

## PUNCH TIPS

### Tips for the safe, successful punching of mild steel

Punches should wear out, but they shouldn't chip or crack. We hear reports of chipped faces or cracks around the center points on punches. We're glad to say that very few of these reports involve our punches. Several factors contribute to punch chipping and cracking. Here is our simple check list that will help minimize this failure.

- 1. Loose coupling nut.** This permits the punch to "move" during the punching process. Such movement will cause uneven pressures.
- 2. Misalignment.** If the punch is not aligned to the hole in the die, non-uniform clearance will result. The effect will be uneven pressure on the face of the punch.
- 3. Improper clearance between punch and die.** The accepted standard clearance for punching mild steel that is less than 1/2" thick is 1/32" total clearance. Punching material that is 1/2" or thicker requires a clearance of 1/16".
- 4. Uneven stripping.** This occurs when the stripper on

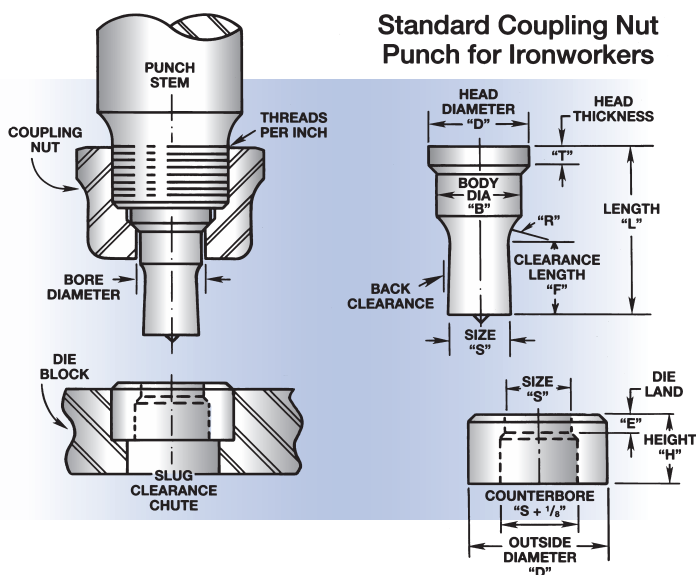
the machine does not firmly and uniformly hold the plate down during the "up" stroke. When this happens, the entire weight of the plate, plus the stripping strain, is concentrated on one side or edge of the punch. Under extreme conditions, as much as 1/2" of the punch may break off.

Some of these conditions that we have described can be controlled on your shop floor. However, it is our job to furnish you with the strongest punches possible. We do this by using the finest shock-resistant tool steels available, machine them to exacting tolerances, and then harden and temper them under careful metallurgical procedures.

Punches usually crack and chip when punching high strength, high tensile plates over 1/2" thick. Our engineers have developed several super tough punches which perform well under these difficult conditions.

If you are breaking, chipping or cracking punches on a regular basis, send us the broken tools (regardless of the manufacturer), and slugs of the material being punched. We would be glad to make a recommendations that will improve the performance – and safety – in your plant.

#### STANDARD PUNCH SET-UP AND TERMINOLOGY

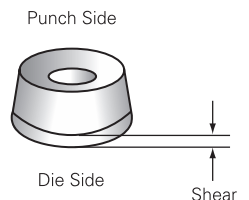


#### Standard Clearance Required Between Punch and Die

- 1/8 - 1/2" material thickness, 1/32" total clearance
- 1/2 - 3/4" material thickness, 1/16" total clearance
- Over 3/4" material thickness, 3/32" total clearance

#### PROPER SLUG APPEARANCE

**CORRECT SETUP:** The punch side of the slug will have a center point indentation and a slight burr.



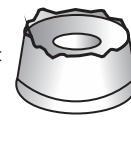
When punching mild steel 1/8" or thicker, the die side of the slug will be dished. The periphery of the slug will be shiny or sheared, for a distance of 10% to 20% of the material thickness.

**FAILURE INDICATION:** Double shear indicates insufficient clearance between punch and die.



**Possible Solution:** Increase punch to die clearance.

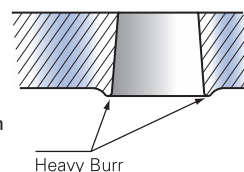
**FAILURE INDICATION:** Uneven burr indicates worn tools or misalignment of punch and die.



**Possible Solution:** Check condition and alignment of punch and die.

**FAILURE INDICATION:**

Heavy burr on die side of material indicates too much clearance between punch and die.

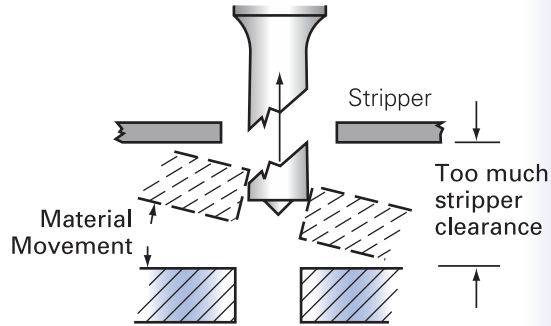
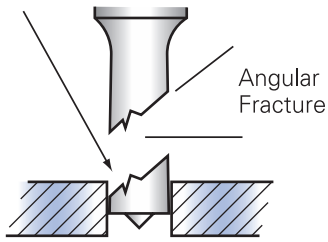


**Possible Solution:** Decrease die clearance.

## STRIPPING FAILURE

**FAILURE:** A portion of the punch is broken off in the material.

**PROBABLE CAUSE:** Too much stripper clearance.



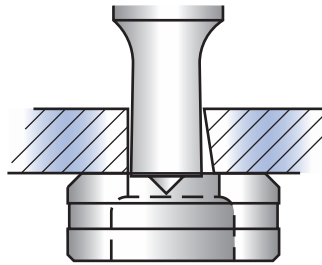
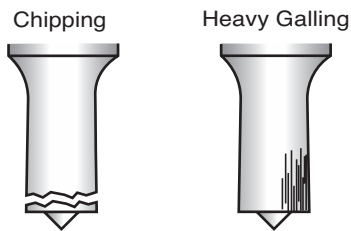
### POSSIBLE SOLUTION:

Adjust stripper closer to the material.

## CHIPPING AND GALLING

**FAILURE:** Punch face chipping or heavy galling on one area of punch.

**PROBABLE CAUSE:** Poor alignment between punch and die, causing the punch to drag.

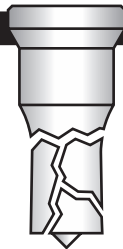


### POSSIBLE SOLUTION:

Adjust alignment between punch and die to create equal clearance all around.

## COMPRESSIVE FAILURE

**FAILURE:** Occurs when the compressive strength of the punch has been exceeded and the entire working end shatters.



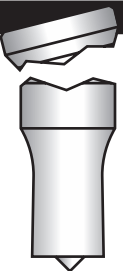
**PROBABLE CAUSE:** Attempting to punch extremely hard or thick materials, or complete misalignment of the punch and die.

### POSSIBLE SOLUTION:

Use an "Alpha Punch" from American Punch Co.

## PUNCH HEAD FAILURE

**FAILURE:** Punch head fractures or breaks off.



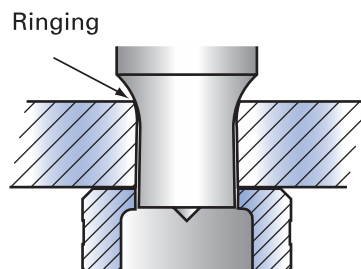
**PROBABLE CAUSE:** Using a loose or worn coupling nut or punch stem.

### POSSIBLE SOLUTION:

Frequently check and re-tighten the coupling nut. Verify that the face of the punch stem is smooth and flat.

## RINGING

**FAILURE:** Material being punched is deformed with each stroke of the press.



**PROBABLE CAUSE:** Material is thicker than the working length of the punch, or the punch is entering into the die too far.

### POSSIBLE SOLUTION:

Adjust the stroke length to enter into the die a maximum of 1/16".

**WARNING:** It is the responsibility of the machine operator to use this tooling safely, in accordance with OSHA Laws and ANSI B11.5 Safety Standards.