Cutting Technologies

Brian Pope
Colorado WaterJet Company

Bill Fowler
Wesco Laser Machining

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Major Cutting Methods

- WaterJet
- Laser
- Plasma
What is WaterJet Cutting?
A Computer Numerically Controlled (CNC) machine using high pressure water & abrasive to cut $%#@^&
5th Axis WaterJet Cutting Head
Full WaterJet Table
Materials for WaterJet Cutting

- Virtually any thickness of any material, up to 8” of AL and 6” of steel.
- Most commonly used for metals
  - Steel
  - Stainless Steel
  - Aluminum
  - Brass, Copper, Titanium, Tungsten
- Other materials include Plastics (Polycarb, HDPE, UHMW, Acetal, etc.)
  Rubber, Wood, Glass
WaterJet Cut Quality

• No (HAZ) heated-affected zone
• The slower the cut, the higher the quality of the cut
• The faster the head moves, the lower the cost of the cut
• Materials can be stacked to cut in layers lowering cost
  - Typically up to 0.250”
WaterJet Cutting Precision

• Tolerances to 0.003” per side
• Nozzle diameter = 0.040”
• Taper:
  - Standard Cutting = +/- .005”
  - Dynamic Cutting < +/- .001”
Edge Quality and Tolerance Guide

Edge Quality

10 8 6 4 2

- Separation Cut: +/- 0.010" Per Side
- Through Cut: +/- 0.008" Per Side
- Clean Cut: +/- 0.005" Per Side
- Good Edge: +/- 0.003" Per Side
- Excellent Edge: +/- 0.001" Taper

Cutting Price

Part Profile (section view)

Standard ("S") Cut

Taper

Dynamic ("D") Cut

Minimal Taper

- 0.25" thick material shown above at "S8" cut quality (0.010" taper).
- "Taper" dimension is consistent across all material thicknesses for each Standard ("S") edge quality - i.e., thicker materials have smaller taper angles.

www.ColoradoWaterJet.com (970) 532-5404
Price Factors

1. CAD (Clean files with minimal CWJ design work)
2. Machine Time
   - Material type and thickness
   - Edge quality and tolerance requirements
   - Operator involvement and setup time
3. Material Cost
4. Quantity of Order
   - # of parts
   - No tooling or NREC charges
Applications

• Virtually any cutting scenario
• Blanking for machine shops
• Sculpture, Architecture, Signage, Aerospace
Sample Projects
Sample Projects
Sample Projects

HRH (His Royal Highness)

[Images of metal projects]
Sample Projects
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<table>
<thead>
<tr>
<th></th>
<th>Waterjet</th>
<th>Plasma</th>
<th>Laser</th>
<th>EDM</th>
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</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td>Erosion process; high speed liquid sandpaper</td>
<td>Burning / melting process using high temperature ionized gas arc</td>
<td>Melting process using concentrated laser light beam</td>
<td>Erosion process using electrical discharge</td>
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<td></td>
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<td>Can also cut a variety of other materials.</td>
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<td><strong>Thickness</strong></td>
<td>Up to 24 inches, virtually any material.</td>
<td>Up to 2-3 inches, depending on material.</td>
<td>Generally 1 inch or less, depending on materials.</td>
<td>Generally 12 inch or less.</td>
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<td>Z constraint is only limit to thickness.</td>
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<td><strong>Part Accuracy</strong></td>
<td>Up to .001”</td>
<td>Up to .010”</td>
<td>Up to .001”</td>
<td>Up to .0001”</td>
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<td><strong>Capital Investment</strong></td>
<td>$60k to over $300k</td>
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<td>$200K to over $1M</td>
<td>$100k to over $400k</td>
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<td><strong>Machine Setup</strong></td>
<td>Same setup for all materials</td>
<td>Different setup for different jobs</td>
<td>Different gases and parameters for different jobs</td>
<td>Different wire types for different jobs</td>
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