



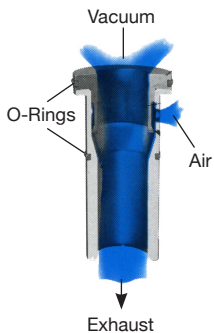
Vacuum Removal Solutions for: Loose Slugs, Shavings, Piercings or Finished Parts in Progressive Fabricating Dies

THE PROBLEM: Uncontrolled loose scrap or small finished parts. Costly losses include; production shut downs, shearing of expensive punches and dies, damage to strip stock, and rejection of finished parts.

THE SOLUTION: The Vacuum Sleeve is designed as a simple method to remove loose slugs or scrap by converting compressed air into a vacuum, which is applied at the die opening. This vacuum not only prevents slugs from pulling out with the punch, but it carries them away from the die surface, through the vacuum source, and deposits them into a container.



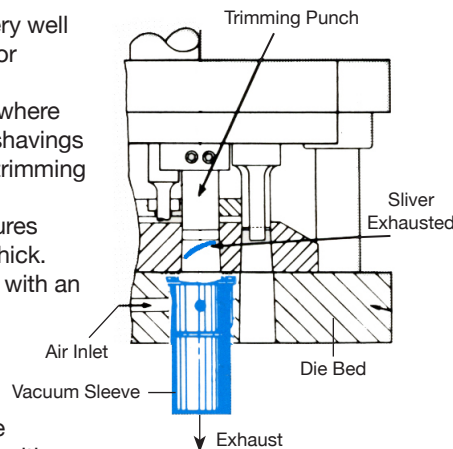
Vacuum Sleeve - How Does It Work



- Compressed air is forced to flow through the circular orifice, creating the required vacuum.
- Center chamber is the vacuum passage and allows removal of solid material.
- Metal scrap passes through the Vacuum Sleeve without disrupting the vacuum flow.
- O-rings, which seal compressed air, allow liberal machining dimensions for installing Sleeves.

Typical Installation:

- Vacuum Sleeves work very well when the application is for individual die openings.
- Shown is an application where vacuum prevents loose shavings from pulling up with the trimming punch.
- The loose shaving measures .640"L x .030"W x .020 thick.
- A VS750 Vacuum Sleeve with an .75" diameter vacuum passage is installed beneath the die opening in the die bed.
- The vacuum prevents the shavings from pulling up with the punch and carries them away from the die surface.



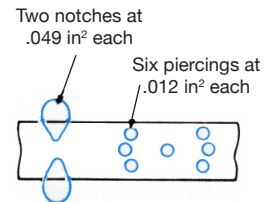
Selecting the Proper Vacuum Sleeve:

Measure the longest dimension of the pieces which are to pass through the Vacuum Sleeve and add 1/8". Be sure to consider the stock thickness.

Vacuum Transducer and Funnel Units

There are many applications that make it impractical to install only Vacuum Sleeves.

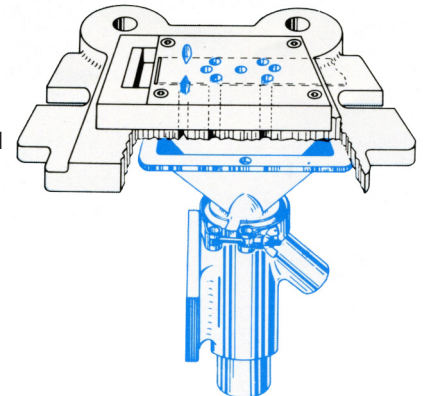
The Problem: It was necessary to remove loose slugs from two notches and seven piercings.



The Solution: Since it would have been impractical to place individual Vacuum Sleeves under each die opening, a Funnel unit was installed (as illustrated). The unit removes scrap from all nine openings and exhausts it into a container.

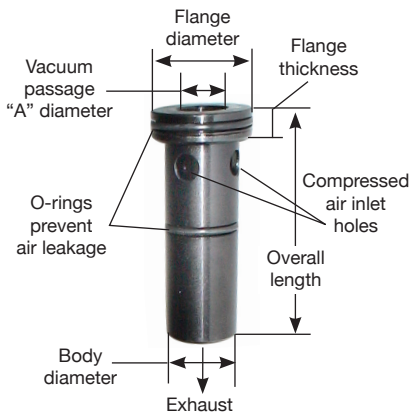
Method for Sizing Unit:

You must consider all openings which allow air to flow into the Funnel unit. The vacuum unit must be capable of maintaining a sufficient vacuum level in the Funnel. Add up the total area of all these openings and select a vacuum unit with an "A" diameter that is equivalent to this area.



In reference to the application shown, this total area equals .182 square inches. Therefore, the unit required for this particular application is a VT500F2 Vacuum Transducer and Funnel Unit. The VT500 provides a 1/2" "A" diameter vacuum passage that is equivalent to .196 in.². The F2 Funnel flange dimensions include all seven piercings.

VS Vacuum Sleeves



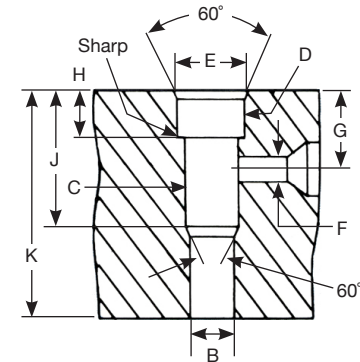
Vacuum Sleeve Chart - 12 sizes available with vacuum passages ("A" diameters) from 3/16" to 2.0".

| Part No. | VS190 | VS260 | VS320 | VS380 | VS500 | VS620 | VS750 | VS940 | VS1250 | VS1500 | VS1750 | VS2000 |
|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| "A" Diameter +.003 | .191 | .261 | .323 | .377 | .500 | .625 | .750 | .937 | 1.250 | 1.500 | 1.750 | 2.000 |
| Flange Diameter | .562 | .625 | .750 | .812 | 1.000 | 1.187 | 1.375 | 1.500 | 2.000 | 2.250 | 2.500 | 3.000 |
| Body Diameter | .375 | .437 | .532 | .593 | .750 | .937 | 1.062 | 1.250 | 1.625 | 1.875 | 2.125 | 2.500 |
| Overall Length | 1.437 | 1.625 | 1.687 | 1.750 | 2.312 | 2.562 | 2.687 | 2.687 | 3.500 | 4.000 | 4.250 | 4.656 |
| Flange Thickness | .243 | .258 | .258 | .258 | .276 | .276 | .276 | .276 | .324 | .324 | .324 | .363 |
| VAC at 20 psi | 6.0 | 6.0 | 5.5 | 5.0 | 3.8 | 3.0 | 1.5 | 1.0 | .5 | .4 | .2 | .2 |
| VAC at 40 psi | 12.0 | 12.0 | 11.5 | 11.5 | 8.0 | 6.5 | 5.0 | 3.8 | 2.3 | 2.0 | 1.0 | 1.0 |
| VAC at 60 psi | 20.0 | 19.5 | 18.5 | 18.5 | 12.3 | 9.5 | 7.5 | 5.5 | 3.2 | 3.0 | 2.2 | 2.1 |
| Area of "A" Dia. (in ²) | .028 | .049 | .082 | .112 | .196 | .307 | .441 | .690 | 1.23 | 1.77 | 2.41 | 3.14 |

Vacuum was measured in inches of mercury. For optimum air flow, an operating pressure of 60 psi (max) is recommended. The standard VS190 through VS940 Sleeves are made of steel. Standard VS1250 through VS2000 are made of aluminum.

Machining Specifications on how to properly install Vacuum Sleeves

| Part No. | VS190 | VS260 | VS320 | VS380 | VS500 | VS620 | VS750 | VS940 | VS1250 | VS1500 | VS1750 | VS2000 |
|-----------------------|-------|-------|-------|-------|-------|--------|--------|-------|--------|--------|--------|--------|
| "B" Diameter +.003 | .375 | .4375 | .5312 | .5937 | .750 | .9375 | 1.0625 | 1.250 | 1.625 | 1.875 | 2.125 | 2.500 |
| "C" Diameter +.005 | .4375 | .500 | .625 | .6875 | .875 | 1.0625 | 1.1875 | 1.375 | 1.812 | 2.060 | 2.310 | 2.872 |
| "D" Diameter +.003 | .5625 | .625 | .750 | .813 | 1.000 | 1.1875 | 1.375 | 1.500 | 2.000 | 2.250 | 2.500 | 3.000 |
| "E" Diameter +/- .005 | .608 | .670 | .795 | .858 | 1.045 | 1.233 | 1.420 | 1.545 | 2.041 | 2.291 | 2.541 | 3.041 |
| "F" Diameter +.003 | .1562 | .188 | 1.875 | .219 | .2187 | .250 | .2812 | .312 | .562 | .562 | .562 | .562 |
| "G" +/- .010 | .492 | .507 | .507 | .507 | .568 | .568 | .568 | .620 | .875 | .875 | .875 | 1.125 |
| "H" +/- .002 | .249 | .264 | .264 | .264 | .282 | .282 | .282 | .282 | .330 | .330 | .330 | .367 |
| "J" +/- .010 | .734 | .750 | .750 | .750 | .854 | .854 | .854 | .958 | 1.343 | 1.343 | 1.343 | 1.812 |
| "K" min | 1.125 | 1.125 | 1.188 | 1.188 | 1.312 | 1.312 | 1.312 | 1.312 | 1.875 | 1.875 | 1.875 | 2.5 |



VT Vacuum Transducer



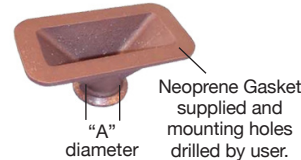
Consists of the VT Housing, Vacuum Sleeve and V-Band Coupling. They are used with either a Funnel or Cap. There are 6 sizes available with "A" diameters from 5/16" to 15/16".

| Model No. | VT320 | VT380 | VT500 | VT620 | VT750 | VT940 |
|--------------------|-------|-------|-------|-------|-------|-------|
| Uses Sleeve No. | VS320 | VS380 | VS500 | VS620 | VS750 | VS940 |
| "A" Dia. of Sleeve | .323 | .377 | .500 | .625 | .750 | .937 |

See Vacuum Sleeve Chart for vacuum levels and area of "A" diameter.

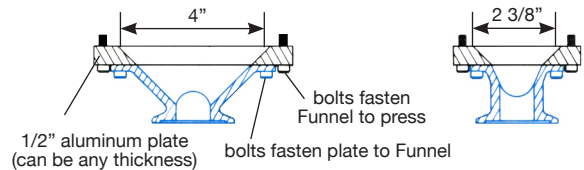
Vacuum Funnels

There are 3 sizes available with "A" diameters from 5/16" to 15/16".

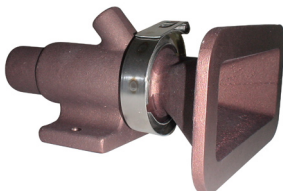


| Model No. | F1 | F2 | F3 |
|--------------|--------|---------|--------|
| Width (in.) | 1 5/16 | 1 13/16 | 2 5/16 |
| Length (in.) | 3 1/8 | 4 9/16 | 6 |
| Height (in.) | 1 9/16 | 2 5/16 | 3 1/16 |

Standard Funnel opening can be changed to meet your requirements by mounting an aluminum plate to the flange. Example: a standard F1 Funnel opening of 1 5/16" x 3 1/8", can be increased up to 2 3/8" x 4".

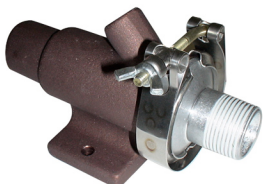


VT Series Vacuum Funnel Units



Consist of a VT Vacuum Transducer and a Funnel. An example of a complete part number is VT500F2. The VT500 indicates the Vacuum Transducer has an "A" diameter of .500". F2 indicates the Funnel size and has an "A" diameter of .500". Funnels and Vacuum Sleeves can be replaced and purchased separately.

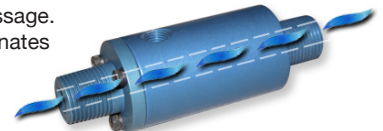
VT Vacuum Cap Units



Consist of a VT Vacuum Transducer and a Cap. An example of a complete part number could be a VT750C1. The VT750 indicates an "A" diameter of .750". The C1 Cap also has a .750" diameter with a 3/4" NPT thread. Cap part numbers C1-320 through C1-750 have 3/4" NPT threads and the C1-940 has a 1" NPT thread.

TDRH Vacuum Cap Units

Threaded vacuum inlet and exhaust connections. Straight through vacuum passage. Two piece construction eliminates need for a vacuum sleeve. Available with "A" diameters from 1 1/4" to 2".



| Model No. | TDRH1250L | TDRH1500L | TDRH1750L | TDRH2000L |
|---------------------------|-------------|-----------|-------------|------------|
| "A" Diameter (in.) | 1 1/4 | 1 1/2 | 1 3/4 | 2 |
| Air Supply Thread (NPT) | 1/4 (F) | 3/8 (F) | 3/8 (F) | 3/8 (F) |
| Vacuum Thread (NPT) | 1 1/4 (M) | 1 1/2 (M) | 2 (M) | 2 (M) |
| Exhaust Thread (NPS) | 1 1/4 (M) | 1 1/2 (M) | 2 (M) | 2 (M) |
| Size: Dia. x Length (in.) | 2.25 x 6.75 | 3.0 x 7.5 | 3.25 x 7.68 | 3.5 x 7.68 |

See Vacuum Sleeve Chart for vacuum levels and area of "A" diameter.

