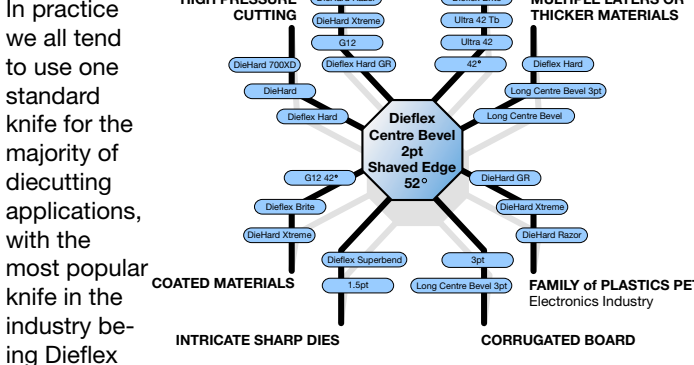
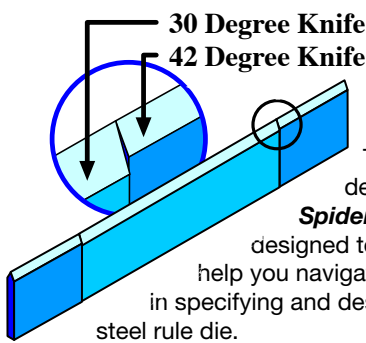


Sandvik Application Spider

One of the dilemmas facing every diemaker and diecutter is matching the right material to be converted with the most effective cutting knife. In practice we all tend to use one standard knife for the majority of diecutting applications, with the most popular knife in the industry being Dieflex



- 2-Point Shaved - 52 degree - Center Bevel knife. However, what do we do when we encounter a tougher material or a more difficult diecutting application? How do we quickly determine



the best option and how do we select between so many different blades with different cutting edge profiles?

To help in this task Sandvik developed the **Application Spider**. See above. This tool is designed to provide a **"Road-Map"** to help you navigate the many different choices in specifying and designing the most effective steel rule die.

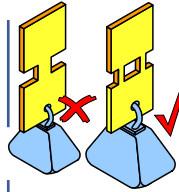
The Spider both provides guidance in making the best cutting tool choice, and it also illustrates the tremendous range of cutting blades at your disposal.

For example, although your standard blade may be a Dieflex 42-degree blade, there may be parts of a design where the penetrating sharpness of Razor is the most effective solution. See above. Or, rather than struggle with nicking consistently by hand, it proves more effective to integrate Sandvik Microperf into the profile of a design. See right. In this application, the integrated nick pattern will increase holding force with almost invisible tags, and the specialized profile of the MicroCut blade will reduce displacement force, and therefore, the potential for flaking.

The Application Spider is effectively a diecutting database and you can access the Spider on the Sandvik Web Site, and/or you can ask your Sandvik representative for a copy.

When you are trying to navigate a complex or challenging diecutting-converting application, the Application Spider is an essential guide.

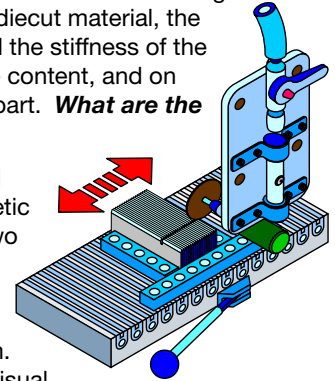
What is Nick Grouping?



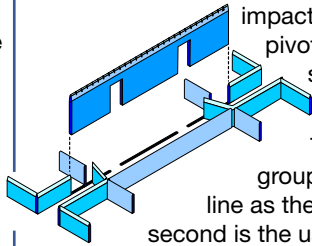
As the name suggests, nick grouping is the practice of setting two micro-nicks of 0.007" or 0.010" in width at specific distances apart based upon the characteristics and grain direction of the diecut material, the type of fiber and the stiffness of the

material, the caliper and moisture content, and on the size and shape of the diecut part. **What are the advantages of this approach?**

First, the micro nicks are so small they do not undermine the aesthetic impact of the design, however, two 0.010" or 0.254 mm nicks placed at a specific distance have twice the holding power of a single nick of 0.030" or 0.762 mm.



See above. Apart from the ugly visual impact, a large single nick will encourage pivoting, while a nick group will build stability in the part and in the entire layout.



There are three ways to accomplish grouped, accurate nicking. The first is in-line as the rule is automatically processed, the second is the use of a Surface Grinder to machine nicks in batches, see above right, and the third is the Inset Knife Technique, using Sandvik MicroNik or MicroPerf.

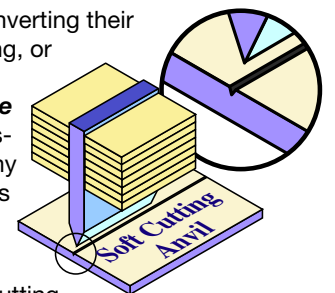
See above left.

Summary

Nick grouping is gradually achieving dominance as the most effective method of nicking for high-speed diecutting. However, it is important to note this system of connecting diecut parts and stabilizing the diecut sheet demands a scientific approach to specification of nick size, of nick spacing and of nick group positioning.

What is Soft Anvil Diecutting?

More and more diecutters are converting their process from Hard Anvil Diecutting, or Cutting **"On-To,"** to Soft Anvil Diecutting, or cutting **"In-To."** See right. The word **"Soft"** is obviously a relative term as there are many different hardnesses and densities of steel and compounds, which form the cutting anvil.



The great advantage of a softer cutting surface is first, the knife-edge is protected from compressive damage when inevitable over-pressurization occurs, and second, the sharpness of the knife edge is preserved, as it is only subjected to the abrasive wear of converting.

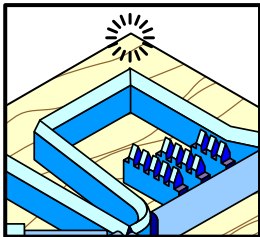
The dilemma with soft anvil cutting is still over-penetration of the tip of the knife into the anvil, as the displacement action of the blade causes ridging. See next page. This will undermine cutting cleanliness of the diecut edge, and begin to disfigure

the diecut part. Responding to this is the practice of continually moving the soft anvil, as the degree of damage in any one area of the cutting surface is reduced. However, this precludes the use of matched female tooling, and it presents another range of problems and issues.

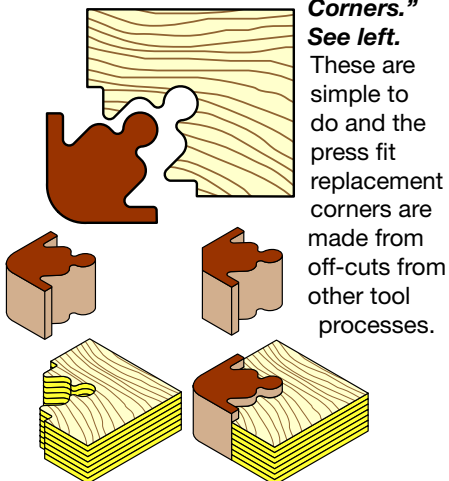
Soft Anvil Diecutting is growing rapidly, as it simplifies and speeds up the make-ready process, and in a market with shorter and shorter production runs, this makes a great deal of sense.

Adding Value to the Steel Rule Dieboard

When fabricating a lasercut or routed dieboard it is a common practice to make the corners perfectly square and sharp. **See right.** While this will certainly meet the requirements of the steel rule die specification, it creates a critical weak spot in the tool, which is liable to damage in transportation and handling of the dieboard. Many diemakers modify the program to include round corners, to mitigate the problem. **See left.**



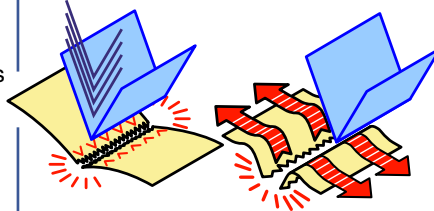
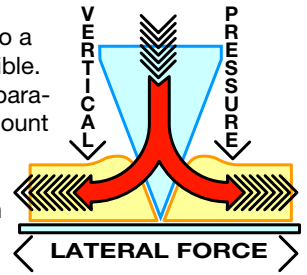
This is effective, however diecutters often complain about dieboard damage, and the need to "fix" the problem. An innovation, which is simple to execute, and one which seems to add perceived value to the steel rule die, is to integrate "Replaceable Corners." **See left.**



These are simple to do and the press fit replacement corners are made from off-cuts from other tool processes.

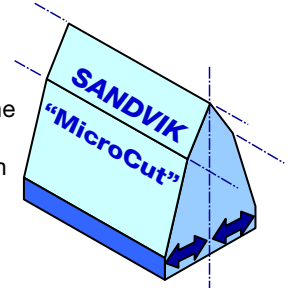
MicroCut: A Multi-Purpose Cutting Tool

The primary goal in diecutting is to convert a substrate into a value-added product as cleanly and as efficiently as possible. This specifically relates to minimizing tensile force and separation stress on the material, and cutting with the lowest amount of force to minimize damage to the cutting tools. Simply stated, our goal is product quality and consistency, and diecutting precision and stability.

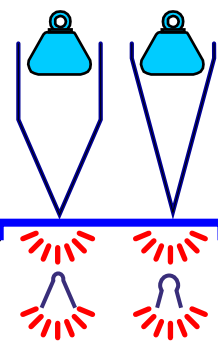


The challenge in platen diecutting, is that cutting is a **Displacement Process** where downward pressure is converted to a lateral splitting force. **See above.** This is accurately described as the combination of two forces. **Explosive Penetration and Explosive Separation.** The word explosive is used because the rupturing of the surface of the material, and the splitting and separation of the material, **see above left**, is accomplished through a rapid increase in tensile stress.

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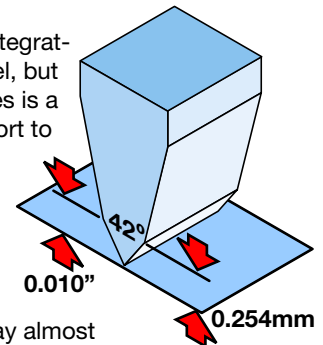


A Diecutting Solution



MicroCut was designed to provide solutions in both phases of diecutting. **See right.** One of the reasons we use knives with different bevels is because there are so many diecutting applications which require tools with a different cutting profile. For example, the advantage of a lower bevel angle knife is cleaner penetration and lower displacement force. However, the potential disadvantage of a low bevel angle knife, cutting onto a steel rigid anvil, is the potential for compressive damage to the tip of the blade. **See left.**

MicroCut avoids this problem by integrating a 42-degree angle primary bevel, but only at the tip of the blade. **See right.** Forty-Two degrees is a relatively low bevel angle, but it provides sufficient support to minimize compressive edge damage.

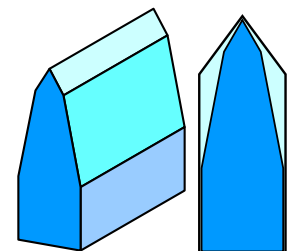


The secondary bevel, which begins at 0.010" – 0.254 millimeters from the tip of the cutting edge, **see below left**, is much sleeker and designed to minimize lateral tensile force in comparison to a standard knife profile.

See below right. As the secondary bevel comes into play almost immediately, it significantly reduces lateral displacement to generate a cleaner diecut edge.

Sandvik MicroCut Summary

When you consider the many advantages of this blade, including lower pressure penetration combined with reduce lateral stress, you can see why it is rapidly emerging as a general purpose cutting knife, which is effective in a wide range of converting applications.



Lower pressure, reduced tensile stress, minimal flaking, stronger nicks, lower material distortion, longer life, and faster

press make-ready, are some of the powerful attributes which are driving the success of this blade. For more information about this revolutionary, multi-purpose blade, contact your local Sandvik representative.