Model: J800/900
Manual Single Knife Slitter

Troubleshooting Handbook
Slitting Problems

JULY 2016

Javelin Machinery (Australia)
A.C.N. 005 543 411 ABN 18 005 543 411

email: sales@javmach.com.au
Website: www.javelinmachinery.com.au

Head Office
PO Box 805, Glen Waverley Vic 3150 Australia
Phone: +61 3 8786 3614
IMPORTANT NOTE

SINGLE KNIFE SLITTING

The principle on which this type of slitting is based, depends on the knife being able to displace the roll width being slit.

Materials which are too dense or have been wound too tightly may be unsuitable to slit by this method.

In this case either the roll must be rewound to a lesser tension or the material cut on a machine known as a slit/rewinder.

Knife parameters are crucial in successful Single Knife Slitting (Refer Knife Selection Section)

As widths being slit increase so must the secondary or back bevel on the knife in order to balance the forces and achieve a straight cut.

Failure to pay attention to choosing a knife with the correct bevel will result in the knife chipping or in an extreme case shatter.

An Operation & Maintenance Manual was supplied with machine, additional copies are available, at a small cost, to assist with training of new operators

Javelin Machinery (Australia)
OPERATOR SAFETY

OPERATOR SAFETY

PLEASE NOTE FOLLOWING BEFORE COMMENCING OPERATION:

Safety should be a constant concern of everyone around any type of machinery. While more than normal precautions were taken in the manufacture of this machine, everyone connected with its operation should be made fully aware of the **High Voltages**, **High Speed Motion** and **Sharp, Rotating Automatically Actuated Cutting Tools** involved.

To prevent injury, the suggestions below should be followed:

1. **KEEP CLEAR** of cutting blade, rotating mandrel, chuck and material when the machine is in motion.
2. **ENSURE** all **GUARDS** in position & safety systems operational before starting the machine.
3. **DO NOT** place your hands between the knife and rolls when loading or unloading. **ENSURE** knife is in its furthest back position.
4. **KEEP** the area around the machine **CLEAN** and **DRY** proof surface or mats. Only the operator to work within area designated by hazard tape.
5. **ENSURE** main isolator is switched **OFF** before any maintenance is carried out.
6. **USE** suitable **PROTECTIVE GLOVES** when handling blades.
7. Ensure **KNIFE IS REMOVED OR KNIFE EDGE COVERED** with the flexible plastic cover provided when servicing or cleaning and when machine not in use.
8. Request **ASSISTANCE** when **CHANGING** knives or **LOADING** heavy material onto the mandrel.
9. Ensure operators & maintenance personnel have reviewed the Manual and understand the safe operation of the machine before operating or carrying out maintenance on this machine.

Ensure only qualified electricians work on the electrical components of the machine. Operators must not open the electrical cabinet, motor drive cabinet or operator panel. In the case of an electrical malfunction qualified electrical personnel/contractor should be called.
PRINCIPLES OF SINGLE KNIFE SLITTING

Slitting by the single knife method is basically the ability of a circular knife to displace the slit roll as it enters the log.

Single knife slitting is not a precise science. Slitting results are affected by a number of factors including:

- the type of backing (i.e. Polyester/Cloth/Foam)
- evenness of adhesive coating,
- tension under which the log has been wound to
- knife diameter
- knife sharpness or dullness
- air or room temperature

While Javelin can recommend settings for different products and widths, the operator must be aware of the factors mentioned and make adjustments accordingly.

- ALWAYS USE HIGH CHROME HIGH CARBON STEEL KNIVES. CHROME CONTENT RETAINS THE KNIFE EDGE (DURABILITY) WHILE THE CARBON IS FOR HARDNESS.

- ENSURE KNIVES RUN TRUE – CHECK WITH A DIAL INDICATOR.

- THE RULE IS TO USE THE SMALLEST DIAMETER KNIFE TO MINIMIZE RUNOUT AND GET BEST RESULTS

CAUTION
~ always use cut resistant gloves when handling knives ~

ONLY PERSONNEL CERTIFIED TO SHARPEN AND BEVEL KNIVES SHOULD OPERATE KNIFE GRINDING FUNCTION
## TROUBLE SHOOTING

**IMPORTANT NOTE:** Condition of the log roll will affect quality of slit rolls. Read the page headed “Principles of Single Knife Slitting”.

### SLITTING - ADHESIVE TAPE

<table>
<thead>
<tr>
<th>PROBLEM/EFFECT</th>
<th>CAUSE</th>
<th>REMEDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double cutting causes tape to tear when being unwound</td>
<td>Knife diameter unsuitable.</td>
<td>Always use the smallest possible knife.</td>
</tr>
<tr>
<td></td>
<td>Knife running out of tolerance.</td>
<td>Clean knife and backing plate surfaces.</td>
</tr>
<tr>
<td></td>
<td>Worn mandrel sleeve.</td>
<td>Replace sleeve. Set knife stop correctly to avoid premature sleeve damage.</td>
</tr>
<tr>
<td></td>
<td>Speed of knife entry unsuitable</td>
<td>Slow down knife forward speed.</td>
</tr>
<tr>
<td></td>
<td>Core diameter too loose on mandrel</td>
<td>Specify correct inside diameter to core manufacturer.</td>
</tr>
<tr>
<td>Excessive width variation</td>
<td>Knife spindle bearings loose.</td>
<td>Adjust preload on bearings.</td>
</tr>
<tr>
<td></td>
<td>Knife edge unsuitable</td>
<td>See knife selection or operator reference sheet.</td>
</tr>
<tr>
<td></td>
<td>Wrong knife bevel.</td>
<td>Sharpen to suitable knife bevel.</td>
</tr>
<tr>
<td></td>
<td>Index mechanism loose.</td>
<td>See Index - Trouble Shooting.</td>
</tr>
<tr>
<td>Cardboard core collapses making tape difficult to unload off mandrel</td>
<td>Excessive spray.</td>
<td>Reduce amount of spray especially when cutting narrow widths. Change to plastic cores.</td>
</tr>
<tr>
<td></td>
<td>Knife edge unsuitable.</td>
<td>Sharpen knife.</td>
</tr>
<tr>
<td></td>
<td>Worn mandrel sleeve.</td>
<td>Replace sleeve. Set knife stop correctly to avoid premature sleeve damage.</td>
</tr>
<tr>
<td>Slit roll distorts after slitting</td>
<td>Loosely wound log</td>
<td>Rewind to firmer tension</td>
</tr>
<tr>
<td></td>
<td>Knife edge unsuitable</td>
<td>Sharpen knife</td>
</tr>
<tr>
<td>Slit roll “telescopes” after slitting</td>
<td>Tight and loose section in log due to uneven adhesive coating</td>
<td>Slit log separating tight and loose sections and rewind to acceptable tension</td>
</tr>
<tr>
<td>Self wound foil tapes, copper, aluminium, lead, tear when being unwound after slitting</td>
<td>Knife edge roll over causing tape to tear when unwound.</td>
<td>Interline foil before slitting.</td>
</tr>
</tbody>
</table>
**IMPORTANT NOTE:** Condition of the log roll will affect quality of slit rolls. Read the page headed “Principles of Single Knife Slitting”.

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<tr>
<td>“Interlined Tapes” width varies from outside to inside diameter</td>
<td>As tape is not bonded together with adhesive, the layers move away unevenly as knife penetrates roll.</td>
<td>Bond end of log roll with fast drying resin. (Hot melt glue).</td>
</tr>
<tr>
<td>Adhesive smearing on sides of rolls. Tape sticks together and cannot be separated.</td>
<td>Knife thickness unsuitable</td>
<td>Use thinner blade</td>
</tr>
<tr>
<td></td>
<td>Knife edge unsuitable</td>
<td>Sometimes very sharp knife can cause this problem. Round off knife edge</td>
</tr>
<tr>
<td></td>
<td>Insufficient lubrication</td>
<td>Check and adjust sprays</td>
</tr>
<tr>
<td></td>
<td>Knife forward speed to slow</td>
<td>Increase knife forward speed and slow mandrel RPM if possible</td>
</tr>
<tr>
<td></td>
<td>Mandrel RPM too high</td>
<td>Decrease mandrel RPM</td>
</tr>
<tr>
<td>Soft adhesive coated tapes such as Teflon are left with steep ridges on either side of the slit roll.</td>
<td>No back bevel on knife</td>
<td>Grind back bevel on knife to minimise problem.</td>
</tr>
<tr>
<td>Knife edge shatters</td>
<td>Knife too sharp</td>
<td>Round edge of knife to strengthen.</td>
</tr>
<tr>
<td></td>
<td>Knife hits mandrel</td>
<td>Adjust knife forward stop. Also check knife spindle for damage</td>
</tr>
<tr>
<td></td>
<td>Core is hard or thick</td>
<td>Reduce knife forward speed when cutting through core</td>
</tr>
<tr>
<td>Concave or convex rolls. Tape visually poor and not suitable for resale.</td>
<td>Knife bevel unsuitable</td>
<td>Refer Section 8.1</td>
</tr>
<tr>
<td>Concave or convex roll at start and end of log roll. Width of roll varies from ID to OD.</td>
<td>Knife bevel not suitable</td>
<td>Grind appropriate bevel onto knife.</td>
</tr>
<tr>
<td></td>
<td>Roll displaces during cutting.</td>
<td>Glue end of roll with hot melt.</td>
</tr>
</tbody>
</table>
IMPORTANT NOTE: Condition of the log roll will affect quality of slit rolls. Read the page headed “Principles of Single Knife Slitting”.

SLITTING - TEXTILES

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<th>REMEDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor quality slit rolls</td>
<td>Knife is dull</td>
<td>Sharpen knife more frequently</td>
</tr>
<tr>
<td></td>
<td>Log roll loosely wound</td>
<td>Rewind to tighter tension. Wrap log roll with stretch film.</td>
</tr>
<tr>
<td></td>
<td>Mandrel speed too slow</td>
<td>Increase mandrel RPM as much as possible. Drive knife, if geared motor fitted.</td>
</tr>
</tbody>
</table>

SLITTING - HOT STAMP FOIL

<table>
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<th>CAUSE</th>
<th>REMEDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge of knife shatters</td>
<td>Foil wound too tight</td>
<td>Rewind to softer tension</td>
</tr>
<tr>
<td></td>
<td>Insufficient knife brake friction</td>
<td>Tighten brake so knife turns only when cutting through core.</td>
</tr>
<tr>
<td></td>
<td>Knife too sharp</td>
<td>Slightly round cutting edge of knife</td>
</tr>
</tbody>
</table>

SLITTING - DENSE MATERIALS (i.e. rubber, some fabrics and foam tapes)

When slitting dense materials such as neoprene rubber, the mandrel must run in the same direction as the knife, which is forward. In other words at the contact point of the knife and material the direction must be the same. Run mandrel at higher speed than the knife in order to get a good slicing action.
SLITTING TECHNIQUES

DENSE MATERIALS (i.e. rubber, some fabrics and foam tapes):

1. Use a strong adhesive tape to anchor the leading edge of your rubber/fabric/foams to the core onto which the product is to be rolled.
2. Roll up product as tightly as possible and use adhesive tape to hold outer edge in place.
3. Wrap finished (log) roll tightly with stretch film.
4. This will help prevent slit rolls falling apart.
5. For heavy materials reduce mandrel speed to avoid vibration.
6. For softer materials increased mandrel speed.
7. The leading edge of rubber on outside of wrap of log roll should run in the opposite direction to mandrel/chuck rotation.
8. Adjust knife brake so that knife begins to rotate only as it enters the log roll.

FILM PROTECTION TAPE

1. Use knife with equal bevel on both sides for cut widths wider than 50mm.
2. Use small amount of knife brake.
3. Keep mandrel speed between 1/3rd to half speed.

SLITTING INTERLINED MATERIALS

Any interlined material especially large diameters need to be glued with a hot melt glue at the chuck end only, to prevent the centre of the log roll slipping away whilst it is being cut.

Note: When slitting copper, lead or aluminium foil whether or not coated with a pressure sensitive adhesive, an interlining paper is essential to achieve quality slit rolls.
KNIFE SELECTION

- always use cut resistant gloves when handling knives -

KNIFE BEVELS When slitting narrow widths only a primary bevel is required but with wider widths a back bevel is needed to balance the forces on either side of the knife so that it will cut straight through the roll without deflecting (See note re bevels below)

CAUTION: Knife may be damaged or shatter if insufficient back bevel on knife when slitting wide widths. Trying to slit a roll to a wide width from a tightly wound log roll, using a knife with insufficient back bevel, risks chipping or shattering the knife.

Diagram No. | Slitting range | Knife requirements
---|---|---
1 | Up to 22 mm (7/8") | No Back Bevel
2 | 25.4 mm (1") - 38 mm (1½") | 0.5 mm (1/64") Back Bevel
3 | 40 mm (1 5/8") - 96mm (4") | 1.5 mm (1/16") Back Bevel
4 | Over 100mm (4") | Equal Bevel both sides of knife
5 | Any width (very hard materials) | Tightly wound denser rolls will require test slitting to determine the best knife bevel & edge for product Additional angle on primary bevel

Dense materials that will not displace Must be rewound to a lesser tension

**With interlined materials it may be necessary to glue end of log roll to prevent centre of roll moving out, also if tightly wound a Diagram 3 bevel may be required. (Ensure log roll is pushed up against chuck face or spacer roll)

**NOTE:** A rounded edge is preferred for most adhesive tapes. Some exceptions would be, for example, foam sealant & paper tapes which require a sharp edge. Too sharp an edge can result in edge breaking down (chipping). Edge should be slightly rounded with Shielded oil stone to prevent this occurring.

KNIFE DIAMETER The rule is to use the smallest diameter knife possible to minimise any run out. Using a dial indicator, check the knife for excessive run out.

KNIFE BEVELS The primary bevel on each knife has a long bevel at 8º with a smaller bevel at the outer edge of the knife at 11º to strengthen knife edge. All Javelin grinders are factory set to 11º and care must be taken for this not to change. We recommend knives be either ground on your machine or returned to Javelin in order to maintain 11º bevel. Knives sent to contractors may result in bevel angle being changed with resultant slitting problems. To ensure knives are sharpened to the edge we suggest running a thin mark around the outer edge with a black pental pen. This mark will disappear once the knife has been sharpened to the edge.

NOTE: It is imperative records be kept for specific materials so the operator knows which knife to choose each time a particular product is to be slit. Ref: Operator Reference Sheets in the Manual.
KNIFE STORAGE

The knife is the most important item on your machine. Knives should be kept in a purpose built cabinet and knife edge protected with protective strip.

~ always use approved protective gloves when handling knives~

Operators should read the guidelines for knife selection, preparation and maintenance carefully.

ROUNDING KNIFE EDGE

Operator MUST wear cut proof gloves when performing this function.

Turn off power at main isolating switch and using a Shielded Oil Stone (see Fig 3.3.1) hold the stone flat against knife edge and slowly rotate the knife with the other gloved hand. This will have the effect of dulling the sharp edge. Polish knife edge with Scotch Bright™

IMPORTANT NOTE

If knife is slightly chipped you will need to return it to JAVELIN for repair. The knife grinder on this machine is not intended for heavy grinding.
SLITTING TOLERANCES

To achieve tolerances within .1mm or ± 4 thou you need to check the following:

1. Use the smallest diameter knife possible ... the bigger the knife diameter the more chance of run-out. Check our knife selection chart for a knife bevel to suit the width you wish to cut. As an example, you cannot hope to hold tolerances slitting narrow widths with a knife with a back bevel.

2. Check the knife spindle, knife and backing plate for run-out using a dial indicator, as described below, where accuracy to .1mm (+/- 4 thou) is required.

3. With some products such as film tapes, you can use the knife brake so that the knife is locked and will not turn. By this method you eliminate any possibility of knife run-out. However, you will need to stop slitting occasionally and rotate the knife so as to prevent a flat spot occurring on one section of the knife-edge.

Other factors that can affect tolerance are the index counter and encoder and in very rare cases the clutch brake. An encoder problem is usually indicated by significant variations in width from roll to roll although the index counter will still read correctly. Always check for any loose wires to the encoder or index counter. A clutch brake problem is usually indicated by erratic tolerances displayed on the P1. When checking for a problem with the unit always first check the correct voltage is going to the clutch brake.

Remember that any burrs on the knife, backing plate, washer and even the locking nut are enough to prevent tight tolerances being held.

Knives should always be fitted on the machine so that the engraved parallel lines face the mandrel and the engraved word “top” is uppermost. The knife must always be sharpened on the integrated knife sharpener mounted on the machine. Javelin knives are bevelled at 11º and any alteration to that angle will cause problems. We strongly advise against sending knives out for sharpening. Even when you receive new knives from Javelin they must be finally sharpened true on your machine.

Remember also that the mandrel must be aligned properly (see section Knife Pedestal alignment in the manual) and the fit of the rubber sleeve to the I/D of the core of your material must be a close fit.

The material must be gripped firmly on the expanding mandrel and up against the face of the chuck so there can be no sideways movement. If you are using a spacer roll between the chuck and material to be cut make sure it has straight edges and that it is approximately the same diameter as the material to be cut.

When measuring slit rolls with a dial Vernier do not allow the jaws of the Vernier to close against the cardboard or plastic core as this can give you a false reading.

If you follow the above points closely you will be able to slit tape to close tolerances.
a. CHECKING FOR BACKING PLATE RUNOUT:

BACKING PLATES THAT HAVE BEEN DROPPED ONTO A HARD SURFACE MAY BE OUT OF SPECIFICATION AND WILL NEED TO BE REPLACED.

i) Run a smooth flat file across the face of the backing plate and washer to ensure there are no burrs.

ii) Check spindle face for burrs or grit.

iii) Fit backing plate and washer and check for runout with dial indicator (See Note).

iv) Runout should not be more than .08mm (.003”). If runout exceeds tolerance, mark backing plate in 2 positions and one position on spindle with marking pen.

v) Rotate backing plate to position 2 and re check if runout is excessive.

b. CHECKING FOR KNIFE RUNOUT

Place dial indicator on knife face (1 at top-Picture A) and rotate knife to 2 (Picture B). A runout of not more than .08mm (.003”) is permissible.

NOTE: Check backing plate on inside by fitting large backing plate/small backing plate and nut, then placing dial vernier on edge of backing plate as shown in picture.
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