



National Steel Rule

080215_PerforatingEtc

Technical Tips

Creasing, Perforating, Combo Perf/Crease, Tear Strips & Zip Strips

General: The subject of creasing, perforating, combo perf/creasing and *tear stripping are generally associated with folding a material along a design line. There are fundamental differences in the application and use of these five styles of rule:

- **Creasing** is a method of crushing/indenting a material at a specified location in a specified width for a specified distance. Due to the nature of the process, creasing rule generally bends in one direction and along a straight line. The folding direction is inward toward the side that has been hit with the creasing rule. Creasing can also be referred to as *Scoring* or *Score*. The width of the crease can vary based on the weight of the material to be folded. Generally thicker materials utilize wider steel for the crease. The common ranges of crease width are 2,3,4,6 & 8 point. (one point is equivalent to .014").
- **Perforating** is a method of cutting and skipping a fold or tear line. Generally used for folding flaps this rule is designed with a cut/skip frequency that is normally balanced, ie: $\frac{1}{4}'' \times \frac{1}{4}''$, $\frac{1}{2}'' \times \frac{1}{2}''$ etcetera. The advantage of perforated rule (aka:*perf*) is it always folds accurately along the fold line and can be folded bi-directionally. The width of the perf rule is generally the same thickness as the cutting rule in the job.
- **Combo Perf/Crease** is a perf with a designed space that is specified at crease height. In manufacturing this rule, the crease portion of the product is notched at a specific depth to create the creasing space. However, this process leaves a flat squared off finish on the space meant to do the creasing. Ideally creasing is rounded where the contact to the product is made. Squared crease spaces can cause some materials to rupture. The width of the combo perf/crease rule (aka: *perf/score*) is generally the same thickness as the cutting rule in the job. New methods are being introduced to incorporate a radius to the creasing space on combo cut/score perf. This development will only improve the overall performance of cut/score perf in folding accuracy and elimination of undesirable liner fracturing.
- **Tear Strip Rule** is a configuration of intermediate cutting with the purpose of separating a container or part along a given line. Perforating & Combo perf/crease can also work as a tear strip. By increasing the cut to space ratio this design specific rule can act as a bi-directional fold and ultimately be torn to serve

as a tear strip rule. This process is becoming more and more popular. Caution is advised, as the ultimate performance of the folding and tearing action is sensitive to humidity, material condition and die cutting variables. Understanding and minimizing the variables is crucial to successful running in a production environment.

- * **Zipper Rule** is commonly confused with Tear Strip Rule. A common application of ZIP strip rule is the ice cream package. This design utilizes opposing runs of specially shaped rule spaced from ½" – 1" apart. A pull-tab is incorporated for the user to start the tearing action and the ZIP strip waste is the paper strip between the opposing rules. Because of the open "L" shape of the zip tooth, zipper rule is almost always utilized in opposing pairs and rarely used as a fold line.



- **Other guidelines:**
- The creasing width is generally 1.5 – 2.5 times the thickness of the solid material, the compressed thickness of corrugated or other compressible materials.
- Solid materials such as SBS (folding carton) should be matrix creased. The height of the crease is determined by the thickness of the material, the desired degree of folding and the matrix to be used.
- The crease height for platen cutting corrugated operations (when not using matrix) is calculated by subtracting the compressed thickness of the corrugated layers from the cutting rule.
- The crease height for soft anvil cutting (penetration cutting – flat die), is calculated by adding the penetration of the knife blade into the anvil with the compressed thickness of the corrugated and then subtracting the sum from the overall knife height.
- To achieve accurate parts from the soft anvil rotary process it is critical to utilize the proper crease height in the cutting die. The proper crease height is one that achieves good creasing quality *AND* operates at the desired *pitch of the machine.
 - Proper knife penetration (soft anvil cutting) is a product of the tooth configuration (serrated rule) and its ability to get through the material. This will occur at a point slightly beyond the gullet of the tooth pattern.

*Machine pitch is the exact circumference the machine is designed to travel in one complete revolution. The operating pitch is a product of the rotary cutting die mounted to the die cylinder, minus the penetration to cut.