARTICLES
- USUALLY HAVE TIMERS WHICH WILL RUN FOR SET PERIODS OF TIME 2 TO 8 HOURS
- NEEDS SUFFICIENT CFM TO EXCHANGE ROOM AIR SEVERAL TIMES PER HOUR

AIR FILTERS

- REPLACEMENT FILTERS ARE AVAILABLE THROUGH MANUFACTURERS OR THIRD PARTY
- THIRD PARTY FILTERS MAY OFFER HIGHER FILTERING BUT MANY SLOW DOWN AIR MOVEMENT
- TURN FILTERS ON WHEN GENERATING A LOT OF DUST AND LEAVE ON FOR SEVERAL HOURS

AIR FILTERS



DIY Shop Dust Filter Plans / How to Clean Air in Your Woodshop

<https://www.youtube.com/watch?v=IL-VGtB1Jl4>

AIR FILTERS

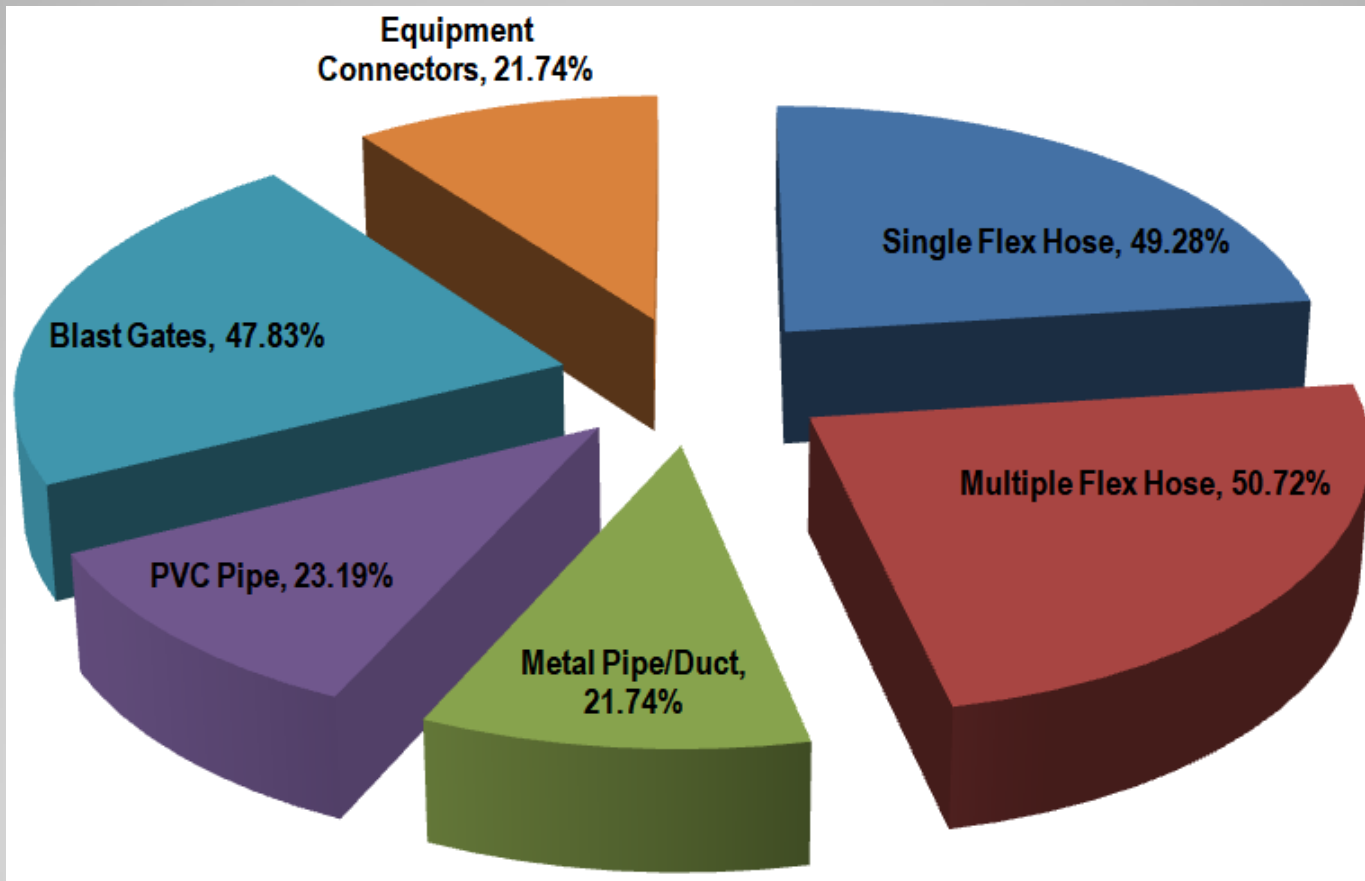
- PLANS FROM VIDEO -

<https://drive.google.com/file/d/0BysXc1AlAJt2SGw0RHJRZUJtUFk/view?usp=sharing&resourcekey=0-6CAYQfxxyfDSk3AlAelb5xQ>

- USE MERV 10 OR HIGHER AIR FILTERS (3M BRAND FILTERS SOLD IN MOST HARDWARE STORES)

DUST COLLECTION SURVEY

HOSE, PIPING, BLAST GATES AND CONNECTORS



HOSES AND DUCTS



Measuring Dust Collection Airflow | Woodworking

<https://www.youtube.com/watch?v=0NmMoIYIsr8>

HOSES AND DUCTS

- DUST COLLECTION HOSES NEED SMOOTH INTERIOR WALLS (KANAFLEX HOSES)
- THE LONGER THE HOSE RUNS THE LESS EFFICIENT (TRY TO KEEP UNDER 10 FEET)
- KEEP HOSE RUNS AS STRAIGHT AS POSSIBLE
- USE CLAMPS DESIGNED FOR DUST COLLECTION HOSES.

HOSES AND DUCTS

- DUCTS CAN BE MADE FROM METAL OR PVC
- KEEP RUNS AS SHORT AS POSSIBLE
- KEEP FITTINGS TO A MINIMUM NECESSARY (KEEP IT SIMPLE)
- USE SWEEPING CURVES NOT A 90°
- BLAST GATES ARE ESSENTIAL WHEN CONNECTED TO MULTIPLE TOOLS

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HOSES AND DUCTS

- DUST COLLECTION DUCT SYSTEMS ARE A SUBJECT TO THEMSELVES
- CHECK OUT SANDOR NAGYSZALANCY "WOODSHOP DUST CONTROL"
- ONLINE SEE BILLPENTZ.COM/WOODWORKING
- YOUTUBE STUMPY NUBS "11 common workshop dust collection mistakes"

HOSES AND DUCTS

- HERE ARE A GROUP OF ADDITIONAL VIDEOS ABOUT SHOP DUCTS AND BLAST GATES
- DIY Wood Guy - Dust Collection Ducting That's Cheap and Easy? - <https://www.youtube.com/watch?v=JZpUfwFha58>
- Mike's Workshop - Dust Collector piping and fittings. - <https://www.youtube.com/watch?v=AFROqIFn4zo&t=15s>
- Mike's Workshop - Grounding your dust collection system - <https://www.youtube.com/watch?v=fgAzfFTgbMo>
- Jay Bates -How To Make 4" PVC Blast Gates- <https://www.youtube.com/watch?v=1eM-6pUmEQ8>

HOSES AND DUCTS

- DIY Wood Guy - Dust Collection Ducting That's Cheap and Easy? - <https://www.youtube.com/watch?v=JZpUfwFha58>

PERSONAL PROTECTION

- PAPER MASKS ARE CHEAP AND ARE READILY AVAILABLE IN MOST HARDWARE STORES
- THEY COME IN A MULTITUDE OF STYLES AND USES (DRYWALL, PAINT, ETC)
- IT IS ALWAYS BEST TO USE A MASK DESIGNED FOR THE FINEST DUST
- MANY PAPER MASKS ARE ONE TIME USE

PERSONAL PROTECTION

EXAMPLES OF PAPER MASKS



PERSONAL PROTECTION

- CLOTH MASKS, AKA REUSABLE MASKS, ARE A GOOD ALTERNATIVE TO PAPER
- FILTER AS LOW AS 1 MICRON
- USUALLY WASHABLE OR USES REPLACEABLE FILTER MEDIA

PERSONAL PROTECTION

EXAMPLES OF CLOTH MASKS



3M RZ MASK
1 MICRON
REPLACABLE CARBON FILTER



DUST BE GONE
WASHABLE
3 MICRON

PERSONAL PROTECTION

- RESPIRATOR MASKS AVAILABLE FOR DUST, CHEMICAL AND PAINT
- DETACHABLE CARTRIDGES RATED FOR SPECIFIC USES
- CARTRIDGES SHOULD BE REPLACED AT RECOMMENDED INTERVAL
- MASK SHOULD BE WIPED CLEAN AFTER EXTENDED WEAR

PERSONAL PROTECTION

EXAMPLES OF RESPIRATOR MASKS



PERSONAL PROTECTION

- INTEGRATED FILTERS IN FACE SHIELDS COME IN EITHER POWERED OR RESPIRATOR STYLES
- ADVANTAGE OF HAVING FACESHIELD AND DUST FILTRATION TOGETHER
- HAVE REPLACEABLE CARTRIDGES OR FILTERS
- MOST HAVE REPLACEABLE SHIELDS

PERSONAL PROTECTION

EXAMPLES OF INTEGRATED FACE SHIELD



Trend AirShield Pro



Full Face Respirator
from Amazon

**Be sure face shield is rated ANSI Z87 – Z97+*

PERSONAL PROTECTION

- PERSONAL AIR PURIFYING RESPIRATORS ARE THE MOST EXPENSIVE (IN EXCESS OF \$1000)
- MEET NOISH AND OSHA STANDARDS FOR MANY HAZARDOUS ENVIRONMENTS
- DUST FILTRATION TO 1 MICRON AND LOWER
- THERE ARE A LIMITED NUMBER OF VENDORS FOR THIS EQUIPMENTS

PERSONAL PROTECTION

EXAMPLES OF PERSONAL AIR PURIFYING RESPIRATOR



3M VERSAFLO



WOODTURNING WONDERS
SR 500/570 AIR PURIFYING
RESPIRATOR

PERSONAL PROTECTION

- THERE IS A DIY VERSION OF THE PAPR
- 3M AIRMATE AIR SUPPLY
- 3M VERAFL0 FACE SHIELD
- 3M VERAFL0 AIR SUPPLY TUBE
- TOTAL COST CAN BE AROUND \$600 AND BELOW
- NOT OSHA APPROVED BUT COMPONENTS ARE

PERSONAL PROTECTION



RESOURCES

- “Woodshop Dust Control”, Sandor Nagyszalanczy, The Taunton Press, 2002
- Bill Pentz Blog - <https://billpentz.blogspot.com/>
- Bill Pentz.com - <http://www.billpentz.com/woodworking/cyclone/index.php#index.php>
- STUMPY NUBS - “11 common workshop dust collection mistakes”
<https://www.youtube.com/watch?v=qjI5l4nF9AM>
- LINCOLN ST. WORKS - BASIC SETUP
<https://www.youtube.com/watch?v=Y6kkg2EoCI>
- Woodworkers Journal - Tune Up Your Dust Collector - <https://www.youtube.com/watch?v=gc9YFJ3X3Xc>

RESOURCES

- Thein Baffle - <https://www.jpthien.com/cy.htm>
- <https://www.woodmagazine.com/tool-reviews/dust-collection/the-lowdown-on-dust-separators>
- Wynn Environmental - <https://wynnenv.com/stumpys-youtube-video/>
- Stumpy Nubs - "How a Bucket and Donut Changed my Dust Collector"
<https://www.youtube.com/watch?v=oosMqnORR6k>

RESOURCES

- Woodworkers Journal = Measuring Dust Collection Airflow | Woodworking - <https://www.youtube.com/watch?v=0NmMoIYIsr8>
- Wynn Environmental - <https://wynnenv.com/woodworking-filters/>
- Spencley Design - DIY Shop Dust Filter Plans / How to Clean Air in Your Woodshop <https://www.youtube.com/watch?v=IL-VGtB1Jl4>

RESOURCES

- Frankly Rustic - Don't buy a Wynn filter until you see this first! (It's a Winner not a Wynn) -
<https://www.youtube.com/watch?v=0hT8tW05IqY&list=WL&index=94>
- DIYTYLER - LTL 2 Stage DC Modification -
<https://www.youtube.com/watch?v=5BoF0gLm6hI>
- DIYTYLER - LTL Let's Talk Dust Collection Filters -
<https://www.youtube.com/watch?v=75SkuQ9oS0w>

RESOURCES

- Gwinnet Woodworkers - Wood Shop Dust Collection with Ricky Alexander -
<https://www.youtube.com/watch?v=GVjYmxYiD60>

EXTRAS:

- <https://www.izzyswan.com/Store/QuickLox-4-Inch-Starter-Kit-p279858043>
- How to Make a DIY Air Filter | Ask This Old House -
<https://www.youtube.com/watch?v=aw7fUMhNov8>