Flange Design & Maintenance

- Back Flange: S.S.
- Bushing: S.S.
- Front Flange: Al. + Hard Anodize
- Nut: S.S.

Good

Damaged
Special Applications
Blade Gang Assembly's

Dual blade

Spacer
Blade Wobbling

Flange deflection due to over tightening

Blade wobbling
Flange & Blade Torquing

4” Saws:

- Flanges: 31+- 3 Inch•Pound
  (3.5 ± 0.35 N x m)
- Spindle: 31+- 3 Inch•Pound
  (3.5 ± 0.35 N x m)

2” Saws:

- Spindle Nut: 22+- 2 Inch•Pound
  (2.48 ± 0.248 N x m)
Torque Meter
Torque Meter
## Advantages & disadvantages

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Single</th>
<th>Multi</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Throughput:</strong></td>
<td>Low / Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Complexity:</strong></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Cost:</strong></td>
<td>Low</td>
<td>Very high</td>
</tr>
<tr>
<td><strong>Break recov.:</strong></td>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td><strong>Flexibility:</strong></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Setup:</strong></td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td><strong>Accuracy</strong> -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Index</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>- Cut depth</td>
<td>High</td>
<td>Lower</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Poor</td>
</tr>
</tbody>
</table>
Special Flange Sets

Silicon
Wax
Glass

60°

3x blade gang ass.

Silicon
Wax
Glass

3-6µ Grit
17µ Grit

.030” (0.76mm)

.006” (0.15mm)

RTV
Tape
Gang Set-Up
Special Flange Sets

4” Gang assemblies
Special Flange Sets

4” Gang assemblies
Special Applications

Special flange sets
Special Applications

Special flange set - Lapping kit
Special Applications

Special flange set - Lapping kit
Special Applications

Special flange set - Lapping kit
4” Lapping Kit
4” Lapping Kit
Special Applications

Special 2” gang assembly
Special Applications

Special 2” gang assembly
Special Applications

Double hub ass. with spacer

1 - Spindle
2 - Hub
3 - Spacer
4 - Hub
5 - Spindle spacer
6 - Spindle nut
Special Applications

Special vacuum handling tool
Special Applications

Special vacuum handling tool
Special Applications

Final die size

Final die size
Special Applications

TIC

72°
Special Applications

Special 2” gang assembly
Special Applications

Special handling tools
Special Applications

Special vacuum handling tools
Special Applications

Ceramic

PZT

15.5mm cut depth
Special Applications

Serrated Thick Metal Sintered Blade
Special Applications

**Blade:**
- Blade matrix:
  - Binder
  - Diamond grit
  - Diamond type
  - Diamond %
- Blade diameter
- Edge geometry
- Blade thickness
- Blade exposure

**General**
The Following blade and process parameters should be optimized by the customer in a production mode:

**Saw:**
- Saw type: (2”, 4”)
- Spindle power
- Saw travel
- Vision
- Cutting Parameters:
  - Spindle speed
  - Feed rate
- Coolant

**Mounting:**
- Clamping method:
  - Vacuum
  - Magnetic
  - Mechanical
- Medium:
  - Tape (Type, Thick. Adhesion)
  - Wax
  - Glue
- Substrate media:
  - Lava
  - Glass, Others.

The Following blade and process parameters should be optimized by the customer in a production mode.
Optimizing the dicing Process

Die manufacturing cost

- Cooling (D.I. Special coolant)
- Dicing
  * Blade
  * Process time
- Waste (Filters closed loop)
- Back-side Plating
- Top Metalization:
  - Masking
  - Coating
  - Etching
  - Baking
  - Others
- Utilities (elect., air)
- Mounting Substrate (Glass, Lava, etc.)
- Mounting Medium (Wax, Glue, etc.)
- Raw Material
Optimizing the Dicing Process

Main dicing saw features
Optimizing the Dicing Process

Spindle geometry & mounting

[Diagram showing the comparison between a long unsupported nose and a short nose, with annotations for vibrations and nose lengths.]
Spindle performance specifications

Output power (Watt)

<table>
<thead>
<tr>
<th>Output Power (Watt)</th>
<th>Krpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>5</td>
</tr>
<tr>
<td>400</td>
<td>10</td>
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<tr>
<td>600</td>
<td>15</td>
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<td>1000</td>
<td>25</td>
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<tr>
<td>1200</td>
<td>30</td>
</tr>
<tr>
<td>1400</td>
<td>35</td>
</tr>
<tr>
<td>1500</td>
<td>40</td>
</tr>
</tbody>
</table>
Optimizing the Dicing Process

Blade parameters to be optimized

- Edge Geometry
- Diamond Grit Size
- Diamond Type
- Diamond Concentration
- Blade Thickness
- Blade Binder (Type, Hard, Soft & Others)
- Blade Diameter
Checklist of point regarding Kerf Quality and Blade Life

(First list of what to do)

- Machine alignment in spec (Shlezinger)
- Cooling alignment
- Adequate cooling pressure
- Proper flange exposure
- Flange in good condition
- Flange set running in proper RPM and free of vibrations
- Blade well dressed in flange
- Proper blade matrix, diamond grit size, diamond % and proper blade thickness
- Proper feed rate
- Proper mounting, if dicing on tape - dice min. .001” into the tape
Checklist of point regarding Kerf Quality and Blade Life

• Machine alignment in spec (Shlezinger)
  • Cooling alignment
  • Adequate cooling pressure
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Application Lab
Dicning blades & process QC
On line production Q.C., final Q.C. & R&D analysis instrumentations

QC = The Eyes of our Customers

- ADT production operators are Q.C. oriented
- Top of the line Q.C. tools & instruments.
- All Q.C. instrument & tools are periodically calibrated per ISO 9001 standards
- In House state of the art specialty designated & designed instrument
On line production Q.C., final Q.C. & R&D analysis instrumentations

Tope of the line QC tools, jigs & instruments
Computer controlled Thickness measurement

I.D. Go / No Go hardened gages

Flatness inspection

Edge profile video system
On line production Q.C., final Q.C. & R&D analysis instrumentations

**Process control:**
- Conductivity testing
- On line profile inspection
- Specialty in-house designed measurement Instruments
- Analytical material balancing
- Chemical analytical control
Functional quality & blade life testing:

ADT Dicing systems

XY Measuring Microscope

QFN – In house inspection

On line production Q.C., final Q.C. & R&D analysis instrumentations
On line production Q.C., final Q.C. & R&D analysis instrumentations

R&D in house testing

SEM inspection

Internal quality analysis on XY Measuring Microscope

Mechanical properties inspection
Dicing Seminar

Dicing Troubleshooting