

**Sandvik**

**Flat Bed and Rotary  
Diemaking Rules**



INTERNATIONAL PRODUCT PROGRAMME



## Flat Bed and Rotary Diemaking Rules

*Sandvik is one of the world's leading producers of tubular products, wire, bar and strip for a wide range of advanced applications.*

### **Complete Control**

Sandvik is a totally integrated steel producer, exercising complete control from steel making to finished product.

All-embracing quality assurance meets the requirements of ISO 9001:2000 covering all aspects from research and development, to production and final inspection. Sandvik has also achieved environmental approval to ISO 14001.

### **Sandvik DieCutting - Worldwide**

Sandvik is the largest worldwide producer and distributor of flat bed, rotary and special rules, with a product programme designed to meet the needs of the world's diemakers.

With production units in Sweden, UK, China and USA, and worldwide distribution through subsidiaries and dedicated distributors, the Sandvik product programme and supply network is second-to-none.

### **Sandvik Group**

The Sandvik Group is a global high technology enterprise with some 300 subsidiary companies, 37,000 employees and activities in more than 130 countries.

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# Dieflex Cutting Rules

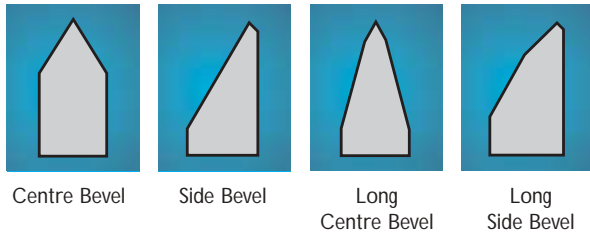
*Sandvik Dieflex, the world's first edge hardened cutting rule, combines the two contradictory requirements of good bendability and high wear resistance.*

*Since its introduction, Sandvik Dieflex has been further enhanced with improvements in tolerance, bendability and a dry rust protective coating.*

*It is only through continual upgrading and considerable investment in research and development that Sandvik Dieflex maintains its position as a market leading brand.*

*Dieflex is available in the following forms: -*

## STANDARD EDGE CONFIGURATIONS

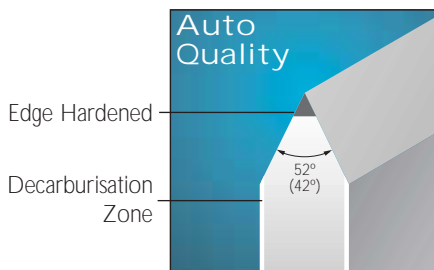


### Dieflex Auto

Dieflex Auto has been specifically developed as a manufacturing process for the production of rules that are ideally suited to diemakers working with automated rule processing and bending equipment.

Side face decarburisation of the rule gives the benefit of a soft 'tensile' skin for excellent bendability. The edge hardening of the rule gives high wear resistance.

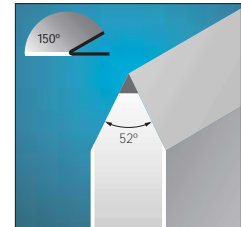
Dieflex Auto also offers tight height, straightness and thickness tolerances, minimum coil set and closely controlled hardnesses giving the benefit of smoother running on automatic machinery.



### Dieflex 52

The original Dieflex rule with its 52° cutting edge. The ideal combination of edge hardness and flexibility for diecutting a wide range of materials.

The well controlled decarburisation allows a 2 point rule to be bent to a minimum of 150°.



Point Sizes: 1 1/2, 2, 3 and 4.

Heights: Up to 100mm.

Availability: Coils and metre lengths.

Hardness: 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)  
3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)

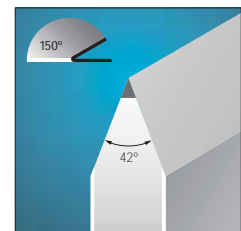
Applications: For solid and corrugated boards and all commonly used substrates.

### Dieflex 42

The 42° angle requires less cutting pressure which leads to a longer cutting life.

The sharp cutting angle achieves easier penetration of the substrate thereby reducing slivers, swarf and dust.

A 2 point rule can be bent to a minimum of 150°.



Point Sizes: 1 1/2, 2, 3 and 4.

Heights: Up to 100mm.

Availability: Coils and metre lengths.

Hardness: 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)  
3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)

Applications: Particularly suited to paper board and recycled board with high dust content.

# Dieflex Cutting Rules

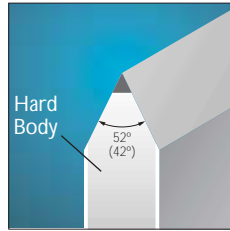
Continued

## Dieflex Hard

A rule with all the Dieflex features but with a harder body.

It is ideal for use with dies that require less tight bends, but where greater body stability is essential.

Dieflex Hard will stand up to the toughest of substrates.

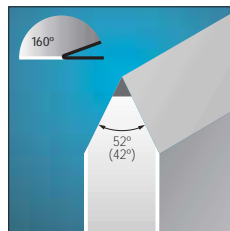


|               |  |
|---------------|--|
| Point Sizes:  | 2, 3 and 4.  |
| Heights:      | Up to 100mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | Body - 400HV (41 HRC) Edge - 640HV (57 HRC)                          |
| Applications: | Suited to solid and corrugated board, plastics and dense substrates. |

## Dieflex Superbend

A slightly lower edge and body hardness gives greater bendability - up to 160°.

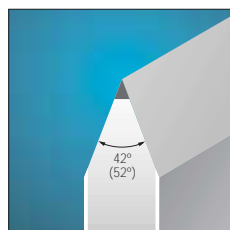
Dieflex Superbend is the ideal rule for the production of more intricately shaped dies.



|               |  |
|---------------|--|
| Point Size:   | 2  |
| Heights:      | Up to 23.80mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | Body - 330HV (33 HRC) Edge - 620HV (56 HRC)                              |
| Applications: | Particularly suitable for greeting cards, tickets and presentation work. |

## DieHard

A rule with a hard and stable body and with good bendability. A higher edge hardness facilitates the cutting of difficult substrates.

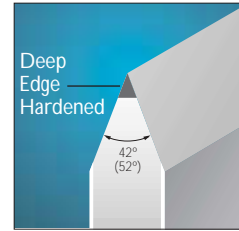


|               |  |
|---------------|--|
| Point Sizes:  | 2 and 3.   |
| Heights:      | Up to 50mm.  |
| Availability: | Coils and metre lengths.   |
| Hardness:     | Body - 470HV (47 HRC) Edge - 680HV (59 HRC)                                |
| Applications: | Ideal for cutting the more difficult substrates, such as plastics and PVC. |

## DieHard 700XD

The 42° angle with deep edge hardening gives increased wear resistance.

The edge hardness is 50% as deep again as Sandvik Dieflex rule, giving significant increases in die life on most applications.



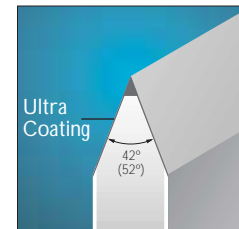
|               |  |
|---------------|--|
| Point Sizes:  | 2 and 3.   |
| Heights:      | Up to 50mm   |
| Availability: | Coils and metre lengths.                                     |
| Hardness:     | Body - 400HV (41 HRC) Edge - 720HV (60 HRC)                  |
| Applications: | For cutting abrasive materials such as gaskets and plastics. |

## Dieflex Ultra

Available with both 42° and 52° edge, its friction reducing coating gives easier penetration into the substrate.

The cutting edge remains sharper longer.

Gives considerable make-ready advantages, avoids costly downtime and reduces slivers and dust.

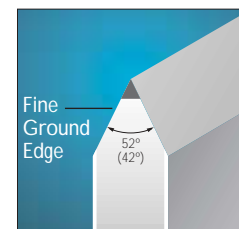


|               |  |
|---------------|--|
| Point Sizes:  | 2, 3 and 4.  |
| Heights:      | Up to 100mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)   |
| Applications: | A rule for solid and corrugated board. Ideally suited to food, pharmaceutical and medical packaging. For long runs with reduced swarf contamination. |

## Dieflex - GR

Dieflex - GR has a fine ground edge that is particularly suited to cutting more difficult materials.

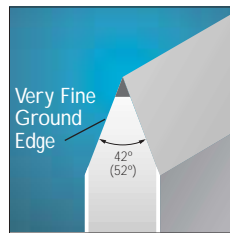
The ground edge of the rule has the distinct advantage of requiring reduced cutting pressure when used with more demanding substrates.



|               |  |
|---------------|--|
| Point Sizes:  | 1 1/2, 2, 3 and 4.   |
| Heights:      | Up to 100mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC) |
| Applications: | Achieves a clean, shearing cutting action with laminated or fibrous substrates.                        |

### Dieflex - G12

A rule for even more demanding materials such as brittle plastics. The very fine ground edge gives improved bendability compared with the standard ground edge rule. The extremely sharp edge means that less cutting pressure is required.

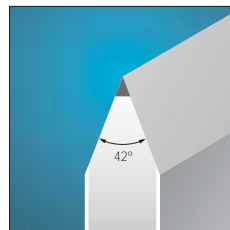


There is also the benefit of reduced slivers, swarf and dust.

|               |   |
|---------------|---|
| Point Sizes:  | 1 1/2, 2 and 3.   |
| Heights:      | Up to 100mm.  |
| Availability: | Coils and metre lengths.  |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)      |
| Applications: | For more difficult substrates such as laminated plastics, foils, coated/varnished cardboards and polyester. |

### DieHard Xtreme

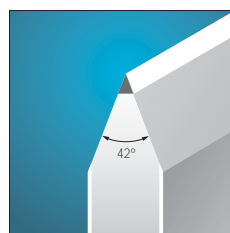
An extra fine ground rule with a sharp edge and a hard stable body. It has good bendability. The high edge hardness and deep edge hardening, reduces edge wear and gives a longer rule life. It is ideally suited to cutting difficult materials.



|               |  |
|---------------|--|
| Point Sizes:  | 2 and 3.   |
| Heights:      | Up to 50mm.  |
| Availability: | Coils and metre lengths.   |
| Hardness:     | Body - 470HV (47 HRC) Edge - 680HV (59 HRC).<br>Deep edge hardened.  |
| Applications: | For more difficult substrates such as PET (Polyethylene Terephthalate), plastic materials, laminated boards and more difficult or tough materials. |

### Dieflex Brite

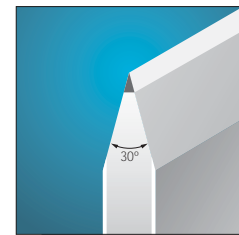
A rule with a bright, mirror finish and extremely sharp cutting edge that's suited to the most demanding materials. The very smooth edge gives improved bendability, reduces friction during cutting, requires less pressure and keeps dust to a minimum.



|               |   |
|---------------|---|
| Point Size:   | 2 and 3.  |
| Heights:      | Up to 50mm.   |
| Availability: | Coils and metre lengths.  |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)  |
| Applications: | Suitable for solving dust problems with paper board and recycled board, plastic laminated paper board, resin coated paper and metallized polyester. |

### DieHard Razor

This rule has a bright mirror-like and extremely sharp cutting edge. It is deep edge hardened and has a hard stable body with good bendability.



The extreme 30° edge angle makes it the sharpest rule in the Sandvik product range - it is particularly suitable for cutting hard, thick as well as thin materials.

|               |   |
|---------------|---|
| Point Sizes:  | 1 1/2 and 2.  |
| Heights:      | Up to 50mm.   |
| Availability: | Coils and metre lengths.  |
| Hardness:     | Body - 470HV (47 HRC) Edge - 680HV (59 HRC).<br>Deep edge hardened.   |
| Applications: | For cutting electronic panels. PET (Polyethylene Terephthalate) plastic sheets, plastic laminated paper and speciality graphic materials. |

### Dieflex MicroNik

Pre-microscopically nicked cutting rule, combines the proven benefits of Dieflex with the advantages of precise micro-nicking. MicroNik makes conventional nicking obsolete. It cuts with less pressure, creates a superior product edge appearance, optimises hold strength and increases press speeds.



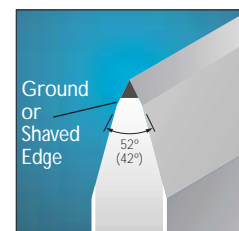
'Nick' spacing-Standard 4 per 1" and 8 per 1".  
Specials to order.

|               |   |
|---------------|---|
| Point Size:   | 2   |
| Heights:      | Up to 30mm.   |
| Availability: | Metre lengths.  |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)               |
| Applications: | Particularly suitable for solid, laminated and coated boards. |

### Dieflex Hard High

A rule specifically developed for the plastics industry.

The 400 HV body gives good rigidity yet decarburisation provides excellent bendability and it is edge hardened for increased rule life.



It is available with shaved or ground edges in all edge configurations.

|               |  |
|---------------|--|
| Point Sizes:  | 3 and 4.   |
| Heights:      | Up to 100mm.   |
| Availability: | Coils and lengths up to 2 metres.  |
| Hardness:     | Body - 400HV (41 HRC) Edge - 640HV (57 HRC)                                    |
| Applications: | Ideal for clean, deep cutting of plastic packaging or vacuum formed packaging. |

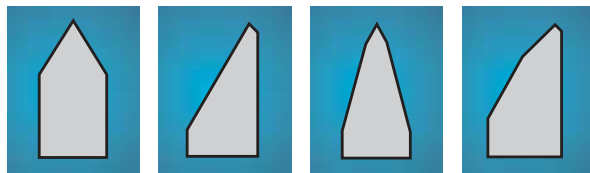
# Flat Bed Cutting and Creasing Rules

A comprehensive programme of flat bed cutting and creasing rules for all carton and corrugated boards, rubber and gasket materials. Available in shaved and ground edge depending on product and/or application.

Standard edge configurations are available subject to type of rule.

## Cutting Rules

### STANDARD EDGE CONFIGURATIONS



Centre Bevel

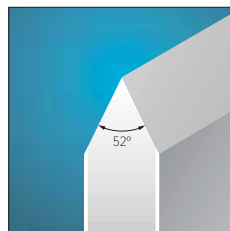
Side Bevel

Long Centre Bevel

Long Side Bevel

### Vertex

It is the user friendly rule that's harder than most conventional rules but bends almost like a soft rule. Side face decarburisation makes it easy to work and it performs well on short and medium runs.



Point Sizes: 2 and 3.

Heights: Up to 50mm.

Availability: Coils and metre lengths.

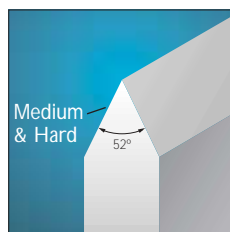
Hardness: 440HV (44 HRC)

Applications: Its versatility makes it particularly suitable for small and medium runs with carton, solid fibre and corrugated board.

### Label

Centre bevel cutting edge with an extremely high degree of accuracy and edge straightness for precise cutting and kiss-cutting.

It is also available with a side bevel cutting edge.



Point Sizes: 1, 1 1/2 and 2.

Heights: 6 to 12mm.

Availability: Coils and metre lengths.

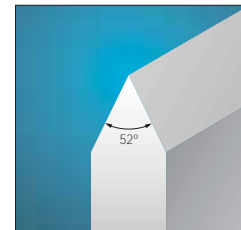
Hardness: Medium - 350HV (35 HRC)  
Hard - 400HV (41 HRC)

Applications: The dedicated rule for label producers.

### Conventional Cutting Rules

A broad range of standard multi-purpose cutting rules.

The cutting rules are available in a range of body hardnesses which are ideal for short runs.



Point Sizes: 2, 3, 4 and 6.

Heights: Up to 100mm.

Availability: Coils and metre lengths.

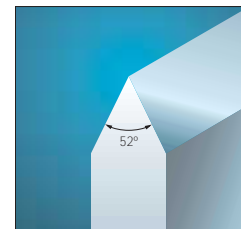
Hardness: Sandvik 350 - 2pt 380HV (39 HRC)  
- 3pt/4pt 340HV (35 HRC)  
Sandvik 400 - 400HV (41 HRC)  
Sandvik 500 - 500HV (49 HRC)

Applications: Ideal for short runs on a broad range of carton and corrugated box work.

### Stainless

Produced specifically for use in hygienic or controlled cleanliness environments.

This centre bevelled rule with a ground edge is non-rusting, readily formed and can be cleaned or washed down on line.



Sizes: Rule thickness 0.7mm and 1.00mm.

Heights: Only 23.80mm.

Availability: Coils and metre lengths.

Hardness: 400HV (41 HRC)

Applications: Packaging for the food, beverage and pharmaceutical industries with demanding hygiene and cleanliness standards.



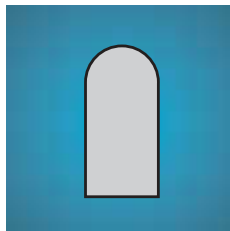
## Creasing Rules

### Round Profile

A fine 'wrap-around' profile, eliminates any tendency to board cracking caused by 'shoulders' in creasing rules with a flatter profile.

The thickness is precisely compatible with Sandvik cutting rules.

Available in MR as standard but also available in other hardnesses - see below.

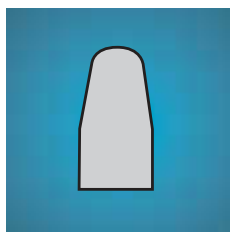


|               |   |
|---------------|---|
| Point Sizes:  | 2, 3, 4 and 6.  |
| Heights:      | Up to 30mm.   |
| Availability: | Coils and metre lengths.  |
| Hardness:     | ESR - 255HV (24 HRC) SR - 2pt 380HV (39 HRC)<br>- 3pt/4pt 340HV (35 HRC)<br>MR - 400HV (41 HRC) HR - 450HV (45 HRC) |
| Applications: | A selection of creasing rules for all substrates.   |

### Special Profile

A medium hard grade creasing rule that allows a reduced size head to be used for tighter, smaller creases without having to change the cut or profile on the die board.

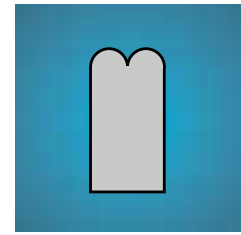
The tip of the creasing rule is thinner than the body but the body rigidity is maintained.



|               |   |
|---------------|---|
| Point Sizes:  | 1 or 1 1/2 on a 2pt body.<br>2 or 2 1/2 on a 3pt body   |
| Heights:      | Up to 23.80mm.  |
| Availability: | Coils and metre lengths.  |
| Hardness:     | 400HV (41 HRC)  |
| Applications: | Ideal for intricate packaging designs and where tighter creasing is required in restricted areas. |

### Duplex

This 4 point medium hard bodied creasing rule has the benefit of a double creasing profile for a squarer crease on thicker materials.

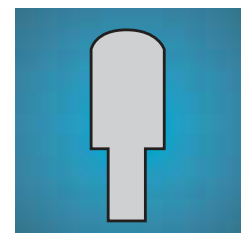


|               |                                     |
|---------------|-------------------------------------|
| Point Size:   | 4                                   |
| Heights:      | Up to 23.80mm.                      |
| Availability: | Coils and 1 metre lengths.          |
| Hardness:     | 400HV (41 HRC)                      |
| Applications: | Thicker card and plastic materials. |

### Laser Crease

Made from a solid piece of tempered steel, which means the head will not separate during diecutting. Laser crease offers various creasing options on a range of body sizes.

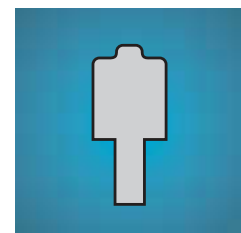
Available with round or flat tops.



|               |   |
|---------------|---|
| Point Sizes:  | 3 and 4pt on a 2pt body.<br>4pt on a 3pt body.<br>6 and 8pt on a 3 or 4pt body. |
| Heights:      | Up to 27mm.   |
| Availability: | Coils and metre lengths.  |
| Hardness:     | 330HV (33 HRC)  |
| Applications: | For better creasing in corrugated and fibre boards.                             |

### TruFold

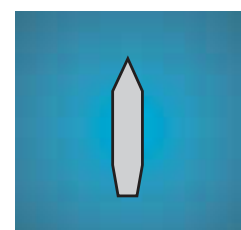
The bead on the head provides an accurate location for the creasing rule. This ensures accurate creasing and eliminates the problem of 'roll' frequently faced while creasing corrugated board along the direction of the corrugations.



|               |                               |
|---------------|-------------------------------|
| Point Sizes:  | 6 on 4pt body, 8 on 4pt body. |
| Heights:      | Up to 23.62mm.                |
| Availability: | Coils and 1 metre lengths.    |
| Hardness:     | 330HV (33 HRC)                |

### TB (Tapered Back) Flat Bed Cutting and Creasing Rules

Specify TB for easier slot location, to minimise back-edge bulging when bending, reduce height variations and make-ready time.

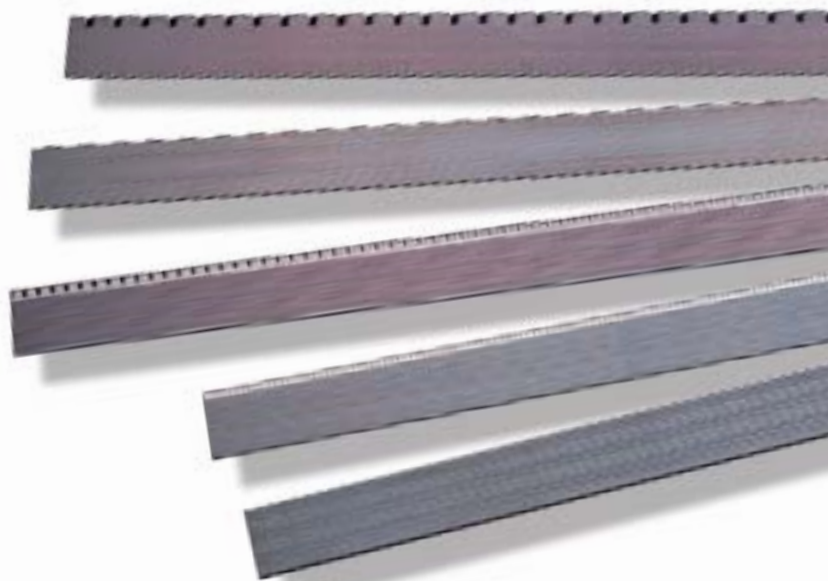


## Flat Bed Special Rules

*Sandvik is the world leading designer and manufacturer of flat bed special rules, with the broadest programme of production and stock rules to meet the widest range of applications.*

*Each and every rule is made from the finest, high quality steel and is manufactured to the tightest height and pitch tolerances.*

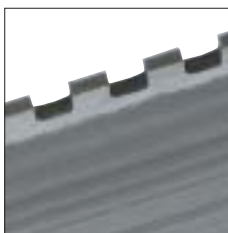
*All Sandvik special rules are produced from the very same base material that is used for the range of quality cutting and creasing rules.*



### Perforating

Available in any tooth and gap configuration with a standard gap relief depth of 3mm and deep relief of 5mm. Other gap relief depths can also be manufactured.

Precise production includes bevel grinding after punching to eliminate burrs which avoids damage to the substrate and gives faster, cleaner running.



Point Sizes: 1½, 2, 3 and 4.

Heights: Up to 100mm.

Availability: Coils and metre lengths.

Hardness: Hard 450HV (45 HRC)

Applications: Tear off labels, removable panels on paper, corrugated and solid board.

### Continuous Stationery Perforating

Continuous stationery perforating rules are manufactured from an extra hard steel and with a high degree of edge straightness.

There is also precise control of tooth, gap and pitch dimensions.



Point Sizes: 1½, 2, 3 and 4.

Heights: Up to 100mm.

Availability: Coils and various lengths.

Hardness: 520HV (49 HRC)

Applications: High speed production of continuous stationery.

### Micro Perforating

Sandvik micro perforating rules are high precision rules made from an extra hard steel with extremely close cut and gap ratios. They are available in shallow (250 micron) and deep (750 micron) perforating versions.



Popular pitches include - 30, 50, 70 and 100 teeth per inch.

Point Sizes: 2 and 3.

Heights: Up to 23.80mm.

Availability: Coils and various lengths.

Hardness: 520HV (49 HRC)

Applications: Business forms, easy tear and fold applications e.g computer printer paper, cheque books and CD inserts.

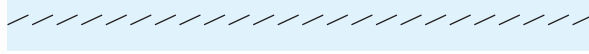
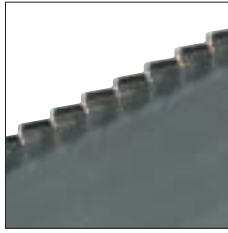
### Selection of popular pitches

| Points |       | Millimetres |       | Teeth Per Inch |       |
|--------|-------|-------------|-------|----------------|-------|
| Gap    | Tooth | Gap         | Tooth |                |       |
| 2      | 2     | 0.7         | 0.7   | 18             | ----- |
| 2      | 4     | 0.7         | 1.5   | 12             | ----- |
| 3      | 3     | 1.05        | 1.05  | 12             | ----- |
| 2      | 5     | 0.7         | 1.75  | 10             | ----- |
| 4      | 4     | 1.5         | 1.5   | 9              | ----- |
| 2      | 10    | 0.7         | 3.5   | 6              | ----- |
| 6      | 6     | 2.1         | 2.1   | 6              | ----- |
| 9      | 9     | 3.15        | 3.15  | 4              | ----- |
| 18     | 18    | 6           | 6     | 2              | ----- |

### Hand Hole Perforating

This rule is available in left and right hand configurations to create top or side access panels.

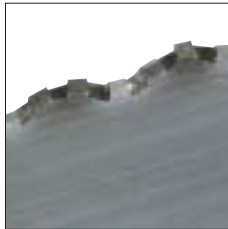
Special hand hole perforating rules can also be manufactured to customers specific requirements.



|               |  |
|---------------|--|
| Point Size:   | 2  |
| Heights:      | Up to 23.80mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | Body 380HV (39 HRC) Edge 640HV (57 HRC)  |
| Applications: | Where fast, easy access to the product is required e.g. tissue boxes, confectionery boxes and tea bag cartons. |

### Glue Flap Perforating

Glue flap perforating rule is a 2 x 2 point perforating rule waved to create a 'serpent' profile, that partially penetrates the substrate surface providing a 'key' for effective adhesion. 2 x 4 point and specials are available to suit specific applications.



|               |                          |
|---------------|--------------------------|
| Point Size:   | 2 and 3.                 |
| Heights:      | Up to 23.80mm.           |
| Availability: | Coils and metre lengths. |
| Hardness:     | 400HV (41 HRC)           |
| Applications: | Glue flap panels.        |

### Cut Crease

Sandvik cut crease rule is a medium hard rule that is produced using special tooling to eliminate burrs on the crease height to achieve a clean edge. It is available in any combination of cut and crease heights.

Cut crease rule is used on both solid and corrugated board where there is a requirement for the crease to fold easily. It is also used as a reverse crease, aiding the reduction of material stress.



|               |                                    |
|---------------|------------------------------------|
| Point Sizes:  | 2, 3 and 4.                        |
| Heights:      | Up to 100mm.                       |
| Availability: | Coils and metre lengths.           |
| Hardness:     | 400HV (41 HRC)                     |
| Applications: | Close ratio creasing e.g. gulleys. |

### Zipper

Zipper rule is a fully edge hardened Dieflex rule which is precisely manufactured with accurate pitches, constant slit depth and clean edges to avoid any 'drag'.

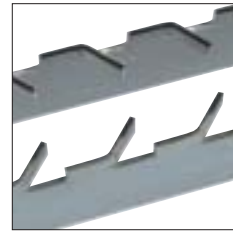
The different asymmetrical shapes shown below are used in a left and right hand combination.

There are three standard zipper rules, types A, B and C, but, by varying the required length ratios indicated below, the product programme extends to more than 50 different configurations.

A two way symmetrical alternative eliminates the need for left and right versions.



A



B

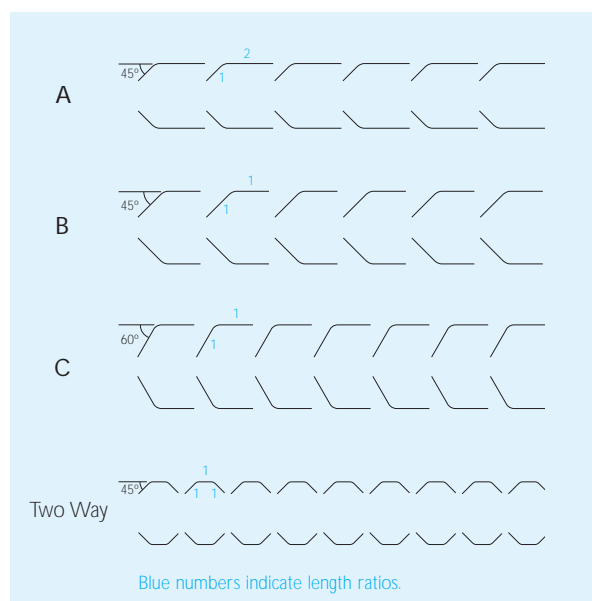


C



Two Way

|               |  |
|---------------|--|
| Point Sizes:  | 2 and 3.   |
| Heights:      | Up to 23.80mm.   |
| Availability: | Metre lengths.   |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC) |
| Applications: | Used to create a tear strip on cartons for access to product.                                      |



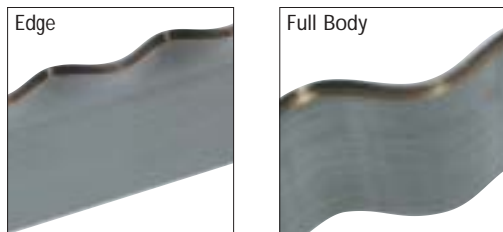
# Flat Bed Special Rules

Continued

## Wave

Sandvik's extensive range of fully edge hardened Dieflex wave rules offers excellent bendability and high wear resistance.

Special wave profiles can be produced to customer's specific requirements.

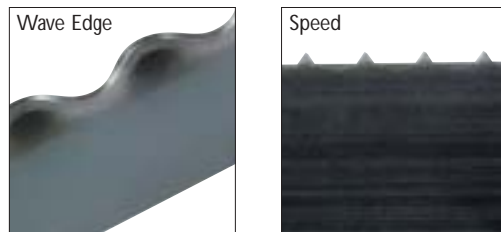


|               |  |
|---------------|--|
| Point Sizes:  | 2, 3 and 4.  |
| Heights:      | Up to 100mm.   |
| Availability: | Coils and metre lengths.   |
| Hardness:     | 2pt Body - 380HV (39 HRC) Edge - 640HV (57 HRC)<br>3pt/4pt Body - 340HV (35 HRC) Edge - 640HV (57 HRC)   |
| Applications: | Enhanced packaging design where a safety edge is required for assembly by hand. Deckle edge rules have irregular wave patterns which are ideal for gift tags, greeting cards and post cards. |

## Stripping

Stripping rule is designed and manufactured for fast running machines.

Flat stripping rule is used for conventional applications. Wave Edge rule is used for wider area stripping such as slots. Speed stripping rule with spikes, is used for gripping and ejecting waste material at extremely high speeds.



|               |   |
|---------------|---|
| Point Sizes:  | 2, 3 and 4.   |
| Heights:      | Up to 100mm.  |
| Availability: | Coils and metre lengths.  |
| Hardness:     | Vertex 440 HV (44 HRC)<br>Medium/hard body 400HV (41 HRC)<br>Dieflex 340 HV (35HRC)<br>Soft 255 HV (24 HRC) |
| Applications: | Stripping dies for autoplatten machines.  |

| Wave Rules | Pitch (A)                    | Depth (B) |             |
|------------|------------------------------|-----------|-------------|
|            | Extra Super Fine             | 2,0 mm    | 0,5 mm      |
|            | Super Fine (2pt only)        | 2,0 mm    | 0,58 mm     |
|            | Extra Fine                   | 3,2 mm    | 0,65 mm     |
|            | Fine                         | 4,8 mm    | 0,80 mm     |
|            | Medium                       | 6,4 mm    | 1,25 mm     |
|            | Medium Large                 | 9 mm      | 1,25 mm     |
|            | Large (full body wave)       | 12,5 mm   | 2,0 mm      |
|            | Extra Large (full body wave) | 19 mm     | 3,7 mm      |
|            | Tsunami (full body wave)     | 24 mm     | 8,0 mm      |
|            | Deckle Edge                  | N/A       | 1,30 mm max |
|            | Shallow Deckle               | N/A       | 0,70 mm max |
|            | Double Deckle                | N/A       | 1,30 mm max |
|            | Fine Scalloped               | 5 mm      | 0,9 mm      |
|            | Medium Scalloped             | 9 mm      | 1,0 mm      |
|            | Ocean                        | 4,0 mm    | 0,6 mm      |
|            | Zig Zag (full body wave)     | 24 mm     | 8,0 mm      |

# Flat Bed Serrated Rules

The National range of flat bed serrated rules has been custom engineered to address a wide variety of applications.

The combination of height, thickness, bevel and tooth configuration means that the number of rules that can be produced is endless.

Existing designs can be modified to meet specific requirements.



## National Serrated 5 and 6 Tooth

An excellent choice when diecutting high density foam products, films and other materials that are difficult to cut.

They are both available with centre or side bevel, can be edge hardened for improved life and customised for specific applications.

The 5 tooth is particularly recommended for cutting through honeycomb.



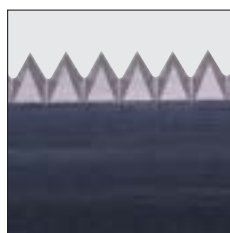
| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

## National Serrated Deep 'V'

Extremely sharp teeth with deep gullets achieves excellent performance, with minimum pressure, when working with films, foams and even some speciality paper products such as thinner honeycomb.

Available with centre or side bevel with 8, 10, 13 or 16 TPI (teeth per inch) edge hardening is recommended due to the sharpness of the tip.

Deep 'V' performs at its best when cutting into air or a slot.

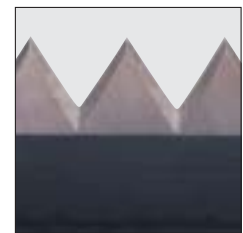


| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

## National 2.7 and 4.6 Tooth

Originally custom designed for cutting plastic bags - now proven to be an excellent choice for cutting foam or film.

Available with centre or side bevel. They can also be coated with titanium nitride or edge hardened to extend their working lives.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

## National Shallow Profile

One of the more versatile National rules for both flat bed and rotary applications.

The rule works extremely well on fabrics, rubber, plastics and other substrates that require diecutting with minimum penetration.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 177.8mm (7.00") and above.

If you can't see the rule to suit your application, send us a sample of the substrate you are working with and we will recommend the rule for the job.

## Rotary Cutting Rules

Sandvik's partnership with National Steel Rule of America has developed a broad range of rules that have been performance evaluated against the criteria of pressure required to cut a given material, penetration into blanket, appearance of substrate edge after diecutting, wear of rule and bendability.

Sandvik's international rotary service centres, using National's Accu Curve technology, provide an even faster service for pre-curved rule for all cylinder sizes. The rules are stress relieved for improved performance.



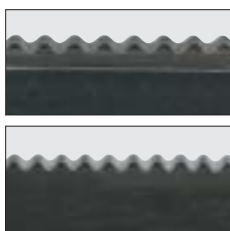
### National Euro-Cut™

Jointly developed by Sandvik and National Steel Rule, Euro-Cut™ is the first rotary cutting rule specifically designed to meet the needs of diemakers and diecutters.

Euro-Cut™ is a shaved edge, symmetrically ground, centre bevel rule that incorporates Nat-Ex™ hardening technology. The combination of the Nat-Ex™ edge on a 345 HV body provides, superior bendability along with extended die life.

Euro-Cut's™ unique 8 and 10 tooth designs reduce cutting pressure on heavy and wet board which improves stripping and extends anvil life. The shaved edge cuts cleanly through all grades of board which reduces both edge crush and paper dust.

Euro-Cut™ works equally well around or across the cylinder. The exceptional cutability of this rule even allows you to use the same height cutting rule in both directions. Euro-Cut™ is available in a harder version (500 HV) for tough lead and trail edge applications.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 3pt. (1.07mm) | 15mm (0.590") - 40mm (1.575")   |
| 4pt. (1.42mm) | 15mm (0.590") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 19.05 (0.75") - 76.20mm (3.00") |

Curved Diameters available 203.2mm (8.00") and above.

### National Standard 8, 10 and 12 Tooth

National standard rotary cutting rules have a smooth shaved bevel and are symmetrically ground to exacting standards. They are available in all rotary heights and can be edge hardened for even longer life.

National 8 Tooth has an aggressive tooth configuration and is used typically for long horizontal cuts. 8 Tooth is an excellent choice when diecutting heavier board grades such as double wall.

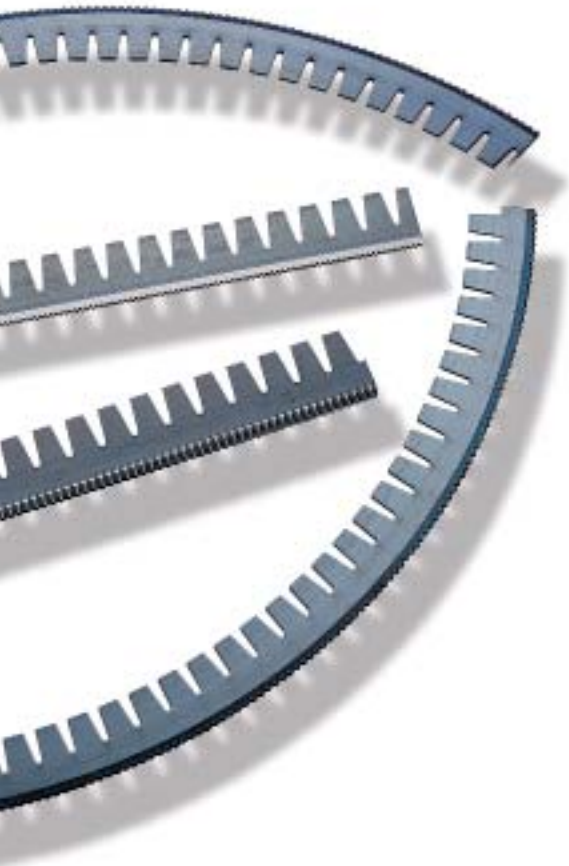
10 Tooth is National's most versatile cutting rule. This radius gullet rule provides an excellent combination of cutability and bendability across a wide range of board grades. National 10 Tooth is the world's most widely used rotary cutting rule.

National 12 tooth cutting rule is the 'original' high performance rule.



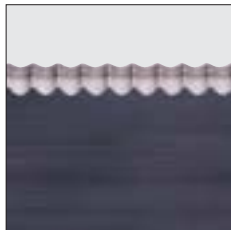
| Thickness     | Heights                           |
|---------------|-----------------------------------|
| 2pt. (0.71mm) | 15mm (0.590") - 50.80mm (2.00")   |
| 3pt. (1.07mm) | 15mm (0.590") - 101.6mm (4.00")   |
| 4pt. (1.42mm) | 15mm (0.590") - 101.6mm (4.00")   |
| 6pt. (2.14mm) | 19.05mm (0.75") - 76.20mm (3.00") |
| 8pt. (2.84mm) | 19.05mm (0.75") - 50.80mm (2.00") |

Curved Diameters available 152.4mm (6.00") and above.



### National Klean Kut

National Klean Kut is available in 8, 10 and 13 tooth versions. Standard 8 tooth Klean Kut is produced from a harder rule for better wear resistance (13 tooth is edge hardened, 8 and 10 tooth are available edge hardened). Klean Kut is an excellent choice for tough lead edge applications.



Klean Kut is a rule designed to cut with minimum pressure and penetration on both medium and heavy board. It has excellent bendability, reduces edge crush and improves stripping when the serrations are placed towards the waste.

Klean Kut is a multi-purpose rule that works extremely well on fibrous materials, plastics and corrugated, leaving a smooth edge on the substrate.

| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 177.8mm (7.00") and above.

### National Arrowhead

Standard 8 tooth Arrowhead combines the benefits of a longer shaved bevel for improved release with an induction hardened edge for longer life. It reduces edge crush and is excellent for medium to heavy boards.



10 tooth Arrowhead has all the benefits of standard Arrowhead plus the fine tooth pattern gives a smoother cut on lighter boards.

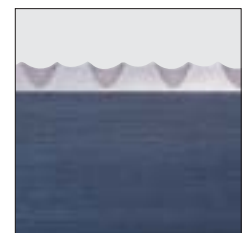
For long runs on medium to heavy board it is an excellent rule to use around the cylinder with standard 8 tooth Arrowhead across the drum.

| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 177.8mm (7.00") and above.

### National Scalloped

Scalloped rule has an extremely durable tooth that works well under the most demanding of applications. The 8 tooth centre bevel leaves a clean scalloped edge on solid fibre substrates, rubber and certain plastics and a straight edge on corrugated material.



Subject to applications it is available in both harder steels and edge hardened for longer life without sacrificing bendability.

| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

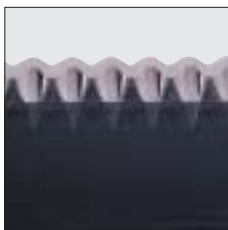
Curved Diameters available 203.2mm (8.00") and above.

# Rotary Cutting Rules

Continued

## National SST

SST (serrated scalloped tooth) is an 8 pitch rule designed to produce a safety edge on corrugated that reduces paper cuts in hand packaging operations.



It can be used as a multi-purpose rotary rule since it produces an excellent balance of cutability, wear and edge appearance.

| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 203.2mm (8.00") and above.

## National 11, 16 and 20 Tooth

National 11 tooth is the ideal rule for foam and composite materials that are likely to stretch prior to cutting.



16 tooth is suitable for displays and applications where edge appearance is critical.

For displays and consumer product packaging 20 tooth gives a clean edge. It also performs well on lighter boards and micro flute.

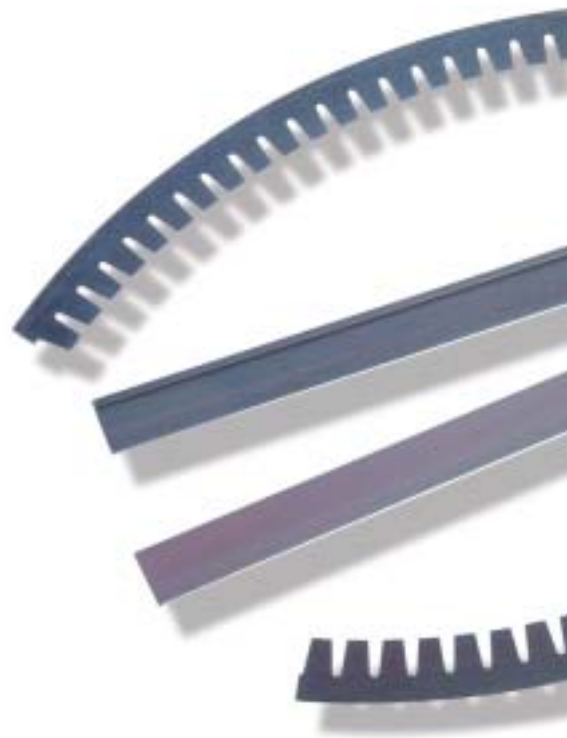
| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 152.4mm (6.00") and above.

## National Steel to Steel

A self-levelling rule that utilises a softer intermittent zone, as opposed to a thinner base, to form a compression zone.

It is available in straights and curves to all standard diameters.



## Rotary Creasing Rules

*The Sandvik/National partnership is further enhanced with a range of creasing rules.*

*The importance of a creasing rule should never be underestimated - it is a critical factor in controlling the sheet as it passes through the diecutter.*

*Using a crease that is too high may result in cracked scores while a crease that is too low may create dimensional problems.*

## National Standard

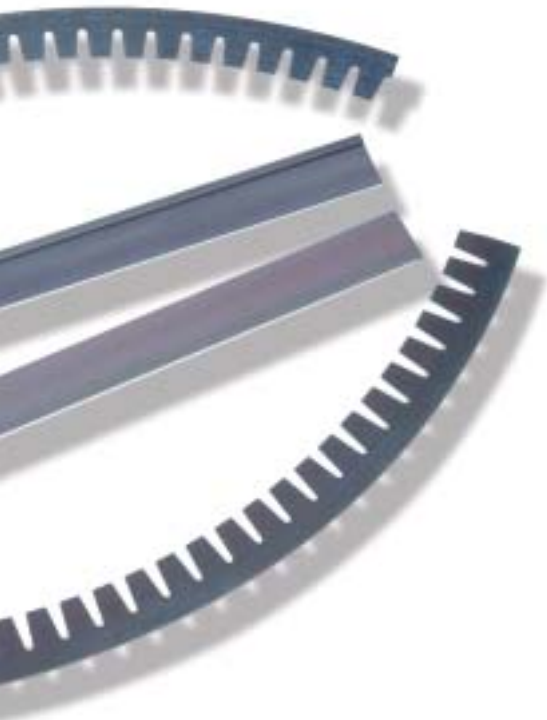
A complete range of standard creasing rules from 3 point through to 8 point. Creasing rules are available with either a radius profile or a flat top.

A large level of stocks are held in all standard heights, curved to fit all major rotary diecutters.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 152.4mm (6.00") and above.



## Rotary Special Rules

The broad range of National special rotary rules has been specifically engineered to provide optimum performance.

Each has been subjected to rigorous evaluation to determine the pressure required for a given substrate, blanket penetration, edge appearance after use, longevity of the rule and bendability.

### National Laser Crease

It is designed to save time by eliminating the need to cut 6 and 8 point lines and its 4 point body makes it much easier to notch.

Laser crease is made from a solid piece of tempered steel which means the head will not separate from the base during diecutting.



| Thickness                     | Heights                          |
|-------------------------------|----------------------------------|
| 6pt. (2.14mm) on 4pt (1.42mm) | 19.05mm (0.75") - 23.62mm (.93") |
| 8pt. (2.84mm) on 4pt (1.42mm) | 19.05mm (0.75") - 23.62mm (.93") |

Curved Diameters available 203.2mm (8.00") and above.

Available sizes:

|        |        |        |        |
|--------|--------|--------|--------|
| 3 on 2 | 4 on 2 | 4 on 3 | 6 on 3 |
| 8 on 3 | 6 on 4 | 8 on 4 |        |

### National TruFold Laser

The bead on the head provides an accurate location for the creasing rule. This ensures accurate creasing and eliminates the problem of 'roll' frequently faced while creasing corrugated board along the direction of the corrugations.



| Thickness                     | Heights                           |
|-------------------------------|-----------------------------------|
| 8pt. (2.84mm) on 4pt (1.42mm) | 19.05mm (0.75") - 23.62mm (0.93") |

Curved Diameters available 203.2mm (8.00") and above.

### National Perforating

Whether you are using for folding, holding blanks together or as a tear rule, we have a perforating rule to meet your precise requirements.

The standard gullet depth of rotary perforating rule is 4.76mm (3/16"), but, a 3.18mm (1/8") deep gullet can be specified. We do not recommend gullets in excess of 4.76mm (3/16").

Perforating and cut crease are available in any tooth and space combination.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 177.8mm (7.00") and above.

### National Cut Crease

A combined precise cut section and a defined gullet height gives a combination rule that is designed to enhance folding for corrugated and folding carton applications.

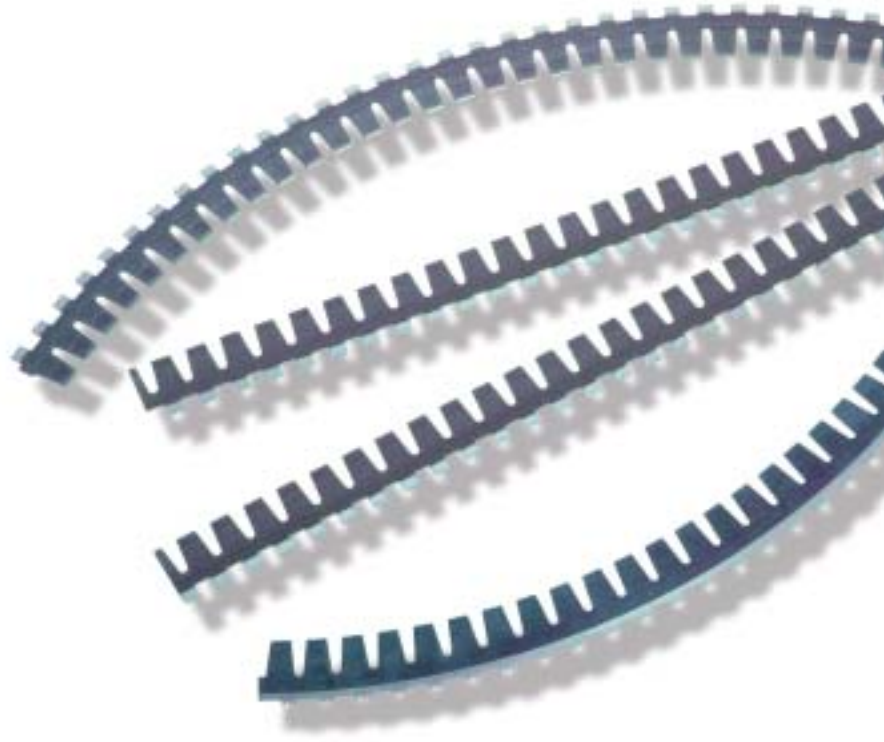


| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |
| 6pt. (2.14mm) | 76.2mm - (3.00") max.           |
| 8pt. (2.84mm) | 50.8mm - (2.00") max.           |

Curved Diameters available 177.8mm (7.00") and above.

# Rotary Special Rules

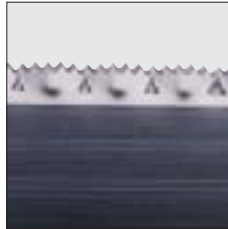
Continued



## National Wave

Produced from centre bevel 20 tooth rule, it is designed to provide a more aesthetic appearance on displays.

It can also be used to leave a safety edge on blanks that will be hand assembled.



## National Zipper

More and more packaging is now being designed for ease of opening.

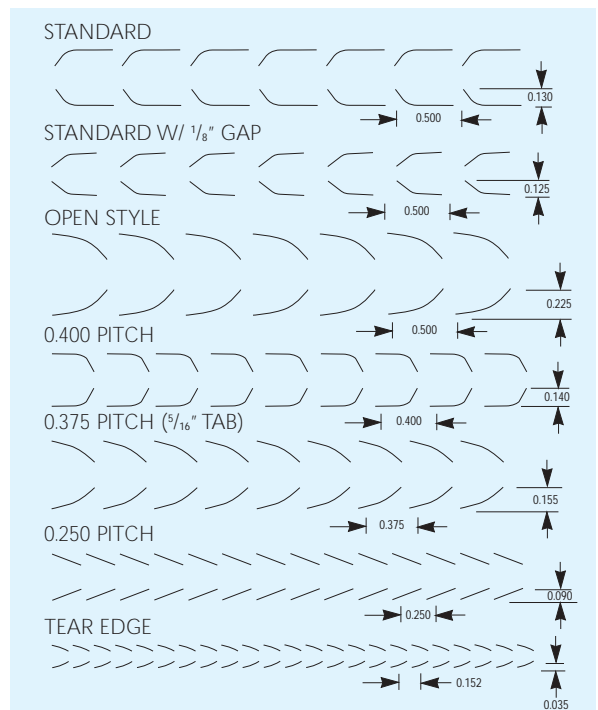
This rule is designed to maintain packaging integrity through the distribution route, yet provide a package that can be easily opened without having to use a knife or other tools.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 2pt. (0.71mm) | 10mm (0.394") - 50.8mm (2.00")  |
| 3pt. (1.07mm) | 10mm (0.394") - 101.6mm (4.00") |
| 4pt. (1.42mm) | 12mm (0.472") - 101.6mm (4.00") |

Curved Diameters available 177.8mm (7.00") and above.

It is supplied in 762mm (30"), 914.4mm (36") and 1 metre (39") lengths and is also available notched or curved in all standard diameters.





### National EZ Score

This rule eliminates the corrugated problem of double roll over score with the corrugation or with trays or displays where the outer liners may become cut.

EZ Score has been designed to cut the inner liner and medium without piercing the outer liner.



| Thickness     | Heights                         |
|---------------|---------------------------------|
| 3pt. (1.07mm) | 12.7mm (0.50") - 25.4mm (1.00") |
| 4pt. (1.42mm) |                                 |

Curved Diameters available 177.8mm (7.00") and above.

### National Prenicked

Prenicked rules ensure that the blanks stay together through the diecutting and stripping processes yet separate easily in the blanking section.

We recommend the use of 25.40mm to 38.10mm (1" to 1 1/2") sections of 1.58mm x 1.58mm (1/16" x 1/16")

perforating rule with a height of .76mm (.030") less than the cutting rule.



### National Miter Tight

One of the most critical areas of a rotary die is the lead edge knife.

A common cause of lead edge failure is scrap build-up between the rule and the trim breaker knives.

Miter Tight blades are designed to prevent scrap build-up by precisely matching the contour of the bevel rules currently used in lead edges.

They are pre-cut in standard 38mm (1 1/2") lengths to save time in ruling and simplify programming.



| Curved Heights   | Straight Heights |
|------------------|------------------|
| 24.38mm (0.960") | 23.80mm (0.937") |
| 25.14mm (0.990") | 24.64mm (0.970") |
| 25.40mm (1.00")  | 25.15mm (0.990") |
| 26.04mm (1.025") | 25.40mm (1.00")  |

### Notching and Curving

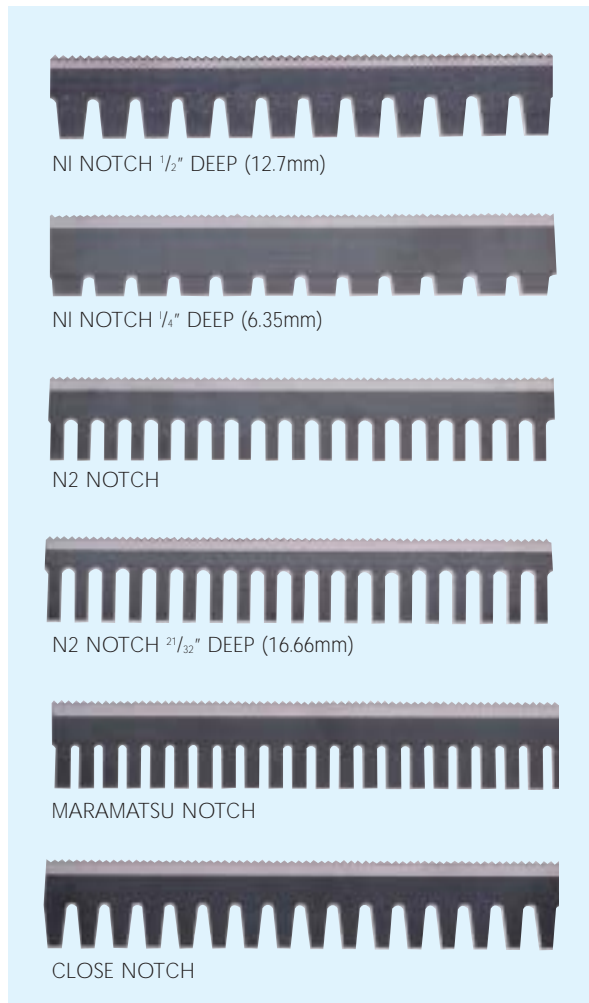
To ensure that rotary rules perform to maximum efficiency during the diemaking and diecutting processes, the back notching must be accurate, burr free and specific to the application.

When bending a circle for a rotary diecutter, the seating of the rule can be improved by specifying a closer notch such as N2.

Accurate back notching together with the Accu Curve system are two of the best ways of ensuring that the rule seats correctly on the cylinder.

The Accu Curve system thermally transforms the structure of the steel from a straight to a curved state. The process eliminates the memory in the steel thus preventing it pulling away from the cylinder.

Sandvik/National also offer the option of curved rule with no back notch. Available in diameters from 280mm (11"), no notch curved rule works well in places where a solid rule will add strength.







# Sandvik

## Flat Bed and Rotary Diemaking Rules



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