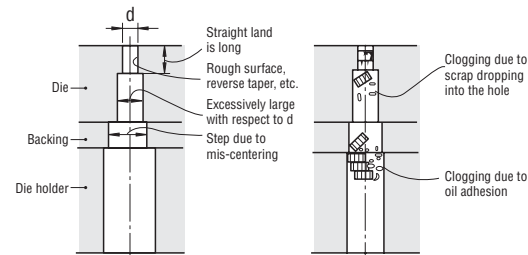


Causes of scrap clogging

Generally, the following are conceivable causes of scrap clogging.

- The straight part of the die tip is too long.
- The rear relief profile is unsuitable (is a reverse taper).
- The inside surface of the die is rough.
- Steps are formed due to mis-centering of the holes in the die, backing plate and die holder.
- When pieces of blanking scrap fall on top of each other and drop together like a cylinder, they clog up the relief hole.
- Scraps become magnetized.

Particularly, during blanking of thin sheets or blanking of small holes, the blanked scrap is light, so it is considered that the scrap will readily clog up due to even a small impediment.



[Fig.1] Causes of scrap clogging
1) "Presswork Troubleshooting" by Hiromi Yoshida, Fumio Yamaguchi

Non-clogging button dies (SV series)

1) Principle and features of non-clogging button dies

One conceivable way of thinking concerning the prevention of scrap clogging is as follows:

$$\text{Scrap discharge resistance (cause of scrap clogging)} < \text{Scrap discharge force} + \text{Weight of scrap}$$

Misumi's non-clogging button dies have an air inlet hole near the tip, so if a non-clogging button die is used in combination with a vacuum device, a downward airflow is generated inside the die. As a result of this airflow the scrap discharge force increases, thus helping to reduce the amount of scrap generated.

For the vacuum device, please use a vacuum pump, vacuum cleaner (pail cleaner) or a scrap vacuum unit. [Fig.2].

2) Scope

Material	Shape of relief hole		Shank diameter D	Tip diameter P		Page
	Regular	Angular				
Steel	SKD11	○	—	6~10	1.00 ~6.00	P.239
	SKH51	○	—	3~5	0.50 ~2.50	
	Powdered high-speed steel	○	—	6~10	1.00 ~6.00	
Cemented carbide	V40	○	○	3~10	0.50 ~6.00	P.447, P.453
Precision carbide	V40	—	○	3~10	0.500~6.000	P.386
	Superfine particles	—	○	3~10	0.500~6.000	

3) When used for scrap retention

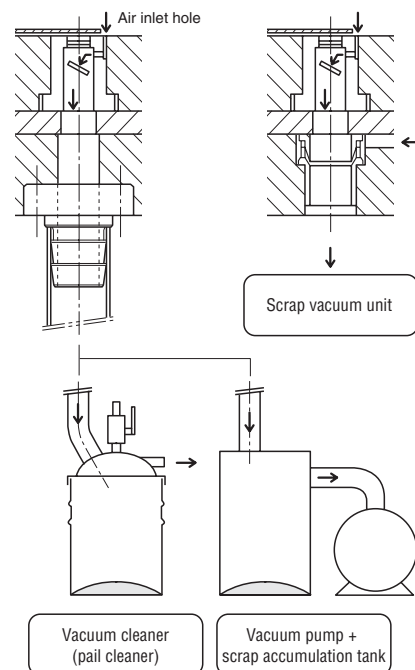
When the BC alterations are used to shorten the tip length (length of the straight part) and increase the bite of the punch in order to separate scrap from one sheet at a time using airflow it is possible to prevent scrap from rising. [Fig.3]

The conventional scrap retention button die was unable to prevent scrap from rising when it was necessary to perform shaving during a subsequent process or when the sheet thickness of the work piece was less than 0.1 mm and the clearance was small. In contrast, these dies can be used to prevent scrap from rising in these applications.

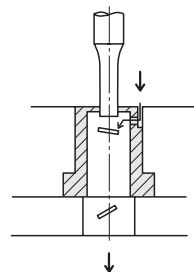
(Only the angular type can be used for BC alterations.)

4) Precautions

- A non-clogging button die is intended to be used in combination with a vacuum device such as a vacuum pump. It is not possible to prevent scrap from clogging by using a button die on its own.
- If the air inlet hole at the top of the button die becomes clogged with lubricating oil, cutting chips, dirt, and so on, the effectiveness of the die will be impaired, so maintain the die periodically. After the die has been stored for a long period, remove solidified lubricating oil, dirt, and so on, clogging the air inlet hole before using the die.
- If the airtightness of a die is poor, it may not be possible to obtain adequate suction effect.
- This product is intended mainly for punching thin sheet material. It may not always be possible to obtain adequate suction performance in the case of thick sheets.



[Fig.2] Examples of combinations with different vacuum devices



[Fig.3] When used for scrap retention

Scrap vacuum unit (SVBN)

1) Principle and features of scrap vacuum unit

- The scrap vacuum unit uses an air blow (compressed air) to create a negative pressure inside the die. This causes the scrap (product) to be pushed downward, preventing the scrap from clogging or rising.
- Greater effectiveness can be obtained by using a non-clogging button die that has an air inlet hole.
- The air supply path to the die holder can be selected from groove feed and hole feed.
- The unit is intended to be recessed in the die holder, enabling it to be installed later as a countermeasure against scrap rising and scrap clogging without making major changes in design.
- There is no need to form an inclined hole to the die plate, die holder, and so on.

2) Scope

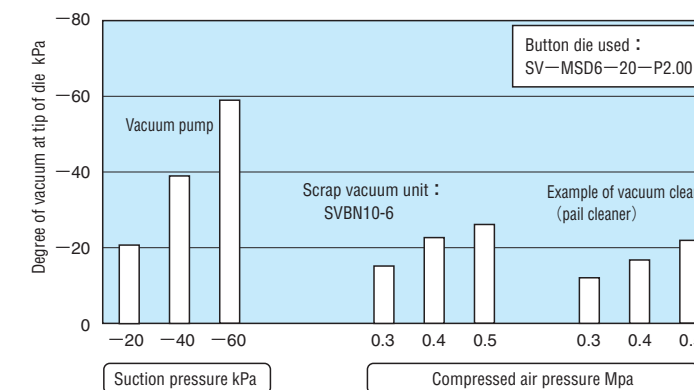
- Hole diameter d: f 3 mm to 16 mm
- O.D. D: f 6 mm to 20 mm

3) Precautions

- The magnitude of the suction force of the scrap vacuum unit differs depending upon the pressure of the air supplied, the hose diameter, the cross-sectional area and length of the air supply path of the plate, and the size of the unit.
- A scrap vacuum unit that is not adequately airtight is likely to have insufficient suction effect.
- When using two or more scrap vacuum units, take steps to ensure that the flow of air through each airflow path is the same. Note that in this case the flow velocity will fall, causing the vacuum to fall as well. The vacuum is proportional to the pressure of the compressed air and the cross-sectional area of the flow path, and inversely proportional to the diameter of the vacuum unit and the length of the flow path.
- Use a hose that has an O.D. of f 6 and an I.D. of at least f 4.
- This unit can be used to prevent scrap from rising or clogging, however it cannot solve these problems under all conditions.
- Dimensions not included in this catalog may be changed for the purpose of improvement.

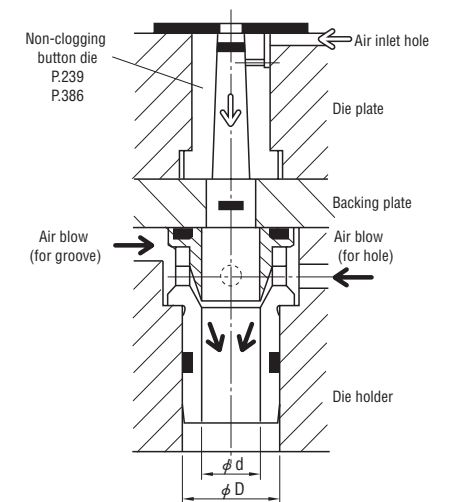
Test data (reference value)

- The scrap suction performance (degree of vacuum at the die tip) becomes maximum when suction is performed using a vacuum pump.
- The suction performance of a scrap vacuum unit or a vacuum cleaner (pail cleaner) is inferior to that of a vacuum pump, however it is possible to drive a scrap vacuum unit using an existing compressor, for example, so there is almost no need to purchase new equipment.
- The suction performance differs depending upon the size of the button die, the hose diameter, the length, and so on, so it is given here only as a rough guide.



[Fig.5] Comparison of different suction units

Note: The suction performance of a vacuum cleaner differs according to the particular model.



[Fig.4] Example of use of a scrap vacuum unit