

# TECH TALK

**Product: Gatorplast®**

**Date: November 9, 2005**

**Subject: Die Cutting**

**Revision:**

**Number: D30**

**Pages: 3**

## **Die Cutting Gatorplast® Material**

Die cutting with steel rule dies allows for the rapid production of flat shapes or cutouts. Typical applications would include the die cutting of letters and shapes or openings in a sheet used as part of an assembly. The key elements to consider when die cutting are the press, the steel rule, the ejection rubber and the substrate. Each of these elements must be selected properly to yield satisfactory results.

### **PRESSES:**

Gatorplast® is most commonly die cut on flat bed presses. The presses can be either moving platen or "clam shell" type. Either type of press can be utilized without affecting the quality of the die cut. The key press consideration is proper "make ready". Make ready is the preparation of the press bed (anvil) to assure that the steel rule cuts evenly through the Gatorplast® without dulling the steel rules. Typically Gatorplast® is cut on a "hard anvil". Make ready for this type of die cutting utilizes carbon paper. The press is lowered to the point where the steel rule just touches the anvil. The places where the rule fails to touch the anvil are built up with 1 mil thick shim tape. This process is repeated until a complete imprint of the steel rule is apparent. Make ready is very important because the platen of the press does not necessarily close evenly. This can be caused by misalignment, uneven cutting loads or by deflection of the platen. As a rule of thumb, a 4 post press will deflect 1 mil per ft. Steel rules, that have been dulled by improper make ready will cut poorly, have increased cutting loads and can contribute to liner cracking problems.

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### **Definition of Steel Rule Die Cutting**

Steel rule dies work basically the same way as a cookie cutter. They are made of a 1"-wide strip steel with one pre-sharpened edge. The cut strips are called "knives." The strip steel is typically made in a thickness range of .014"–.166". To specify thickness, the term "point" is used. The strips are bent to the shape of the trim line and held in place by a block called a "die body." In order to facilitate ejection of the part, strips of a compressible material such as neoprene are glued along the perimeter and protrude above the cutting edge of the rule.

During die cutting, the steel rule die (SRD) assembly is fixed under the top platen, and the sheet material is placed on a steel bottom platen. Pressure is applied to force the knives of the SRD through the (often preheated) sheet material. The platens are then opened and the parts removed. In some cases, additional work such as finishing the cut edge might be required.

### **Steel Rules:**

There are two types of steel rule dies that can be used to cut Gatorplast<sup>®</sup> material, cutting rules and serrated rules. The most common is a cutting rule. The type of cut needed will determine which rule is used.

#### Cutting Rules:

Cutting rules are the most commonly used when die cutting Gatorplast<sup>®</sup>. There are three types of bevels: A center bevel, inside bevel, and outside bevel. Inside and outside bevels are more commonly used to cut Gatorplast<sup>®</sup>.

A center bevel is "V" shaped, i.e., honed from both sides.

An inside bevel has the straight unhoned side of the rule on the outside of the cut and the beveled side on the inside of the cut. The rule of thumb is that the beveled side is always towards the scrap.

An outside bevel has the straight unhoned side on the inside of the cut and the beveled side on the outside. An outside bevel is used if the inside piece must be saved.

#### Serrated Rules:

Serrate rules are also used to cut Gatorplast<sup>®</sup>. The best serrated edge rules to use with Gatorplast<sup>®</sup> have 12 -20 teeth per inch and a side bevel rule. The non-beveled side should be placed toward the good piece. When using a 12-tooth rule,



the cut piece will have an unclosed edge with fine serration marks. A 20-tooth rule will slightly indent the top liner but the serration marks will be almost invisible. The side toward the bevel (bleed off area) will be partially closed with more noticeable serration marks. Serrated rules must always be used with a soft anvil because the teeth must penetrate completely through the bottom liner.

### **Stripping and Ejection Rubbers**

Stripping rubber is essential when cutting Gatorplast<sup>®</sup>. This is used to prevent cracking in the die cut piece. Liner cracking problems need to be considered whenever coated products such as Gatorplast<sup>®</sup> are die cut.

Rubber used to merely remove the part from the die is called ejection rubber. Rubber is rated by its hardness. Typical Shore "00" Durometer hardness ratings are: Soft 20 – 40, Medium 30 – 50, and Hard 40 – 60. The proper techniques for the use of ejection rubber with Gatorplast<sup>®</sup> include:

1. The ejection rubber should be at least the height of the steel rule and preferably 1/16" - 1/8" higher than the rule.
2. The ejection rubber should not touch the steel rule. This prevents dragging on the blade or getting the rubber cut by the rule. This also prevents the liner from being pulled away from the rule by the distorting rubber.
3. Medium to hard rubber is most commonly used. It is best to completely rubber the rules to prevent cracking.
4. On critical areas, soft rubber can be used for additional build-up to prevent cracking. Critical areas are usually near tight bends or sharp points. For these areas, the stripping rubber can be built up as much as 1/4" above the rule height.
5. The rubber should be selected to allow it to fully compress between the steel rules without crushing the Gatorplast<sup>®</sup> or bending the rules when the press is fully closed.