While using diamond wafer blade with ISOMET™ for cutting brittle samples:

1. Do not use too much pressure while fixing the sample
2. Do not go above speed 5 especially while cutting uneven samples
3. Do not start the machine with sample sitting on the blade
4. Start the blade and then gently drop the holder with specimen on the revolving blade
5. If you hear any change in noise while cutting, please check the cause for it. (either the sample is close to finish or the sample has slipped due to poor fixing within the grips and the fuse might blow if you do not take care of it immediately)
6. Never try to rectify a problem with movement while blade is running (it could snip the blade or fuse might go or sample might break)
7. Never apply pressure on the sample while cutting is on
8. Do not start the blade with weights on
9. Add the weights very gently while the sample arm is placed on the revolving blade
10. When the sample is close to finish take all the weights off or else due to the impact of the arm with chucks the sample might crack
11. Make sure the blade is tightly fixed to the shaft before the sample is cut or else the blade will wobble and break off the edge of the blade
12. If the blade does not want to move do not leave it on. check the fuse, check the auto-stop, check the cut in the sample (may be the cut does not coincide well with the blade)
13. Try not to run the machine if you are going to be gone for a while
14. MOST OF ALL BE PATIENT WITH THESE SAMPLES. CUTTING COULD RUIN ONE TO TWO MONTHS OF PRIOR WORK IN ONE AFTERNOON IF YOU HURRY
15. If you need the fuse for replacement check with Kumar or John Rundle
16. Use the shield before operating the machine to avoid the spill during rotation on your clothing.
17. CLEAN-UP THE AREA AFTER YOU ARE DONE WITH YOUR CUTTING.

Kumar 3/94

More Tips on the use from Buehler's Guide

Dressing New Blades for Optimum Use:

1. New wafering blades must be dressed 5-7 times before initial use to remove metal matrix and expose abrasive grains for free cutting action.

2. One or more dressing cuts may be required when cutting certain ductile metals and alloys.

3. Non metals such as ceramics, glass and minerals rarely require dressing beyond the initial one.

4. Never dress by manually pushing the dressing stick into the rotating wheel.

5. Clamp the dressing stick in chuck and make as many cuts as required

Flanges:

1. Select the largest flanges that will allow enough exposed blade to cut through the specimen.

2. Size of the flanges can be optimized by keeping in mind the size of the sample with regard to the size of the blade.

Weights:

1. Although higher loads result in faster cutting, only enough weight should be applied to maintain a reasonable cutting rate. Excessive wieght application may cause damage to the blade and produce greater deformation of the sample at the cut surface.

Lubricant:

1. ISOCUT® Cutting Fluid (Buehler # 11-1193) can be used for most applications.

2. Some materials such as plastics cut more raplidly with ULTRAMET® Sonic Cleaning Solution (Buehler # 75-5000) in 1:20 dilution as a lubricant.

3. Other liquids such as distilled water or alcohol may also be used, but the cutting rate will be usually lower.

Wafering Blades:

1. They consist of thin metal discs with abrasive grain embedded in a powder metal matrix rim.

2 They are supplied in two concentrations; low for ceramic, mineral and other non-metal applications and high for general metal applications.

3. They come in 3", 4" and 5" with with a standard arbor of 0.5".

4. Glazing of these blades results due to the smearing action of the sample which coats the abrasive grains, reducing their efficiency.

5. Non-metals seldom cause glazing and therefore dressing is not required.

6. Gummy metals, such as steel and nickel-base alloys are most likely to glaze the blade. When cutting these materials, it is normal to dress the blade after each cut. (Again hand-feeding the dressing stick should be avoided.

Rotational Speed:

1. Generally higher speeds produce higher cutting rates but at the expense of deformation and contact heat.

2. The load should be sufficient to enable cutting but not so high to create glazing.

3. The greater depth of deformation in the sample and the deflection of the blade are two other negative side-effects higher speeds of cutting.

Lubricant Film:

1. When there is excessive lubricant film, the cutting rate goes down due to hydroplaning, wherein a thick film of lubricant caused the abrasive grain to make shallower contact with the workpiece.

2. Removal ofexcess lubricant allows the abrasive grain to make more aggressive contact, thus removing material at a higher rate. (Note: Do not wipe the lubricant, while the blade is running. Sufficient lubrication can be achieved by slower speed of rotation and proper level of lubricant in the lubricant pan.

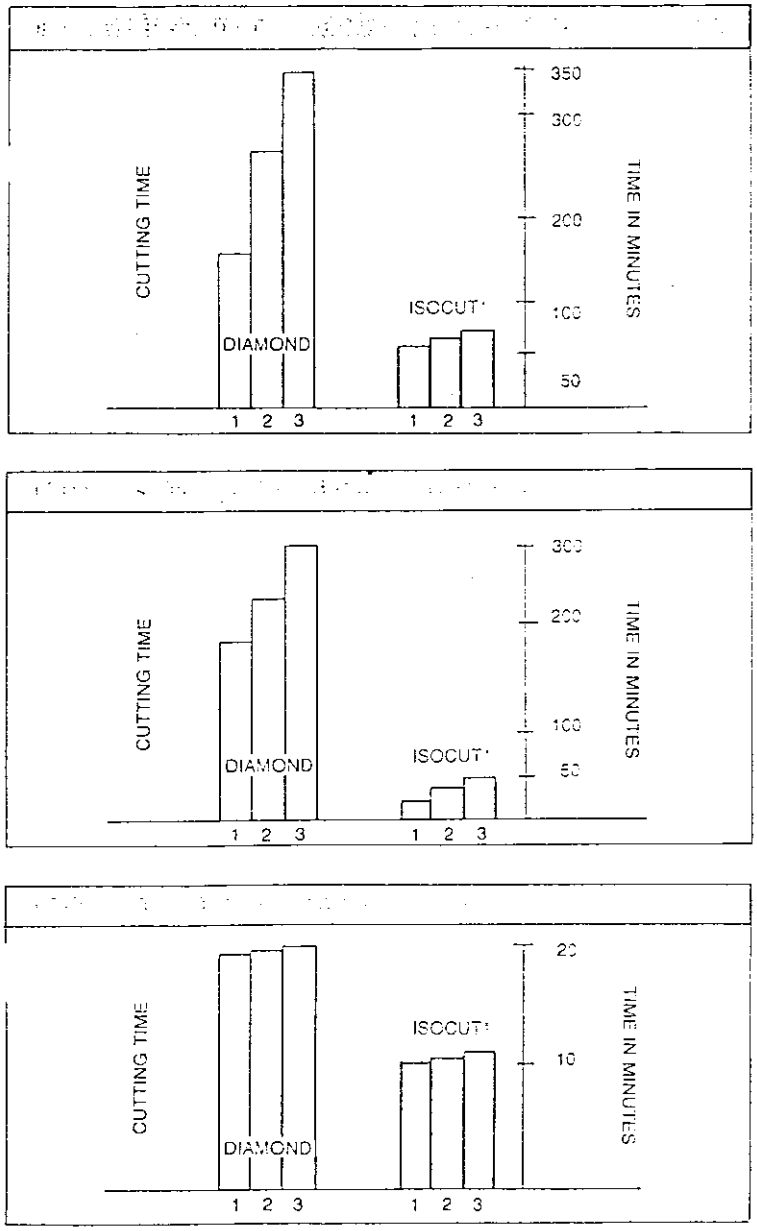

Figure 6. Comparison of Diamond vs ISOCUT performance for 3 selected materials.

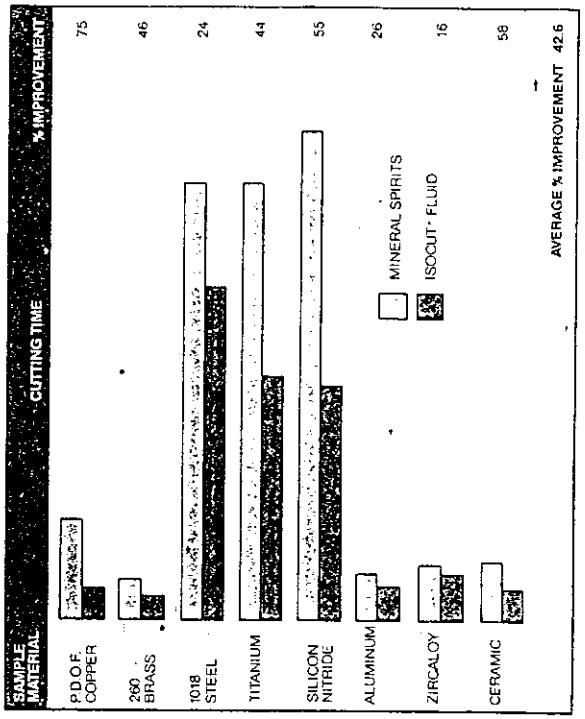

Figure 8. Comparison of Cutting Times resulting from the use of Mineral Spirits vs. ISOCUT® Fluid.

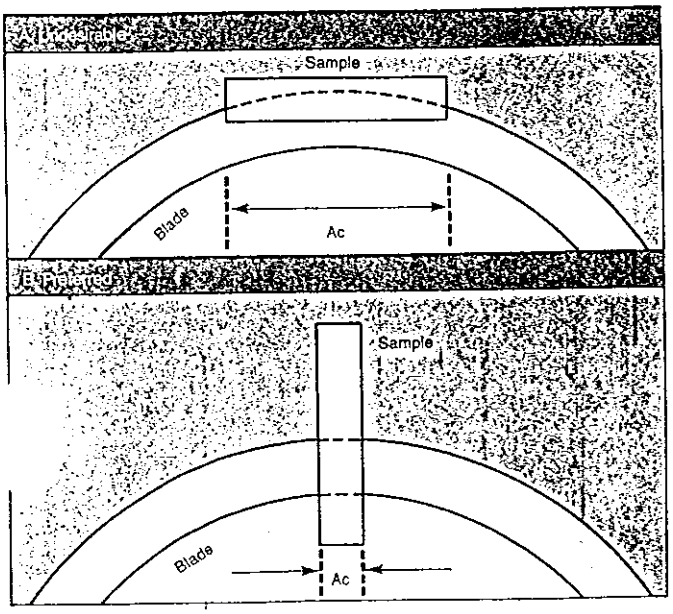

Figure 10. Effect of Sample Orientation on contact area (Ac) and cutting rate.

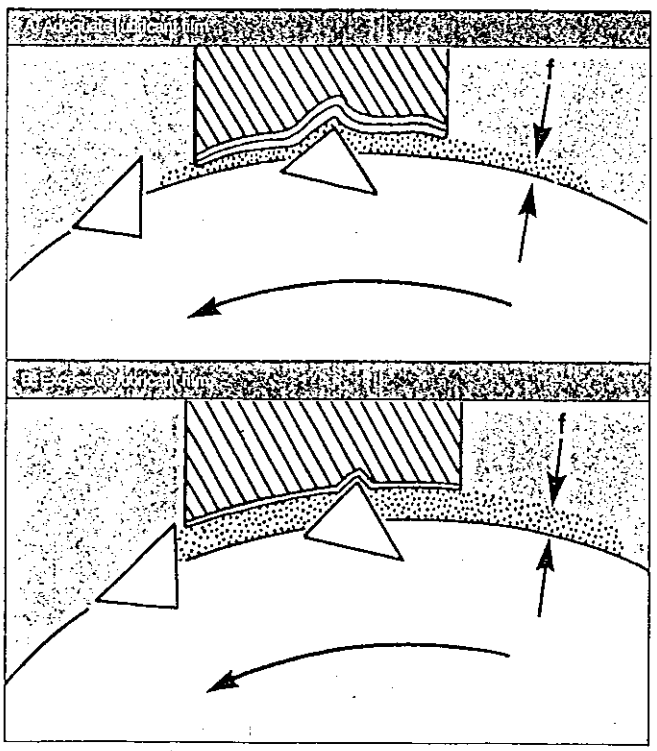

Figure 9. Effect of Lubricants (f) Physical Properties on cutting efficiency.