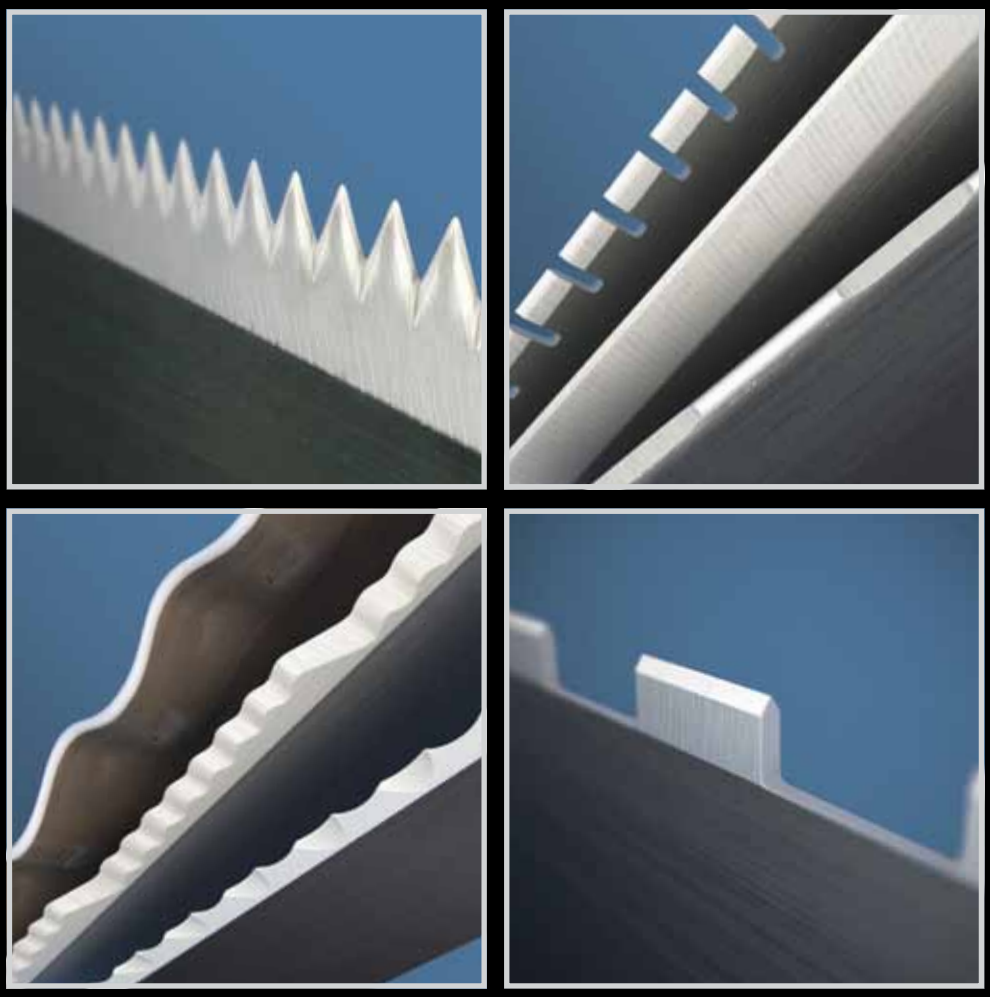
National Steel Rule



THE FIRST RULE OF PRODUCTION

ZIMMER INDUSTRIES, INC.
SUBSIDIARY OF NATIONAL STEEL RULE

About National/Zimmer

The First Rule Of Production

How do National Steel Rule and Zimmer Industries set themselves apart from the competition?

We ASC. No, that's not spelled wrong. ***Ask***ing our customers what they wanted from their rule manufacturer, created the ASC acronym that clearly guides how we operate today:

- **A- Availability** - The best products in the world don't mean a thing if they aren't readily available. Therefore, we maintain the ***largest rule inventory*** in the world today.
- **S- Speed -** Inventory, plus a huge manufacturing capacity and state of the art proprietary equipment, allow us to provide the ***fastest deliveries*** in the industry, standards and specials alike.
- **C- Consistency -** The ever increasing demands of the industries we serve absolutely require that steel rule be truly consistent in its quality and characteristics. We are fully committed to providing that critical consistency.

- **Focus - Steel rule is the only product National and Zimmer manufacture.** It is our sole and driving focus.
- **Innovation -** We have long been the industry co-leaders in innovative rule development. To date, together we have created ***over 150 rule innovations*** and are adding new items to that list every year.
- **Experience -** Joining forces in 2010, National and Zimmer effectively combined two highly experienced management and production teams. Between them, the companies have ***over 150 years of rule making experience***.
- **Service -** It's been said that we are a service company disguised as a rule manufacturer. We treat our customers like we do our friends and we know virtually all of them on a first name basis.
- **Flexibility -** We recognize that bigger isn't always better. We strive to be large enough to effectively compete in the global marketplace, yet small and flexible enough to quickly react and respond to any changes in our customers' needs.
- **Ongoing Improvement -** We are fully committed to ***continuous improvement and change,*** while never forgetting our history and the things that made us what we are today.

The National/Zimmer Steel Rule Quality Policy

We recognize that what was good enough yesterday, may not necessarily be good enough today and what is good enough today, may not be good enough tomorrow. As such, our dedicated mission is to continually improve all aspects of our business to insure our relevance in the ever changing industries we serve.

National Steel Rule

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National Steel Rule

Most of the items in this catalog are available in an almost infinite number of combinations of heights, point sizes, tempers, bevels, tooth patterns, etc.

Unless otherwise stated, a majority of catalog photos are shown at 200% magnification.

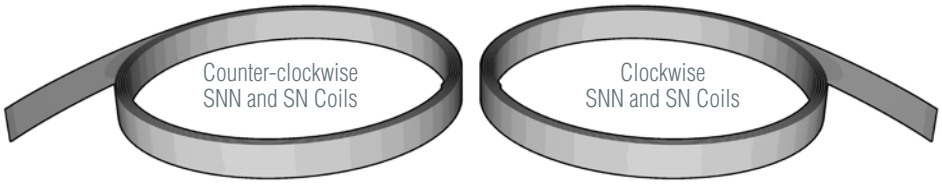
Automatic Rule Processor Coil Specifications

Our Code (Part No.)	Wind/Feed Direction	Maximum OD	Point Size	Standard Coil Length
AC	Counter-clockwise	21" (.53 M)	2 Pt.	300' (91.4 M)
"	"	"	3 Pt.	200' (60.9 M)
"	"	"	4 Pt.	150' (45.7 M)
DP	Clockwise	21" (.53 M)	2 Pt.	300' (91.4 M)
"	"	"	3 Pt.	200' (60.9 M)
"	"	"	4 Pt.	150' (45.7 M)

Metric to English Conversion

1 mm	= .039 inches
1 Inch	= 2.54 cm or 25.4 mm
1 Meter	= 39.375 Inches
30 Meters	= 98.5 Feet

Auto Bender Guide



			30" Lengths		36" Lengths		1 Meter Lengths		48" Lengths	
Thickness	Heights		Feet /Box	Strips/Box	Feet /Box	Strips/Box	Feet /Box	Strips/Box	Feet /Box	Strips/Box
2 Pt.	0.500 - 1.125"	(12.7-28.58 mm)	250 Ft.	100	300 Ft	100	328 Ft.	100	272 Ft.	68
2 Pt.	1.126 - 1.250"	(28.6-31.75 mm)	170 Ft.	68	204 Ft.	68	223 Ft.	68	136 Ft.	34
3 Pt. & 3 x 2	0.500 - 1.125"	(12.7-28.58 mm)	175 Ft.	70	210 Ft.	70	248 Ft.	75	200 Ft.	50
3 Pt. Wave	0.500 - 1.125"	(12.7-28.58 mm)	167 Ft.	67	201 Ft.	67	248 Ft.	75	200 Ft.	50
3 Pt.	1.126 - 1.500"	(28.6-38.10 mm)	125 Ft.	50	150 Ft.	50	164 Ft.	50	100 Ft.	25
3 Pt.	1.501 - 3.000"	(38.13-76.20 mm)	62 Ft.	25	75 Ft.	25	112 Ft.	34	100 Ft.	25
4 Pt.. 4x2, & 4x3	0.500 - 1.125"	(12.7-28.58 mm)	125 Ft	50	150 Ft	50	164 Ft.	50	136 Ft.	34
4 Pt.	1.126 - 1.500"	(28.6-38.10 mm)	85 Ft.	34	102 Ft.	34	112 Ft.	34	68 Ft.	17
4 Pt.	1.501 - 3.000"	(38.13-76.20 mm)	42 Ft.	17	51 Ft.	17	56 Ft.	17	68 Ft.	17
6 Pt.	0.500 - 1.125"	(12.7-28.58 mm)	85 Ft.	34	102 Ft.	34	121 Ft.	37	100 Ft.	25
6 Pt.	1.126 - 1.500"	(28.6-38.10 mm)	85 Ft.	34	102 Ft.	34	112 Ft.	34	68 Ft.	17
6 Pt.	1.501 - 3.000"	(38.13-76.20 mm)	42 Ft.	17	51 Ft.	17	56 Ft.	17	68 Ft.	17
8 Pt.	0.500 - 1.125"	(12.7-28.58 mm)	62 Ft.	25	75 Ft.	25	82 Ft.	25	68 Ft.	17
8 Pt.	1.126 - 1.500"	(28.6-38.10 mm)	50 Ft.	20	60 Ft.	20	66 Ft.	20	40 Ft.	10
8 Pt.	1.501 - 2.000"	(38.13-76.20 mm)	25 Ft.	10	30 Ft.	10	33 Ft.	10	40 Ft.	10
6 x 3, 6 x 4, 8 x 3, 8 x 4 Laser			85 Ft.	34	102 Ft.	34	98 Ft.	30	100 Ft.	25
2 Pt. Zipper Up To 1.125"			85 Ft.	34	102 Ft.	34	98 Ft.	30	100 Ft.	25
3 & 4 Pt. Zipper Up To 1.125"			42 Ft.	17	51 Ft.	17	49 Ft.	15	52 Ft.	13

Hardness Guide

Term	Scleroscope	RC Range	Vickers
Medium Soft	50	32-35	320-345
Medium	55	36-40	350-395
Medium Hard	65	41-44	400-435
Hard	70	47-50	445-500
Extra Hard	80	51-55	525-590

Note: Not all hardnesses available for all rule sizes.

Coil Packaging Information

	Most common lengths per Box	
2 Pt. Rule	300 Ft.	(90 M)
3 Pt. Rule	200 Ft.	(60 M)
4 Pt. Rule	100 Ft.	(30 M)
4 Pt. Rule (Processor Coils)	150 Ft.	(46 M)
6 Pt. & 8 Pt. Rule	50 Ft.	(15 M)
3 x 2, 4 x 2 & 4 x 3 Laser Crease	100 Ft.	(30 M)
6 x 4 & 8 x 4 Laser Crease	50 Ft.	(15 M)
6 x 3 & 8 x 3 Laser Crease	50 Ft.	(15 M)

Serrated Rule

Scalloped Rule

A National classic, 8 Tooth Scalloped rule has an extremely durable edge that cuts effectively even under the most demanding conditions. Designed with a true center bevel, this rule creates a scalloped finished edge on materials such as fiber, rubber and plastics. Cuts a wide assortment of materials in both flat and rotary applications.

- Durable tooth design
- Minimal penetration
- Creates a safety edge on the cut material
- Also available in 10 Tooth version

4.6 and 2.7 Tooth Serrated Rule

4.6 Tooth shown here.

These tooth patterns were specifically developed and designed for plastic bag conversion. The precisely spaced toothing of both patterns allow bag hand holes to be formed with exactly half a tooth left on each side of the rule at the eventual joint. Titanium Nitride or custom induction edge hardening is available to improve die life. May also be used to effectively cut foam and or plastic film.

- Creates excellent, precise hand holes
- May be coated or edge hardened for maximum life
- Available in many sizes

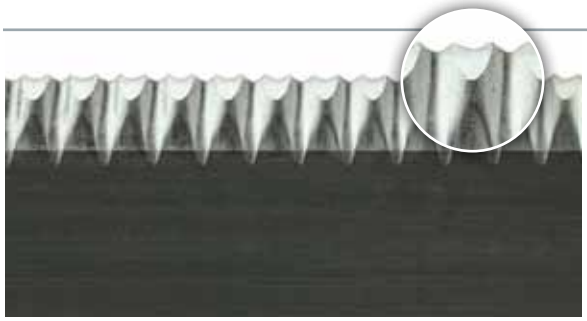
5 and 6 Tooth Serrated Rule

Either of these rules is an excellent choice for cutting plastic films, various foams and almost any other material that requires low cutting pressure. Ultra sharp teeth cut with minimal concavity on foam type materials and with minimal stretch and distortion on plastic films. Perfect for cutting into “air” or a supported slot.

5 Tooth shown here.

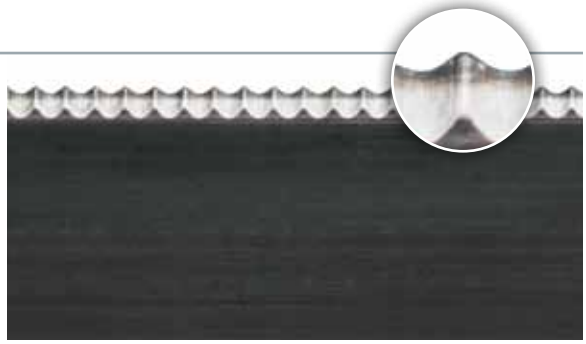
- Available with custom induction edge hardening
- May be customized to solve many specialty type applications
- Available in center or side bevels
- Perfect for tough materials such as “Honeycomb” and “Falconboard®”

Excalibur



Designed to cut with the least penetration possible, this National exclusive serrated rule may be used for flat or rotary applications. Unique cutting channels create minimal cutting pressure and product edge crush.

Automotive Klean Kut



Engineered to provide an optimal combination of bendability and cutability, this unique 6 point, 13 tooth rule cuts a wide variety of products. Primarily manufactured from our exclusive Nataloy steel, Automotive Klean Kut utilizes a super smooth, shaved cutting edge to effectively cut even the toughest of materials, cleanly and with minimal pressure. Available in both US and Metric sizes, this rule works well on textiles, automotive trim parts, leather, insulation and other fibrous materials. The unique tooth pattern allows for layering of materials without fusing.

- Cuts a wide variety of materials
- Prevents fusing
- Edge hardened for maximum blade life
- Also available in 3, 4 and 8 Point

14 Tooth Shallow Profile

This 14 TPI center bevel rule is normally made with teeth ground on one side, but can also be manufactured with either a symmetrically ground center or a true side bevel. All three patterns have very shallow gullets and are extremely versatile, in both flat and rotary applications. They work well on fabrics, rubber, plastics and other materials requiring minimal penetration. A perfect choice when cutting against a belt or non-oscillating anvil. Cuts with very minimal penetration.

- Provides excellent anvil life
- Ideal for cutting against hard pads or belts
- Available in a wide range of heights and point sizes

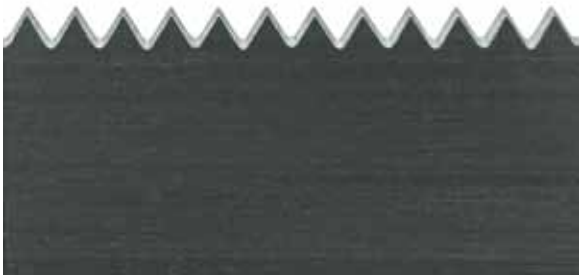
13 Tooth Shallow Profile

Like traditional shallow profile rule, 13 Tooth Shallow Profile is an ideal choice for flat applications cutting into a resilient surface. This product has a radius tooth design and is slightly deeper and more aggressive than 14 tooth Shallow Profile.

- Ideal for flat applications
- Edge hardening recommended for optimum blade life.

Serrated Rule

Deep "V" Serrated Rule



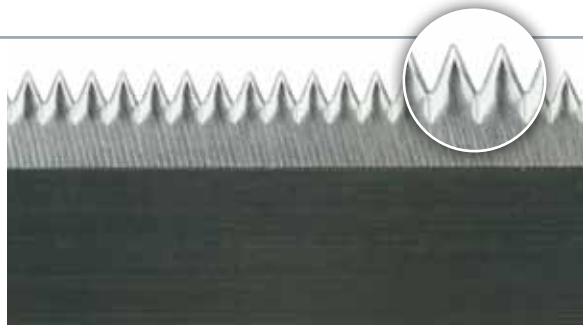
8 Tooth shown here.

Combining an extremely sharp tooth with a deeper gullet depth, creates a family of serrated rules that work effectively on materials such as films, foams and even some specialty paper products, such as thinner Honeycomb stocks. Due to the extreme sharpness of the teeth, we recommend these rules be edge hardened. Most effective when cutting into "air" or a supported slot.

- Available in many teeth per inch patterns including 8, 9.5, 13, and 16
- Choose side or center bevel
- Minimal cutting pressure
- Edge hardening recommended

QC100

This unique, proprietary rule is a National exclusive. In successful use around the world, QC100 is widely recognized as the most effective serrated rule ever designed for the diecutting of various foams. Edge hardened for maximum life, when properly used, cutting into a minimal clearance supported slot, this rule has had multiple reports of running well over 100-million impressions. QC100 starts cutting a wide variety of foams on contact, with absolutely minimal cutting pressure. This greatly reduces or eliminates "beading," and possible concavity. The most popular QC100 size is 12Tooth, but it may also be special ordered in 10 and 16 tooth.



12 Tooth shown here.

- Minimizes concavity, cutting pressure and "beading"
- Precision manufactured and edge hardened for unrivaled blade life
- Excellent bendability
- Also great for plastic films

Super Eight

Recently developed, this unique eight tooth rule is perfect for the emerging and demanding digital print market. Combining key performance elements from both our Klean Kut and Arrow Head rules, Super Eight effectively fills the need for the diecutting of structural paper, foam or plastic panels, by providing a highly reduced cutting pressure and an edge appearance and feel never before possible with conventional serrated rules. Available (and strongly recommended) with our unique Teflon coating option, Super Eight has proven to be consistently successful in the diecutting of dense, super tough, non-compressible materials, often over 1" in thickness.

- Provides excellent edge appearance and feel
- Perfect for display work, non-compressible materials, structural paper, foam and plastic panels
- Highly recommended to be Teflon coated for ultimate cutting ease

Available Edge Styles

Shaved (AKA Skived)

This is by far the most commonly used edge style in the world today. Shaving is accomplished by using sets of precision tooling that incrementally remove the steel to form the desired cutting edge or bevel. Shaving runs faster than other rule manufacturing methods and is therefore often less costly to produce. This process creates a smooth edge with machined lines that run horizontal to the cutting action produced, thus being less likely to crack when bent. Extremely tight height tolerances are made possible by the process of shaving.

Ground

A ground edge is usually produced by multiple grinding wheels that incrementally remove the steel in order to create a cutting edge. By its nature, ground rule (due to the breakdown of grinding wheels) does not provide the same degree of height tolerance normally made possible by shaving. However, ground rules are able to be made with an infinite point and the grinding lines created are vertical to the cutting action. These two features make ground rules perfect for many demanding applications such as cutting various plastics.

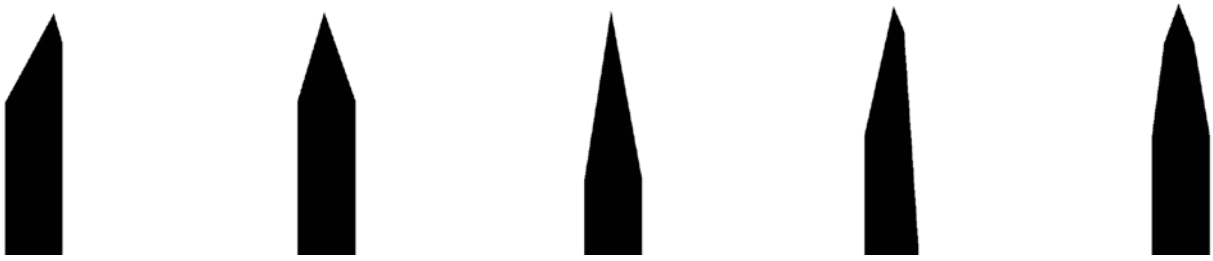
Fine Ground

Has all the advantages described above, but due to the additional use of extremely fine grit grinding wheels, the grinding lines produced are much closer together, creating an edge that is smoother, less likely to crack and produces less dust.

Micro Serrated

This unique edge style is very coarsely ground in order to create microscopic "teeth" that require less cutting pressure than conventional smooth bevels. Due to the fragile nature of the "teeth," edge hardening is recommended on this type of edge.

Please note - Many of the rules and bevel styles we manufacture, may be custom edge hardened and or specially coated for maximum blade life and/or lubricity. *Please see page 8 for more information.*



Side Bevel	Center Bevel	Long Side Bevel	Long Center Bevel
(Single Bevel or Side Face)	(Double Bevel or Center Face)	(Double Single Bevel or Side Face Double Bevel)	(Double Double Bevel or Center Face Double Bevel)
Used for cutting materials where a straight edge on the diecut blank is required. Also assists in ejection when release is a factor.	Center Bevel is by far the most commonly used edge style and is primarily provided in either a 42, 52 or 60 degree included angle. On National rules, the most popular angle is 52 degree, while Zimmer rules are most commonly made in a 60 degree angle. Shown above on the left is a representation of a 52 degree edge and on the right is 42 degree (often referred to by the non-included angle or 21 degree). Edge hardening is usually recommended when employing a 42 degree bevel, due to this edge's severe sleekness. Other custom angles are readily available.	Used for the same type applications as regular side bevel, except when cutting thicker material.	Excellent for cutting thicker materials and improving product release. Also cuts with little edge crush and distortion of diecut blank

Standard Cutting Rules

Available in an almost countless number of variations, National and Zimmer's standard cutting rules are successfully used around the globe. Heights range from .250" (6.35 mm) up to and including 4.000" (101.60 mm). Tempers range from dead soft to extra hard, plus the availability of induction edge hardening and special coatings.

Point sizes from range 1/2 to 8 (.18 - 2.84 mm). Virtually any desired coil configuration, custom length, or custom bevel angle can be easily provided. Some of the most common applications of our cutting rules include business forms and label manufacturing and various forms of diecutting. In these industries, the two most used heights are .918" (23.32 mm) and .937" (23.8 mm). Many of our rules are also available in stainless steel.

Cutting Rule

AutoMate

Our premier diecutting rule, AutoMate is very specifically designed for use in today's state of the art rule processing equipment. This precision shaved rule effectively combines custom edge hardening with excellent, consistent bendability.

- Maximum blade life
- Excellent bending characteristics
- Perfect for automated rule processing equipment
- Available in various heights, bevels and point sizes

Nataloy

Our exclusive alloy formulation is the result of many years of research and development. This economical, multipurpose rule combines the excellent bendabilty of a medium temper, with the blade life of a medium hard rule. Available either shaved or ground and may be custom induction edge hardened to further improve blade life.

- Multipurpose and versatile
- Economical
- Shaved or ground edge
- Wide variety of sizes and bevels
- Also available in an HT (Hard Tip) version at a body temper of 41/44 and a tip hardness of 52/54 Rockwell C Scale.

Surebend 44

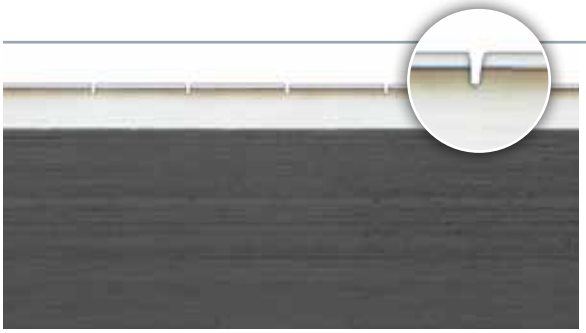
This versatile utility rule is an economical choice for many everyday applications. While the body temper is the same as Nataloy rule, Surebend has greater wear resistance, while still bending well. Available in multiple heights and bevel styles.

- Multipurpose and versatile
- Economical
- Shaved or ground edge
- Wide variety of sizes and bevels
- Also available in an HT (Hard Tip) version at a body temper of 41/44 and a tip hardness of 52/54 Rockwell C Scale.

Prenicked Rule (AKA Bundle Breaker)

To achieve maximum productivity in today's high speed platen diecutters, blanks must stay securely together through both the diecutting and stripping operations, yet come apart cleanly in the blanking section. By employing Prenicked Rule, you can be certain the nicks are cleanly formed and totally consistent, allowing you to alter the strength of the hold by simply replacing the small section of the Prenicked Rule, as opposed to re-ruling an entire knife. Available in multiple nick patterns.

One example of prenicked rule shown here



4 nicks shown here.

MicroNik

A specialty version of our prenicked rules, MicroNik replaces unsightly, old fashioned nicking with nicks as small as .007" (.18 mm) and has a unique super sleek bevel that cuts with minimal pressure and reduces edge crush, dusting and angel hair. The virtually microscopic nicks create an edge that looks and feels far superior to those produced by any conventional nicking method. The excellent "hold strength" MicroNik provides, often allows significantly faster press speeds. Edge hardened for maximum blade life. The most common nick patterns are 4 and 8 per inch, but 2 through 16 nicks may be custom ordered.

Self Leveling Rule

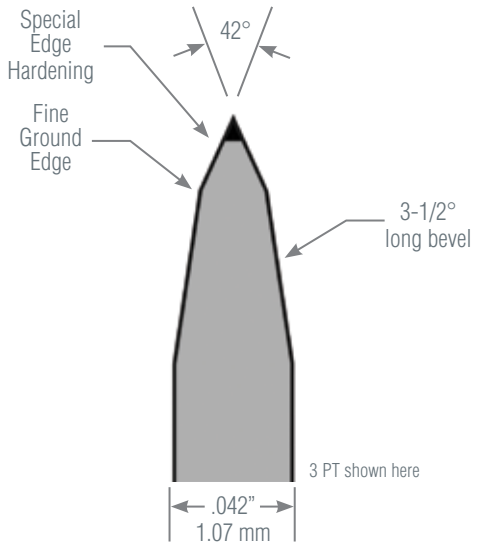
Another National first, this rule was originally patented many years ago. The objective of a conventional make-ready is the building up of low spots where the rule is not cutting 100%. This painstaking, tedious process can translate into many hours of expensive downtime. Self Leveling rule was designed to significantly reduce make-ready time by actually employing the press itself to level out the rule. This is accomplished by utilizing two compression zones that effectively allow the rule to compress to the lowest point where effective cutting occurs. Precision induction edge hardening assures long life and minimal dust.

- Greatly reduces make-ready time
- Long blade life
- Reduced dusting

Cutting Rule

Plasticut

A fine ground, custom edge hardened cutting rule, Plasticut is specifically designed for cutting Polyethylene, Polypropylene, PVC, or PET. Available in two versions (AutoMate [AM] for bendability and SureBend [SB] for added beam strength). These rules feature a 42 degree (included angle), fine ground bevel and a harder edge than conventional rules. For easier cutting of many plastics, a sleek 3-1/2 degree long (double) bevel is provided. Manufactured in a wide variety of heights.



Plasticut Specifications

	Plasticut AM	Plasticut SB
Body Hardness	34RC	44RC
Edge Hardness	57RC	57RC
Thickness	2PT, 3 PT or 4 PT	2PT, 3 PT or 4 PT
Heights	.937 to 2.000	.937 to 2.000
Bevel	42 Degree	42 Degree
Special Long Bevel	3-1/2 Degree	3-1/2 Degree
Finish	Fine Ground	Fine Ground

Special Processes and Materials

Edge Hardening

When optimum rule life is a must, our custom induction edge hardening is an excellent solution.

Coatings

Titanium Nitride and/or Boron Coating

These processes produce a super hard edge that improves rule life dramatically, without sacrificing rule bendability.

Teflon Coating

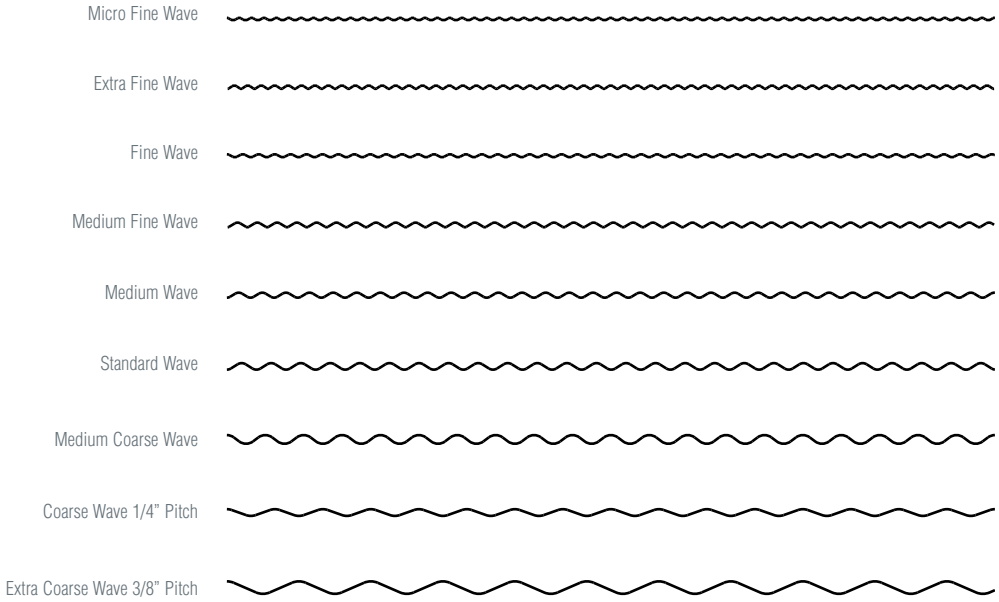
Most of our rules can be coated with a durable Teflon coating that adds tremendous lubricity. This can be very helpful when cutting pressure sensitive or other “sticky” materials. Teflon prevents buildup on the rule, as well as aiding in release.

Stainless Steel Availability

Many of our rules are also available in stainless steel. Please ask for details.

Wave Rule

Whether edge appearance or safety is your primary concern, National manufactures a wave rule that will suit your application. Nine different patterns are available in 2, 3 and 4 point. Waved only along the cutting edge, these rules can be installed within the existing kerf of a dieboard for immediate changeover to a decorative or safety edge. All wave rule is available with National's custom edge hardening. Custom wave patterns may be special ordered.



Thickness Available

2 Pt. (0.71mm)
3 Pt. (1.07 mm)
4 Pt. (1.42 mm)

Wave Rule Specifications

Wave Rule Profile	Pitch		2 Point Body		3 Point Body	
Micro Fine Wave	0.062"	(1.6 mm)	0.031"	(0.8 mm)	0.042"	(1.1 mm)
Extra Fine Wave	0.071"	(1.8 mm)	0.039"	(1.0 mm)	0.055"	(1.4 mm)
Fine Wave	0.083"	(2.1 mm)	0.040"	(1.0 mm)	0.055"	(1.4 mm)
Medium Fine Wave	0.100"	(2.5 mm)	0.046"	(1.2 mm)	0.058"	(1.5 mm)
Medium Wave	0.125"	(3.2 mm)	0.047"	(1.2 mm)	0.062"	(1.6 mm)
Standard Wave	0.145"	(3.9 mm)	0.047"	(1.2 mm)	0.060"	(1.5 mm)
Medium Coarse Wave	0.200"	(5.1 mm)	0.066"	(1.7 mm)	0.078"	(2.0 mm)
Coarse Wave 1/4" Pitch	0.250"	(6.4 mm)	0.069"	(1.8 mm)	0.092"	(2.3 mm)
Coarse Wave 3/8" Pitch	0.375"	(9.5 mm)	0.088"	(2.2 mm)	0.088"	(2.2 mm)

Tear Edge Rule (AKA Zipper Rule)

More and more of today's packaging is being designed with ease of opening in mind. National's Tear Edge Rule is designed to maintain package integrity through the distribution channel, yet provide a package that opens without need of knives or other tools.

Available in both serrated style for rotary dies and standard for flat dies, National Zipper rule can be ordered in a variety of styles depending on the desired tear strength. Like all National products, zipper rule can be customized to meet your specifications.

National Tear Edge Rule is sold in matching left and right hand sets in standard lengths of 30", 36" and 1 meter. Serrated Zipper rule is also available notched or curved in all standard diameters. May also be used for tear-off panels or as a glue assist.

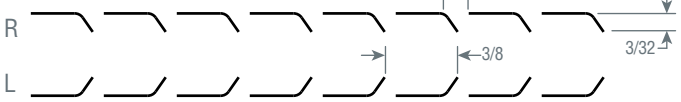
See pages 10 and 11 for tear edge patterns.

Tear Edge Rule (AKA Zipper Rule)

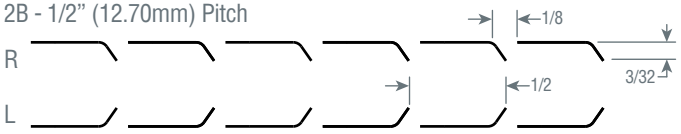
2 Point Patterns

These rules are in use around the globe, providing a wide variety of effective opening features, for an almost endless array of applications.

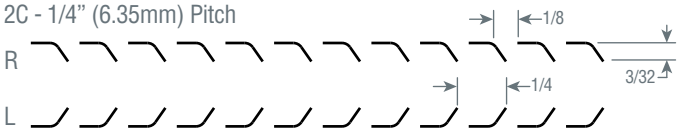
2A - Standard 3/8" (9.53mm) Pitch



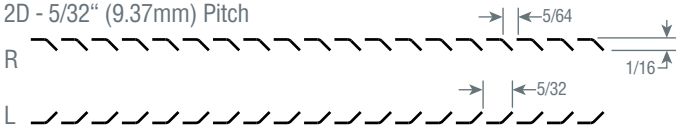
2B - 1/2" (12.70mm) Pitch



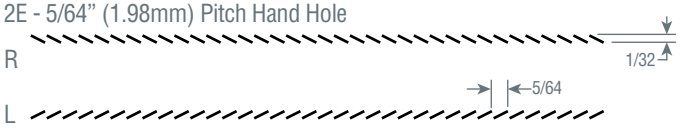
2C - 1/4" (6.35mm) Pitch



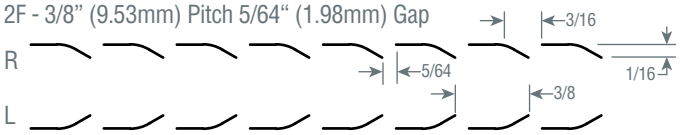
2D - 5/32" (9.37mm) Pitch



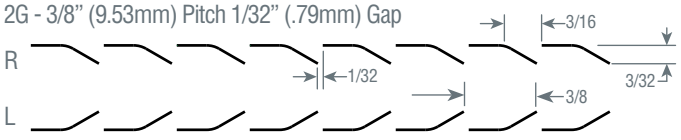
2E - 5/64" (1.98mm) Pitch Hand Hole



2F - 3/8" (9.53mm) Pitch 5/64" (1.98mm) Gap

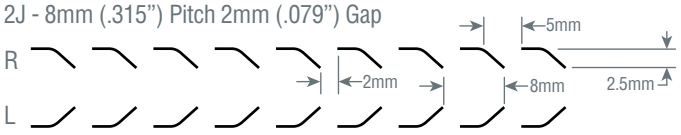


2G - 3/8" (9.53mm) Pitch 1/32" (.79mm) Gap

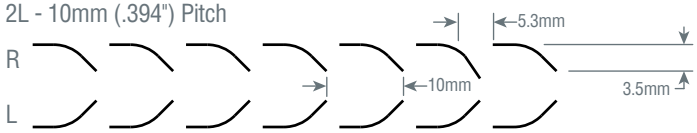


2H - 9/64" (3.57mm) Pitch Hand Hole

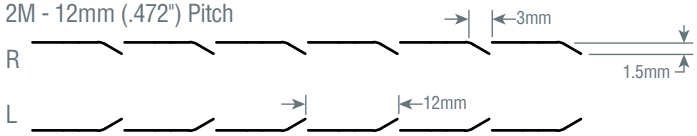
2J - 8mm (.315") Pitch 2mm (.079") Gap



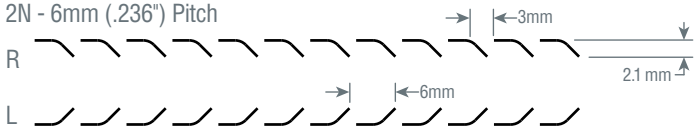
2L - 10mm (.394") Pitch



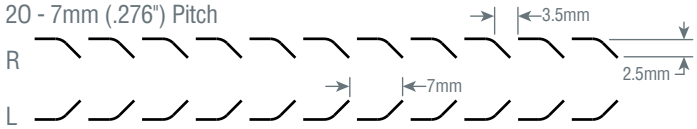
2M - 12mm (.472") Pitch



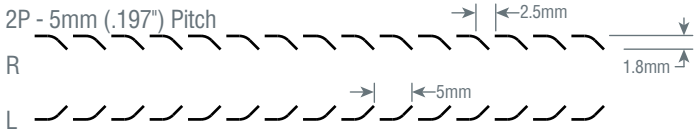
2N - 6mm (.236") Pitch



2O - 7mm (.276") Pitch

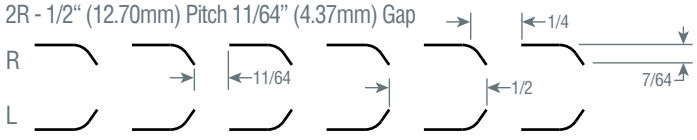


2P - 5mm (.197") Pitch



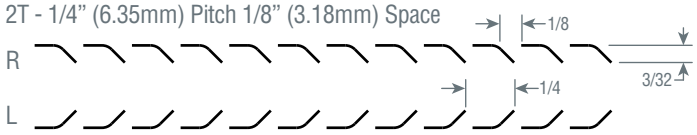
2Q - 13/32" (10.32mm) Pitch 5/64" (1.98mm) Gap

2R - 1/2" (12.70mm) Pitch 11/64" (4.37mm) Gap



2S - 1/4" (6.35mm) Pitch 5/64" (1.98mm) Wide

2T - 1/4" (6.35mm) Pitch 1/8" (3.18mm) Space

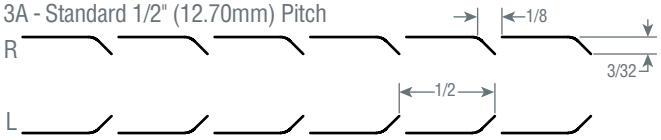


Please check our website **www.steelrule.com**, as other patterns may become available in the future.

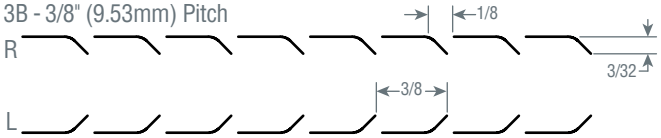
Tear Edge Rule (AKA Zipper Rule)

3 Point Patterns

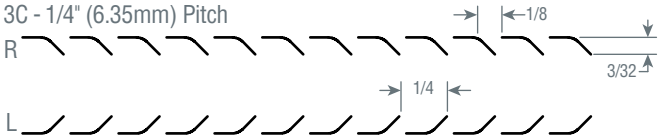
3A - Standard 1/2" (12.70mm) Pitch



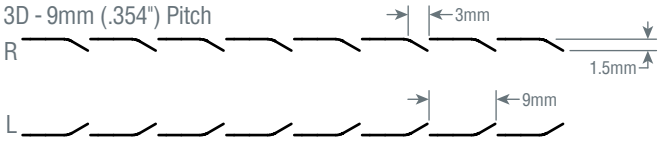
3B - 3/8" (9.53mm) Pitch



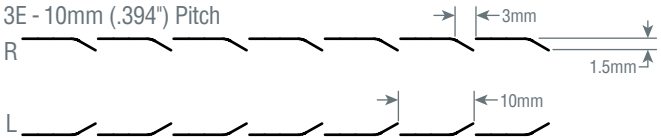
3C - 1/4" (6.35mm) Pitch



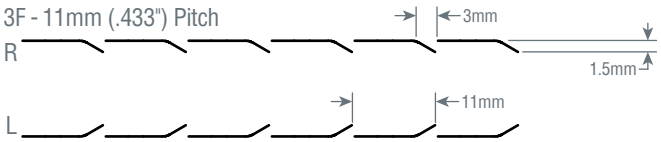
3D - 9mm (.354") Pitch



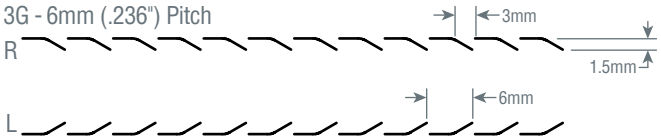
3E - 10mm (.394") Pitch



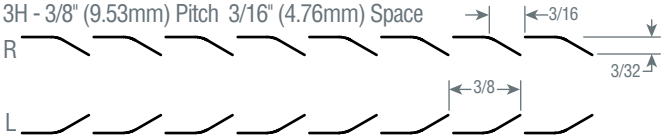
3F - 11mm (.433") Pitch



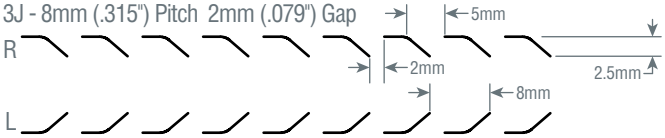
3G - 6mm (.236") Pitch



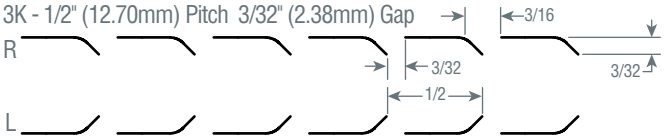
3H - 3/8" (9.53mm) Pitch 3/16" (4.76mm) Space



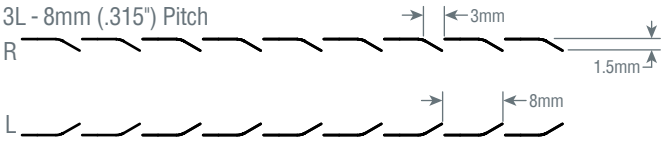
3J - 8mm (.315") Pitch 2mm (.079") Gap



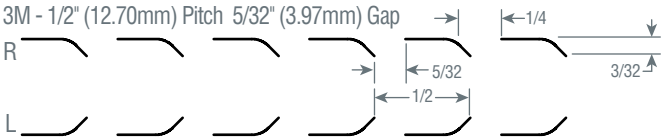
3K - 1/2" (12.70mm) Pitch 3/32" (2.38mm) Gap



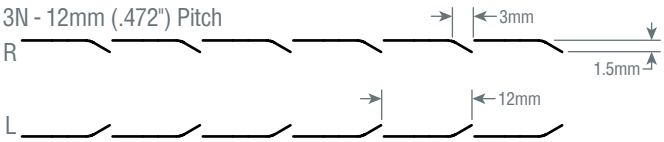
3L - 8mm (.315") Pitch



3M - 1/2" (12.70mm) Pitch 5/32" (3.97mm) Gap



3N - 12mm (.472") Pitch



3O - 1/2" (12.70mm) Pitch 7/32" (5.56mm) Gap

Please check our website **www.steelrule.com**, as other patterns may become available in the future.

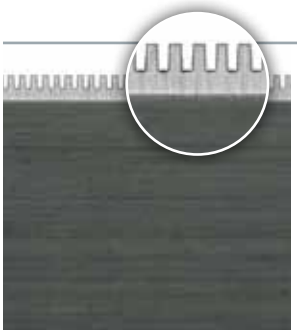
Perforating Rule

Standard Perforating Rule

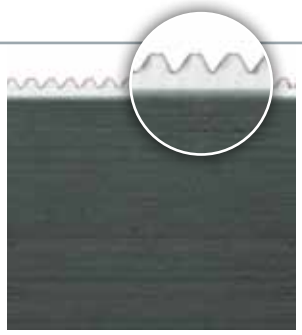
No other rule manufacturer in the world has more experience, more inventory, or more knowledge of perforating rules than National/Zimmer. A huge variety of standard perf rules are available from stock and virtually any tooth and space can be custom made with reasonable time frames and minimums. Precision punched with super accurate feeding systems, these rules are then fine ground to eliminate troublesome burrs and allow improved stock release. Available in TPI (teeth per inch), decimal, metric and fractional versions.

8 Tooth x .032" shown here.

1/4" x 1/4" shown here.



MicroMax - 50T shown here at 300% Magnification is shown at 600%.



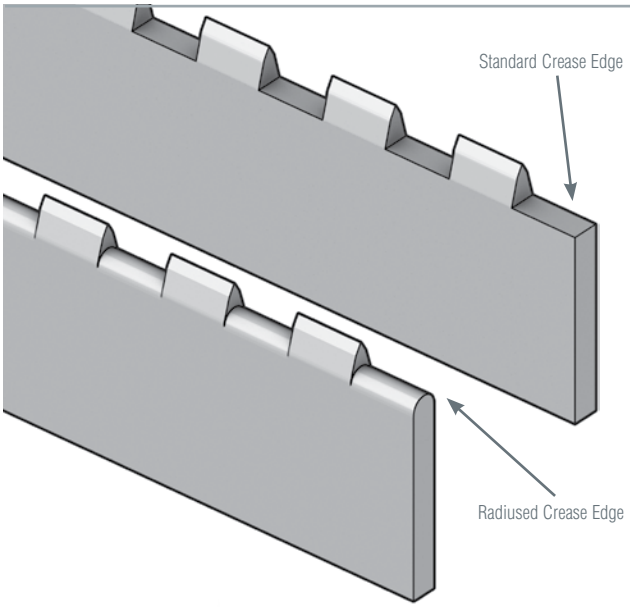
Invisible - 30T shown here at 300% Magnification is shown at 600%.

Microperforating Rule

Microperfs create the unusual combination of a strong hold and an excellent look and feel to the torn edge of the stock. Having made and sold far more Micoperfs than any other rule manufacturer worldwide, Zimmer is the industry leader in this highly specialized field.

- "MicroMax" is our premium, square tooth Microperf line, ranging from 20 to 70 TPI, with spaces as small as .007" (.039 mm) and a choice of gullet depths, though the standard depth is .020" (.51 mm). A wide variety of configurations is available. Most commonly ordered in cut lengths.
- "Invisible" perf is our economical line of Microperfs . These rules have triangular shaped teeth and are perfect for thin applications (approximately from .001" (.025 mm) - .012" (.30 mm) dependent on the number of teeth). The more teeth, the thinner the application and TPI range from 25-100. Deeper gullet versions may be available. The 100 Tooth pattern was specifically designed for cold creasing various plastics and is in use around the world. Invisible perfs are most commonly ordered in coil form.

Combination Cut Crease Rule



Combining a precisely punched cut section with a defined gullet height, this rule is designed to effectively enhance folding characteristics for multiple applications. Offered in an almost endless variety of configurations, including metric sizes, combination rule may also be edge hardened for maximum life.

Combination Cut Crease with Radius Gullets

Very similar to the above rule, but with the added positive feature of a radiused (rounded off) crease edge. This simple addition reduces or eliminates the score cracking that is often associated with conventional cut creases that usually have sharp edges on the crease areas.

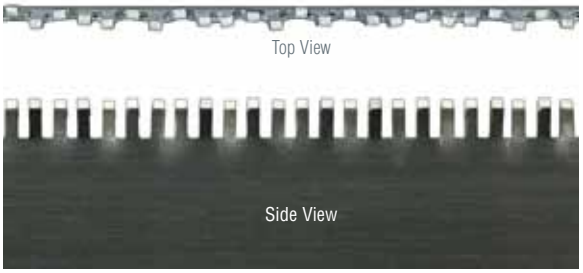
Perforating Rule

Counter Combo Rule (CCR)

A further refined version of Combination Cut Crease rule, this truly unique product provides a crease height that is only .002" (.05 mm) higher than the cut height. Primarily, the various cut crease patterns of this rule would have a .937" (23.80 mm) cut x .939" (23.85 mm) crease, though other patterns may be custom ordered. Perfect for use with steel counters, creating an end product that has little or no cracking, reduced stock sticking and feeds faster through folder gluers. Eliminates the need for the dangerous and time consuming practice of dovetailing.

Due to fine tooth this blade is shown at 200%. Magnification is shown at %800.

Glue Flap Perforating Rule



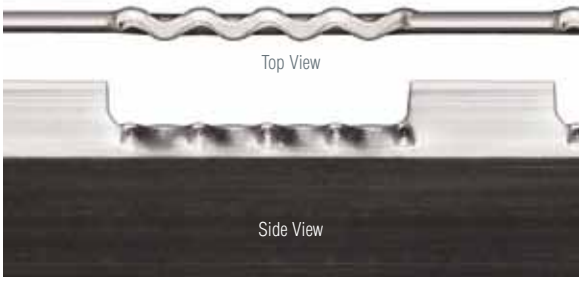
Glue Flap Perf is a 2 point rule, most commonly made with a 1/32" x 1/32" (.8 mm x .8 mm) tooth and space that is waved back and forth with a medium wave pattern. Designed to be used in the most common creasing rule heights, this unique rule creates a more porous surface on the flap for more effective glue adhesion. Other patterns may be custom ordered.

Combination Cut and Cut Rule

Another National exclusive, this unique rule has two cutting levels that can provide both a cut and a slit score in the same operation. May also be used to score corrugated and carton stocks, as well as specialty products such as plastics. Available in a wide range of configurations.

Due to fine tooth this blade is shown at 200%. Magnification is shown at %800.

Platinum Wave Score



One of National's latest innovations, Platinum Wave Score has a primary height of tooth that cuts against the steel hard plate just as normal perf would, while simultaneously allowing the secondary height of the wider, waved portion of the rule, to create a scored area, that is less likely to fracture. Available in 3 or 4 point body versions, the wider scores this rule provides, are made possible without having to change the cut line or piece rule together.

Shelf Ready Perforating Rule

Many of today's manufacturers require packaging that not only provides efficient, safe shipping of various specific items, but may also be ultimately used to display and sell those items at the retail consumer level. National has responded to this requirement by creating a full line of special perforating rules that simultaneously provide the necessary perforation strength to allow safe shipping and handling, but when separated, result in stock edges that have an appearance and feel that are suitable for product display and consumer purchasing. The "secret" to the success of these rules, is the ability to create more teeth per inch, combined with smaller perf spaces or ties than were previously possible. Available in many styles and patterns.

Creasing Rule

Standard Crease Rule

The importance of effective creasing rules in both flat and rotary converting cannot possibly be overstated. Too high a crease often results in score cracking and too low a crease can result in dimensional problems and/or difficulty in folding. 2 and 3 point come standard with a double radius, while 4, 6 and 8 point come standard with one round and one square edge. Our crease rule inventory is the largest in the industry. Can also be custom made in any height or standard point size with reasonable minimums and time frames.

single radius double radius double square

MicroTrak Crease Rule

Top View 8 Tooth shown here

Side View 8 Tooth shown here

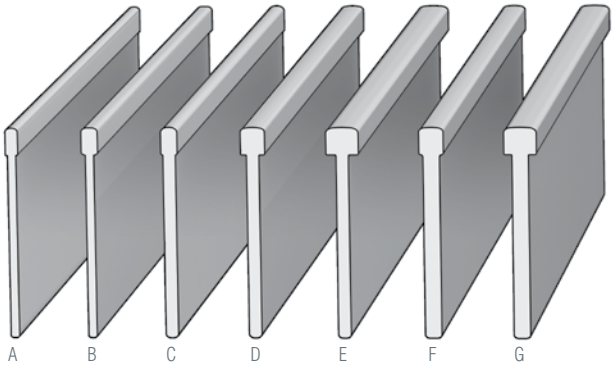
A proprietary, innovative rule that uses patterns of smoothly machined, small "teeth" that wave the rule up and down, causing it to "break" up the crease face that contacts the stock. MicroTrak reduces the stress often associated with conventional creasing, providing significantly reduced or fully eliminated score cracking and score rollover. Provides improvement in sheet control and is also excellent for use on heavy, dark ink lay-downs. Ideal for most types of paper materials, but especially good for dry board and highly recycled, short fiber stocks. Usually allows faster folder gluer speeds. Works equally well in both flat and rotary applications and is available in 2 versions- 8Tooth and 13Tooth, in a wide array of configurations.

Laser Crease

A world standard, National Laser Crease was uniquely designed to save time and money, enabling you to burn a dieboard faster by eliminating the need to cut thicker lines when a wider score is needed. Also allows you to alter the width of a score without having to recut a line. The 6 and 8 point rules come standard with a crown cap (square with broken corners) but a full radius top may also be special ordered. Many configurations are available.

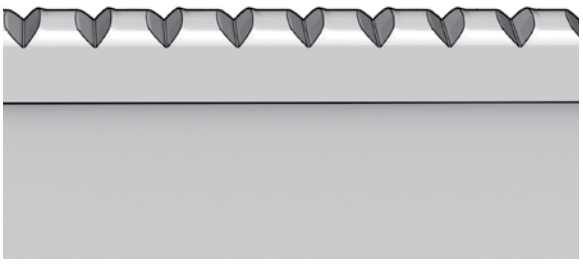
Standard Profiles

A.	3	ON	2	STD	RADIUS TOP		
B.	4	ON	2	STD	RADIUS TOP		
C.	4	ON	3	STD	RADIUS TOP		
D.	6	ON	3	STD	CROWN TOP		
E.	8	ON	3	STD	CROWN TOP		
F.	6	ON	4	STD	CROWN TOP		
G.	8	ON	4	STD	CROWN TOP		



A B C D E F G

MicroTrak Laser Crease



Combining the two rules shown above, this product adds the features and advantages of MicroTrak to the multiple conveniences of Laser Crease.

Creasing Rule

Wave Score

Top View

Side View

Employing a precisely engineered sine wave pattern, on a standard crease rule, this product goes across board flutes and creates wider scores to create a more effective, less likely to roll over crease for many tough applications.

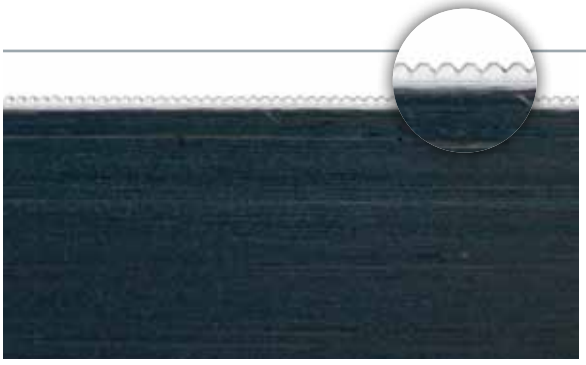
Duo-Score

This recent innovation, exclusively from National, combines the advantages of Wave Score and MicroTrak by waving conventional crease in both up and down and back and forth directions. Provides ease of folding, reduces or eliminates score cracking and rollover and is excellent for heavy dark ink laydowns and litho lam labels. May be utilized in both flat and rotary applications.

Top View

Side View

100 Tooth MicroTrak

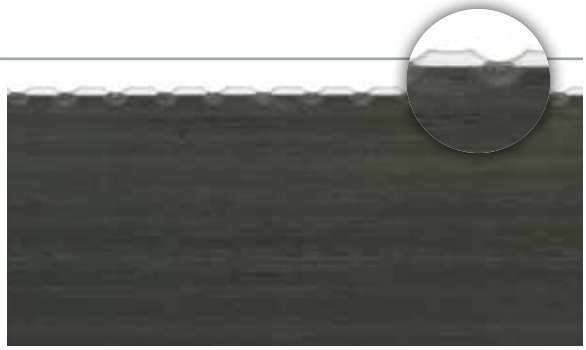


Due to fine tooth this blade is shown at 600%. Magnification is shown at %1200.

A specialty version of MicroTrak made specifically for cold scoring plastics, this proprietary rule is in successful use around the world creating excellent, effective creasing of various plastic stocks at a very low cost versus the use of conventional RF (Radio Frequency) creasing. May be used cold or hot.

Scoop Crease

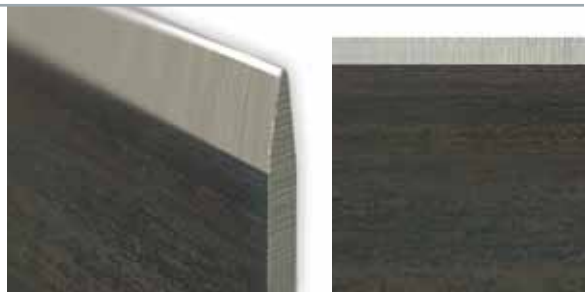
Designed for cold creasing of various plastics, this unique rule has a cutting edge with a prescribed number of teeth (usually 6-8) per inch "scooped" out of the edge. An excellent alternative to costly methods of plastic scoring, such as RF (radio frequency) or heated platens.



Creasing Rule

I-Crease (AKA Facet Crease)

This reduced bead crease is normally made with a medium or medium hard temper for long life and excellent beam strength. The smaller bead is ideal for tighter, more severe creasing without having to alter the cutline in the dieboard.



Top 10 Crease

In response to continued requests for wider crease rules, National uniquely manufactures a 4 point body crease with an 8 point Laser cap that has been waved back and forth to create a 10 point face. Perfect for heavy duty, demanding applications.

Reverse Crease

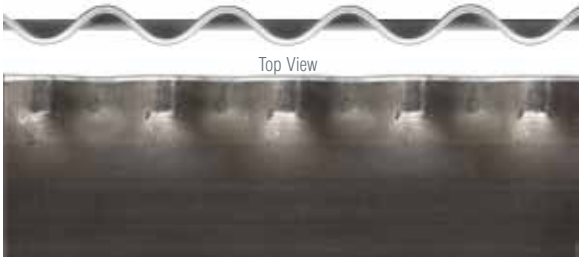
Most commonly produced with an 8 pt head on a 4 point body, this unique rule has a hollowed out groove in the middle of the rule head that creates a double creasing profile that can effectively be used in double rollover applications. Additionally, the rule may be used with a matrix on the stock's reverse side.

8 point on 4 point shown here

Special Applications Rule

Stripper Wave Rule

Most often produced as a 2.000" (50.80 mm) 3 point creasing rule, this unique product may be effectively used to construct a male stripping board. The rule's wave may be altered to strip slots of varying widths. Also available in additional heights.



Top View

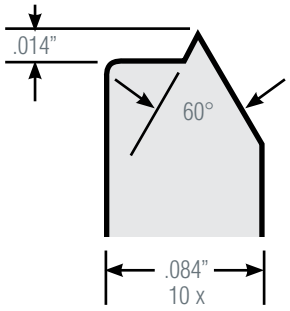
Side View

Trim Strip

This rule was uniquely designed to reduce setup time by limiting the number of lower pins. Points spaced at .197" (5 mm) apart, effectively force the waste through the female stripping board. Also available in Stripper Wave patterns.

Cut Seal Rule

This unique rule can simultaneously cut and seal many compressible stocks, such as various plastics (including vinyl) and is perfect for items such as sound deadening materials.



An examples of a 6 pt Cut Seal Rule shown here

Testing, Development and Consulting Service

We view our customers as valued partners and are firmly committed to providing them any technical assistance that may be needed. To do this effectively, we maintain a state of the art full service testing facility. This enables us to evaluate a specific rule's performance on various materials customers may send us and then recommend one or more rule types and or process solutions to the specific converting problem or need. This complimentary service can often reduce costly trial and error testing. Just send us the material in question and we'll do the rest.

National

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