

## USING A SQUARE SHEARBUTTON™ FOR QUICK, CLEAN PARTS SEPARATION ON THICKER MATERIALS

### THE PROBLEM:

As discussed in a previous Solution Bulletin, micro-joints (or “shake and break”) are a traditional method fabricators use to separate multiple parts from a sheet of material. In thicker materials, the micro-joints are not always strong enough to hold the part while punching. If the size of the micro-joints is increased, this tends to leave an even larger burr on the part.



Example of common micro-joint

To review, the traditional micro-joint method places small, interconnecting tabs between parts by programming the spacing of the slitting punch to leave material unpunched. However, micro-joints leave burrs on the edge (right), which, unless removed, could interfere with other downstream operations such as bending. Micro-joints may also cause serious injury if not removed.

In the previous Solution Bulletin, Mate recommended using a Square EasySnap™ tool in place of micro-joints to provide a smooth edge and fast parts separation. Still, Square EasySnap does have material limitations, and is recommended for a maximum material thickness up to .060”(1,52mm). What if you punch thicker material?

### THE MATE SOLUTION:

A Square ShearButton™ tool (right) is a part retention system for thicker materials. Available in both form up and form down, Square ShearButton allows fabricators to snap punched components out of sheet metal. It is quite similar to a round half shear, but square. A benefit of the form down is that once the tab is removed, the edge closely matches the quality of a punched edge.



Above photo shows the snap line created with the Square ShearButton tool.

Square ShearButton is a punch and die system. One of the components is a spring loaded set that allows partial punch penetration and allows the material to strip off from the tool set. When the tools penetrate the sheet, they move material in the shape of the punched tab (up or down) to a point before the material fractures. This leaves a tab that is strong enough to hold the



Example of the burr left over as the result of a wire joint process.



Square ShearButton in Ultraform holder.

part in place, but will still break off easily for removal. The actual depth of penetration and force required to snap the part is dependent on the ductility and thickness of the material being punched and the width of the shear button. It also keeps parts removal easy since the you simply snap the parts off the sheet.



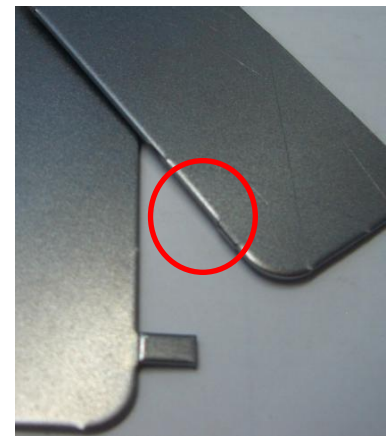
Square ShearButton example, before separating parts. Note: 2 tabs shown, but 1 tab would be plenty strong.



Square ShearButton shown after punching and ready to be removed, before separating parts after removal from sheet.



Square ShearButton (form down) after removal from sheet shows smooth edge quality.



Notice that tab is less than slitting width, if desired.

Example after parts separation shows clean, smooth edge.

Square ShearButton may be used with a variety of material types, including stainless steel, aluminum, cold roll steel and more. Depths and heights may be adjusted to suit the user's application.

**WHEN TO USE SQUARE SHEARBUTTON:**

- Nesting parts in a large sheet (photo above right).
- Very large or heavy parts with minimal micro-joints. These tabs are much stronger than the traditional micro-joint, so fewer are needed.
- Rounded part corners where a corner micro-joint is not possible.

**AVAILABLE TOOLING STYLES AND STATION SIZES**

- Available for all machine types. Consult you Mate Applications Specialist for more information.

**MATERIAL RESTRICTIONS:**

- Works best on materials between 0.06”(1,52mm) and .12”(3,04mm)

## TONNAGE RESTRICTIONS:

- None

## TIPS FOR SUCCESS:

- Square ShearButton tools may be ordered the same width as a parting or slitting tool.
- For standard Square ShearButton strength, program to penetrate the material by 50% of the thickness.
- Square ShearButton tab sizes or widths may vary, depending on the user's preference and application. Example: a width of .118"(3,00mm) using a .197"(5,00mm) square shear button.
- In a nesting application, use Square ShearButton on one edge of the part for single part removal or between parts.
- Use Square ShearButton as the last tooling operation if at all possible
  - If this is not possible, punch both sides adjacent to the tabs before forming with the Square ShearButton. This will help prevent the forms from being smashed with tools used after the Square ShearButton is formed.
- To prevent leaving burrs behind after part removal, use sharp corner parting or slitting tools up to the Square ShearButton tab. This will help ensure the tabs break evenly.
- If edge quality is not your primary concern, try using a trapezoid shaped punch for slitting. A small burr will result on the part from the radius corner of the punch. Using this method will leave a smaller section on the part than the skeleton. This ensures all tabs break away from the part, not the skeleton.
- In Trumpf-style presses, select Tool Type 14 (forming).

## HOW TO ORDER:

- Square ShearButton may be ordered to form up or form down
  - Form Code:
    - S3, Square ShearButton, Form Up
    - S4, Square ShearButton, Form Down
  - Provide the following information:
    - Material Type
    - Material Thickness
    - Machine Type
    - Tooling Style
    - Tooling Station

## OTHER MATE PRODUCTS TO CONSIDER:

- EasySnap™: Allows fabricators to simply snap parts out of punched material with reduced micro joints or slitting. Ideal for thinner materials. Watch a video at:  
<http://www.youtube.com/user/mateprecisiontooling#p/u/7/TJwjLBqQi-A>
- Square EasySnap™: similar application to Square ShearButton, but for thinner materials.
- Traditional tools, such as trapezoid or dovetail shapes, or a slitting punch