CUTTER BLADE KNOWLEDGE
Cutter Blade Knowledge

Cutter Blade Materials

- Steel Tip
  - Rarely used anymore and difficult to find
  - Material is ductile and less prone to chipping

- Carbide or Cemented Carbide
  - Provides excellent wear resistance and hardness
  - Material offers better rigidity than steel which enables the cutter blade to provide better cutting accuracy
  - Brittle material and can be chipped if dropped or dense material is cut
  - Can be sharpened better than steel blades, but lifespan is shorter
Blade Angle

- Blade angle should be chosen based on thickness and density
- Thickness is determined by substrate without backer
- Density is determined by material construction and lamination
- Blade should be able to cut through entire substrate layer and into the backing without going deeper than blade edge
CUTTER BLADE KNOWLEDGE

- Blade Offset

  - The offset determines the blades turning radius and compensation from the cutting carriage
  - A blade with a higher offset can handle thicker/laminated substrates better
  - Offsets over 1mm are simulated to compensate for material properties to avoid Figure B below

Perfect  Not Enough  Too Much

A

B

C
CUTTER BLADE KNOWLEDGE

❖ Blade Extension
  • Changing blade extension can substitute for changing pen pressure
  • Max blade extension is designed for pre-printed graphics
  • Blade extension should be minimized for cut substrates
  • Change blade extension by twisting blade holder cap
  • Blades with shorter blade edges need less extension

[Rough Estimate for the Amount of Blade Extension]
Use the following dimension as a rough estimate for setting the amount of blade extension.

\[
\text{Amount of blade extension} = \text{Thickness of the material portion} + \frac{\text{Thickness of the carrier paper}}{2}
\]
## Roland DG Blade Options

<table>
<thead>
<tr>
<th></th>
<th>ZEC-U5022 (Bundled with GX-640)</th>
<th>ZEC-U5025</th>
<th>ZEC-U1715</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Angle</td>
<td>55 degree</td>
<td>50 degree</td>
<td>17 degree</td>
</tr>
<tr>
<td>Suitable Sheet</td>
<td>Ordinary Vinyl Reflection Sheet</td>
<td>Ordinary Vinyl Reflection Sheet</td>
<td>Sandblast</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td>4,000m</td>
<td>4,000m</td>
<td>Depending on the sheet</td>
</tr>
<tr>
<td>Comment</td>
<td>It is a basic cutter suitable for ordinary vinyl. The tip is slightly sharper than ZEC-U1005. It is not suitable for hard material such as glass fiber.</td>
<td>It is a versatile cutter suitable for ordinary vinyl, reflection sheet and laminated sheet. The cutting quality is better than ZEC-U1005 and ZEC-U5022. It is not suitable for thick laminated sheet and hard material such as glass fiber.</td>
<td>It is a special cutter suitable for Sandblast. The tip cracks easily.</td>
</tr>
</tbody>
</table>

![Diagram of blade designs]
## Cutter Blade Knowledge

- Roland DG Blade Options

<table>
<thead>
<tr>
<th></th>
<th>ZEC-U3017</th>
<th>ZEC-U3050</th>
<th>ZEC-U1005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset</td>
<td>0.175</td>
<td>0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>Angle</td>
<td>45 degree</td>
<td>32 degree</td>
<td>50 degree</td>
</tr>
<tr>
<td>Suitable Sheet</td>
<td>Ordinary Vinyl</td>
<td>Sandblast Card Board</td>
<td>Ordinary Vinyl</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td>Depends on the sheet</td>
<td>Depends on the sheet</td>
<td>8,000m</td>
</tr>
<tr>
<td>Comment</td>
<td>It is suitable for cutting small characters or objects.</td>
<td>It is for thick material such as PPF, Sandblast.</td>
<td>It is a basic cutter suitable for ordinary vinyl. The durability is high. If the cutter pressure is not enough, use ZEC-U5022 or ZEC-U5025.</td>
</tr>
</tbody>
</table>

Design:
- ZEC-U3017: Offset 0.175, Angle 45°, Diameter 1.0
- ZEC-U3050: Offset 0.50, Angle 32°, Diameter 1.0
- ZEC-U1005: Offset 0.25, Angle 50°, Diameter 1.0
CUTTER BLADE KNOWLEDGE

Common Cutting Problems & Solutions

• Incomplete Cuts
  • Problem:
    • Vinyl is not cut all the way through
  • Possible Solutions: (in order of diagnosis)
    • Blade dull or chipped (causes friction and doesn’t stay deep, but planes on surface like a boat)
    • Improper blade extension (blade can’t dig deep enough because blade holder cap interferes)
    • Pen pressure not high enough (same as improper blade extension)

• Stitch Cut or Dash Cut
  • Problem:
    • Cut lines in dashes or even spaced sections
  • Possible Solutions:
    • Blade chipped or dull (can’t cut material and jumps due to friction)
    • Blade holder needs lubrication or replacement (blade doesn’t swivel properly due to friction)
    • Slow speed (same as blade being chipped or dull)
    • Replace damaged cutter strip (blade caught in grooves and jumps to next location)
Common Cutting Problems & Solutions

- Circles Don’t Close
  - Problem:
    - Vectors do not connect according to artwork on screen
  - Possible Solutions:
    - Use sans serif fonts (Serif fonts have sharp angled corners and the blade can’t turn fast enough)
    - Points need to be rounded (vector graphics that have small angles like serif fonts. e.g. - flame tips)
    - Incorrect offset (Plotter is over or under-compensating for vector curve)

- Small Letters and Shapes Lift Up During Cutting
  - Problem:
    - Adhesive gels back together under vinyl after being cut
  - Possible Solutions:
    - Use vinyl with a different adhesive (some adhesives don’t adhere to the liner well enough for small detail. Removable/low tack adhesives are most common problem)
    - Increase blade extension (adhesive may be too thick and not cut all the way through)
    - Replace blade (sharper blade cuts adhesive better)
    - Use higher angle blade (low angle blade may not cut through adhesive effective enough)
    - Increase pen pressure (liner could be soft and absorbing adhesive causing it to gel together)