

The **C&T** guide to creasing corrugated board

C&T Matrix Ltd
Sanders Road
Wellingborough
Northamptonshire NN8 4NL
England

Telephone: +44 (0) 1933 273444
Fax: +44 (0) 1933 229277
Email: sales@candtmatrix.co.uk
Web: candtmatrix.co.uk



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THE CORRUGATED MARKET

Over the past 20 years, the printing and conversion of corrugated board has grown rapidly thanks to increased consumption in convenience foods, electrical goods, household care products and direct mail associated with on line purchasing. Corrugated board is often used in these applications thanks to its inherent strength with reduced weight as well as its flexibility.

With this growth in consumption, there has also been a clear improvement in the level of sophistication associated with the use of corrugated material.

Multicolour pre-print jobs are now commonplace and brand owners now demand exceptional quality in terms of print and finishing in both pre- and post-print.

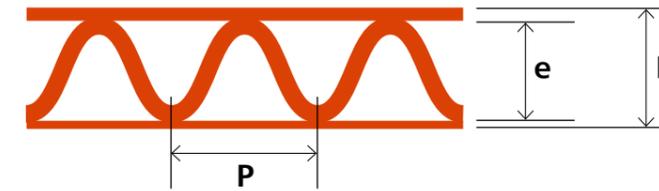
Furthermore, corrugated board has allowed brand owners to reduce the amount of packaging used by

eliminating previous boxes within boxes – the strength of corrugated board allows inner packaging to be eliminated.

Previously, creasing matrix was rarely used with corrugated material as the quality of the crease lines was not subject to such stringent requirements. However, due to the increased level of sophistication required in terms of print and finishing quality, the use of creasing matrix can greatly improve the overall result of a job and is quickly becoming the norm.

This document aims to assist and educate users in the utilisation of creasing matrix on corrugated board in order to obtain the best results.

DEFINITION OF CORRUGATED BOARD



Corrugated board is defined as containing at least 3 layers of board – two outer liners and an inner flute. The internal triangular structure of this fluting provides corrugated board with its trademark strength and durability.

TYPES OF CORRUGATED BOARD

Flute profile		Type	e (mm)	H (mm)	P (mm)
Large flute		A	4.5	5	8.9
Small flute		B	2.3	2.8	6.5
Medium flute		C	3.5	4	8
Micro flute		E	1.2	1.6	3.2
		F	0.75	1.2	2.4
		G/N	0.4	0.8	1.8
		O	0.3	0.7	1.1
Double wall		BC		6.5	
		BE		4.5	
		BF		3.8	
		EF		2.6	

Problems associated with creasing corrugated board:

Matrix solutions

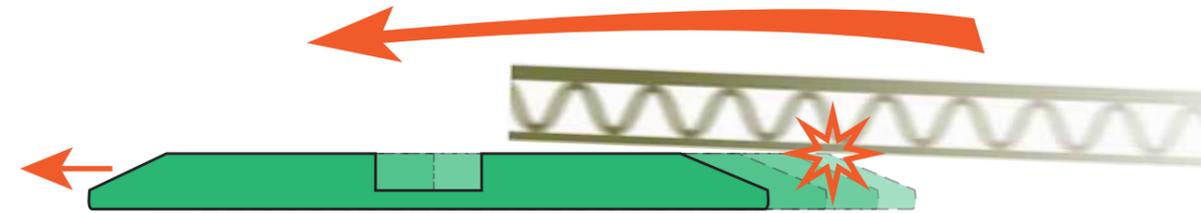


KNUCKLING

As was common practice in the past on corrugated board, many users simply use the creasing rule to score the board with no counter-part. This gives poor definition to the crease and upon folding the board, “knuckling” is present, where the board fails to crease cleanly and the fluting becomes very pronounced.

Solution

- The use of creasing matrix reduces knuckling by creating a holding form in which to crease.
- The result is a more accurate and better defined crease.
- Overall appearance is improved.
- Superior performance at folder/gluer stage.



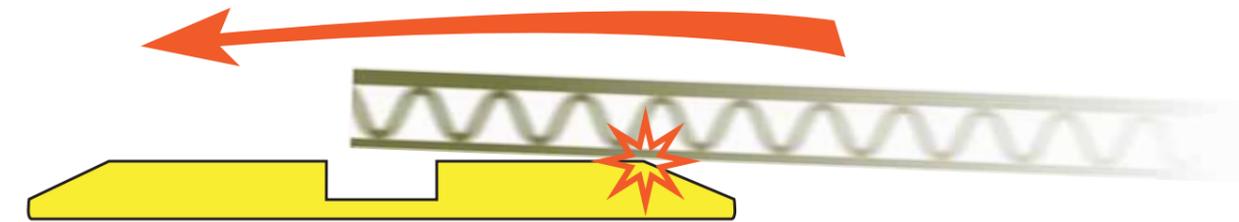
ADHESION PROBLEMS

Corrugated material tends to be more robust and rigid. For this reason, as the board runs over the top of the creasing matrix, the matrix is subject to greater pressure from the board and will tend to move on the plate. This will result in poor registration of the crease if the matrix moves or even failure to crease at all if the matrix detaches completely. This culminates in additional make-ready alterations and machine downtime.

Solution

- Increase the width of the creasing matrix and the adhesive contact area, increasing the surface tension bond.
- Wider matrix will result in stronger adhesion on the plate.

The downside of creasing corrugated board is that it can be more challenging to achieve an excellent finish due to the nature of the board. The most common problems are.....

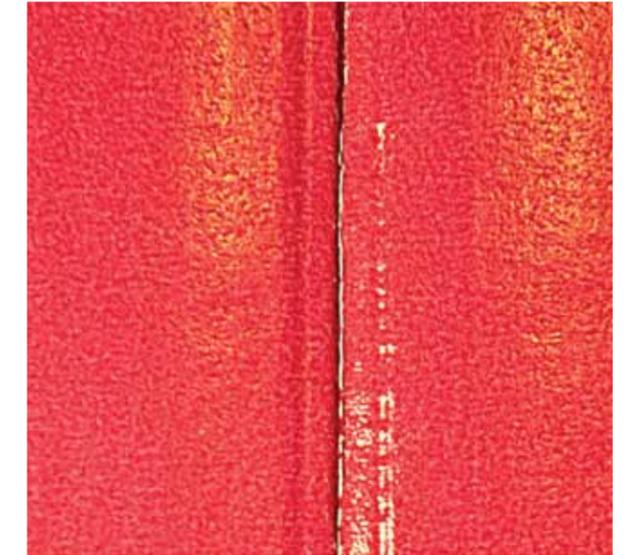


RUNNABILITY

When running thicker boards at speed through automatic die cutters, the board can occasionally catch the outer edges of the creasing matrix. This can lead to blocking in the machine as well as the problems relating to the creasing matrix being pulled off the plate from the outside edge.

Solution

- An improved chamfered edge on the creasing matrix will improve the flow of the board over the matrix.
- A shallower, more progressive angle of chamfer can be achieved with a wider creasing matrix.



WITNESS MARK

A witness mark occurs when the creasing matrix not only leaves the definition of the channel in the board but also leaves parallel marks from the shoulders of the creasing matrix itself. This is unsightly and detracts from the overall finish on the corrugated product. Furthermore, a witness mark made too close to the main fold when creasing with the flute can weaken the board and, in extreme cases, lead to a second or even third unwanted crease.

Solution

- By increasing the width of the creasing matrix, the pressure on the matrix is spread, reducing the chance of a witness mark occurring.

Corrugate - a revolution in the creasing of corrugated board



Wider base for better adhesion to reduce witness marks.

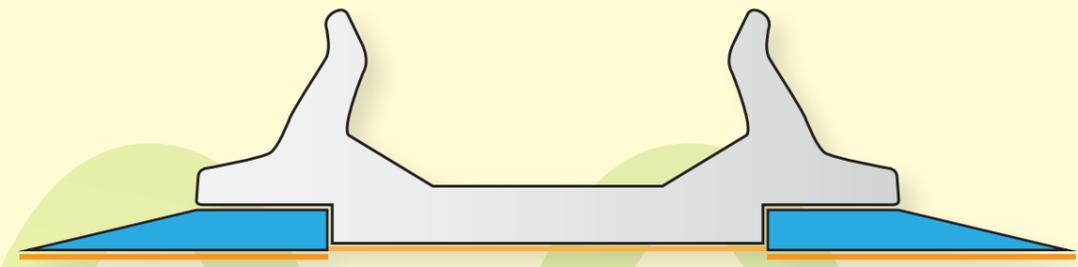
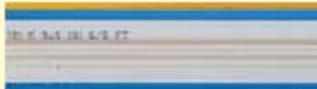
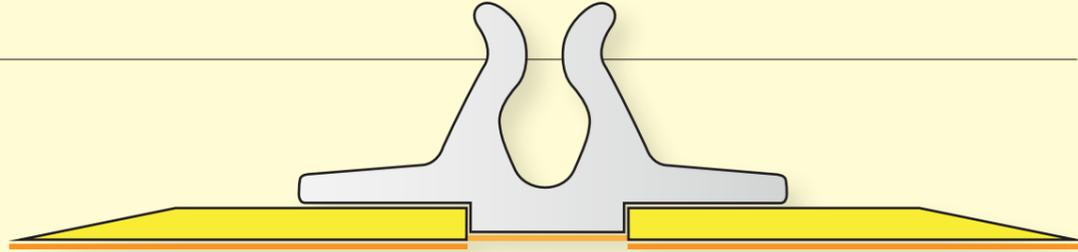
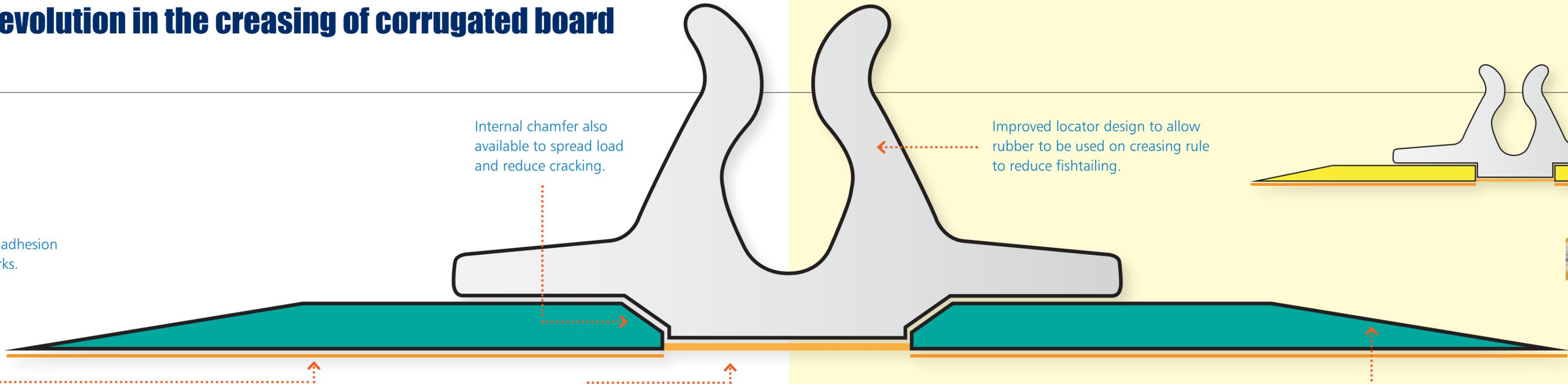
Internal chamfer also available to spread load and reduce cracking.

Improved locator design to allow rubber to be used on creasing rule to reduce fishtailing.

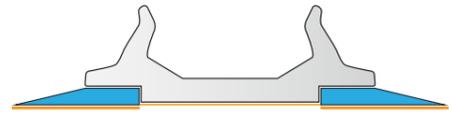
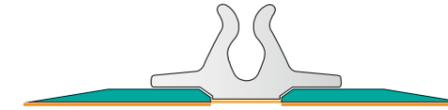
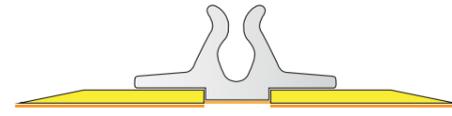
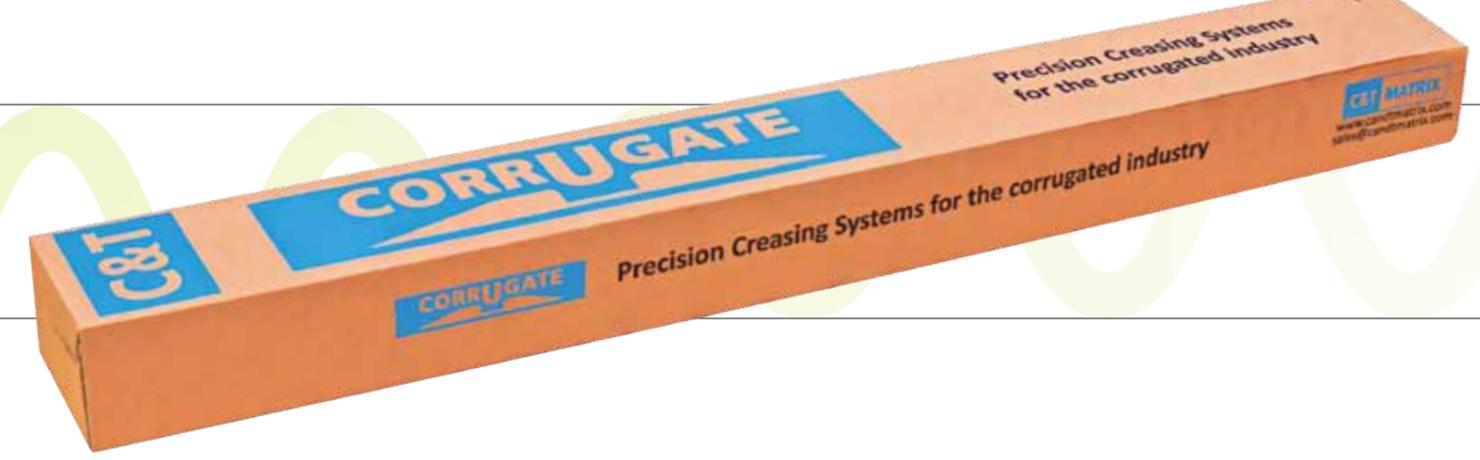
Wide range of channel widths.

Shallower, sharper chamfer to improve runnability.

To overcome the problems described in the preceding pages, C&T Matrix have developed a specially engineered creasing matrix which, when combined with specific ejection rubbers, can help eliminate the difficulties associated with creasing corrugated boards.



Corrugate - the product range



CORRUGATE - Standard

- All sizes stated come with a standard 3/4 point locator.
- All sizes are positioned on a 20mm base.
- Box holds 32 x 75cm strips = 24 metres.

Dimensions	H x W (mm)			
Base colour	Yellow	Orange	Green	Blue
	0.6 x 2.5	0.7 x 2.5	0.8 x 2.5	1.0 x 2.5
	0.6 x 2.7	0.7 x 2.7	0.8 x 2.7	1.0 x 2.7
	0.6 x 3.0	0.7 x 3.0	0.8 x 3.0	1.0 x 3.0
	0.6 x 3.2	0.7 x 3.2	0.8 x 3.2	1.0 x 3.2
	0.6 x 3.5	0.7 x 3.5	0.8 x 3.5	1.0 x 3.5
	0.6 x 4.0	0.7 x 4.0	0.8 x 4.0	1.0 x 4.0
			0.8 x 5.0	1.0 x 5.0
			0.8 x 6.0	1.0 x 6.0
				1.0 x 7.0
				1.0 x 8.0
				1.0 x 9.0
				1.0 x 10.0

Please note: Other matrix and locator sizes are available and prices / delivery time will be quoted on request.

| H x W (mm) |
|------------|------------|------------|------------|
| Yellow | Orange | Green | Blue |
| 0.6 x 2.5 | 0.7 x 2.5 | 0.8 x 2.5 | |
| 0.6 x 2.7 | 0.7 x 2.7 | 0.8 x 2.7 | 1.0 x 2.7 |
| 0.6 x 3.0 | 0.7 x 3.0 | 0.8 x 3.0 | 1.0 x 3.0 |
| | | 0.8 x 3.2 | 1.0 x 3.2 |
| | | 0.8 x 3.5 | 1.0 x 3.5 |
| | | 0.8 x 4.0 | 1.0 x 4.0 |
| | | 0.8 x 5.0 | 1.0 x 5.0 |
| | | | 1.0 x 6.0 |

CORRUGATE - I/C

- All sizes stated come with a standard 3/4 point locator.
- All sizes are positioned on a 20mm base.
- Box holds 32 x 75cm strips = 24 metres.

Please note: Other matrix and locator sizes are available and prices / delivery time will be quoted on request.

| H x W/c2c* (mm) |
|-----------------|-----------------|-----------------|-----------------|
| Yellow | Orange | Green | Blue |
| | | | |
| 0.6 x 5.0 / 3 | 0.7 x 5.0 / 3 | 0.8 x 5.0 / 3 | 1.0 x 5.0 / 3 |
| 0.6 x 6.0 / 4 | 0.7 x 6.0 / 4 | 0.8 x 6.0 / 4 | 1.0 x 6.0 / 4 |
| 0.6 x 7.0 / 5 | 0.7 x 7.0 / 5 | 0.8 x 7.0 / 5 | 1.0 x 7.0 / 5 |
| 0.6 x 8.0 / 5 | 0.7 x 8.0 / 5 | 0.8 x 8.0 / 5 | 1.0 x 8.0 / 5 |
| 0.6 x 9.0 / 6.5 | 0.7 x 9.0 / 6.5 | 0.8 x 9.0 / 6.5 | 1.0 x 9.0 / 6.5 |
| 0.6 x 10.0 / 8 | 0.7 x 10.0 / 8 | 0.8 x 10.0 / 8 | 1.0 x 10.0 / 8 |

CORRUGATE - U-BEND

* c2c is our abbreviation for centre to centre. This measurement is calculated by measuring the centre of one creasing rule to the centre of the other rule in mm.

- All sizes are positioned on a 20mm base.
- Box holds 32 x 75cm strips = 24 metres.

Please note: Other matrix and locator sizes are available and prices / delivery time will be quoted on request.

Problems associated with creasing corrugated board: Combined matrix and rubber solutions



CRACKING

Cracking occurs due to excess pressure in the crease which results in the outer liner splitting. This occurs most frequently when creasing a corrugated board which has been printed in dark colours or treated with a high gloss finish. The quality and thickness of the outer liner will also be key factors.

Solution

- Ensure correct crease rule height.
- Widen the base of the matrix to spread the "violence" of the creasing.
- Use an internally chamfered matrix.
- Consider a U Bend/Double crease to spread the fold across two creasing areas rather than one.
- Use of rubber on the creasing rule to "prepare" the board for creasing and crush the fluting around area to be creased, thus reducing the pressure in this area, and creasing in effect, a solid board.



FISHTAILING

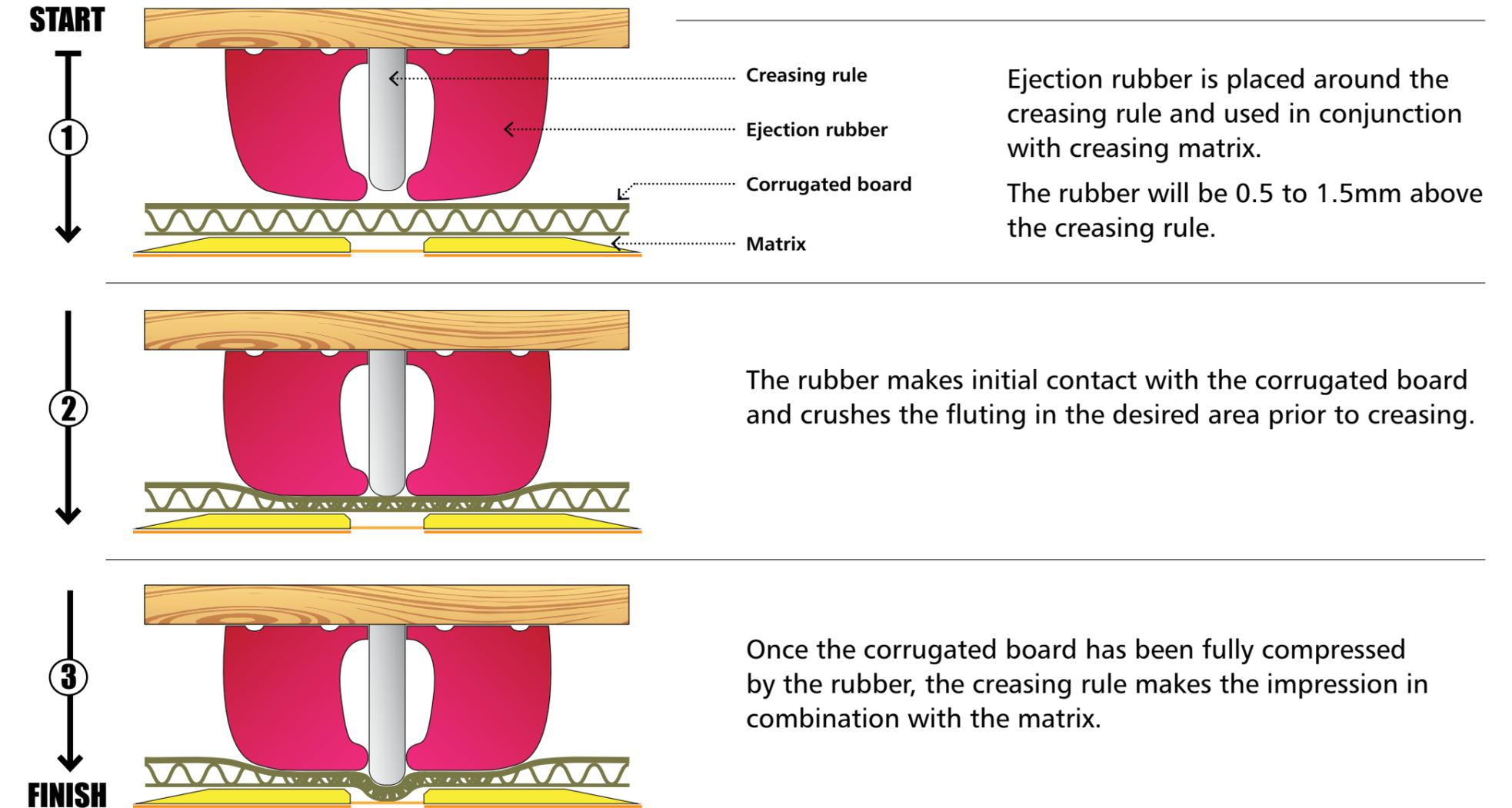
Fishtailing occurs when the board becomes misaligned at cut and crease stage within the die cutter.

This results in a crease which is not exactly where it should be and, when the board moves to folder gluer stage, the resulting box can be out of square.

Solution

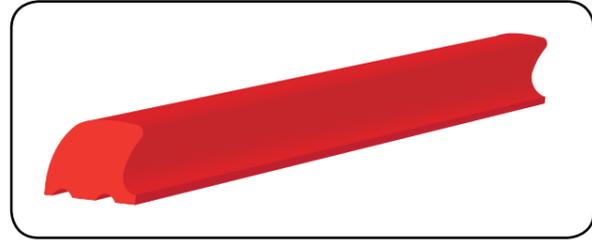
- C&T advocates the use of specific rubber and matrix combinations to "hold" the board in the correct position as it is creased.
- This revolutionary approach involves adding rubbers to the creasing rules on the die to control the board as it moves through the creasing process.

Illustration showing the use of profile rubber on the creasing rule



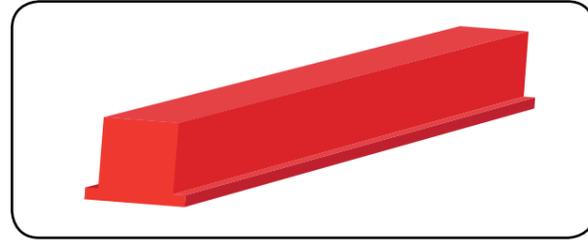
Recommended rubbers for corrugated board:

The range



Red Soft-C Rubba

- Can be used on the creasing rule in tandem with creasing matrix.
- Softer material – 25 shore hardness.
- Better cushioning effect which will sympathetically crush larger flutes.
- Benefits of “roll together” from the C profile shape.
- Holds board to reduce fishtailing.
- Available from 5.0mm to 14.0mm.



Red Soft-T Rubba

- A high quality alternative to sponge rubber.
- Extended ejector life due to unique structure.
- Softer material – 25 shore hardness.
- Less degradation compared to traditional sponge rubber in hot/dry high speed presses.
- Holds larger flute corrugated board effectively to reduce fishtailing.
- Available from 5.0mm - 11.0mm.



G Profile Rubba

- Unique hinged top acts as a natural lever to improve the crush when creasing.
- Harder material – 70 shore hardness.
- Better suited to microflutes where a harder rubber is required.
- Recommended when material contains higher recycled content.
- Available from 5.0mm to 11.0mm.



Easi-Crease Rubba

- Incorporates a unique hollow centre, increasing the cushion effect.
- 60 shore hardness.
- This allows an effective yet sympathetic crushing of the corrugated board.
- Can be used on the creasing rule in conjunction with creasing matrix.
- Also suitable for rotary dies where creasing matrix is not used.
- Can be glued or stapled to the die.
- Height above creasing rule will vary according to the board – between 0.5mm to 1.5mm.
- Available in 6.0mm to 11.0mm.

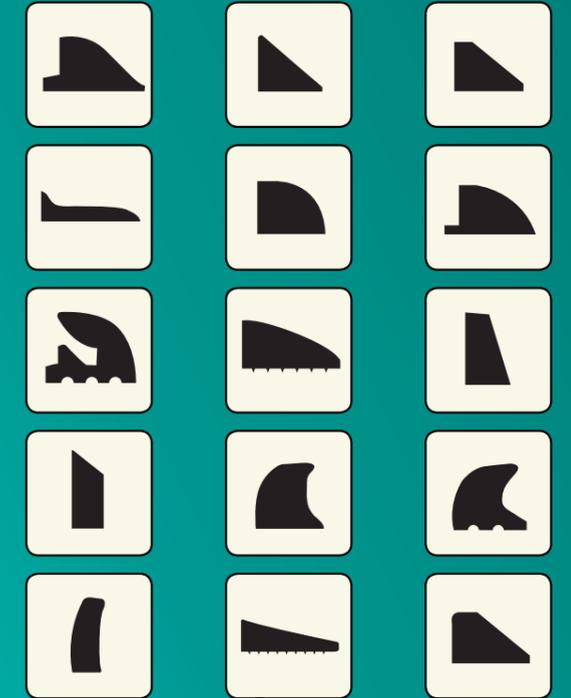


Flexi-Crease

- 60 shore hardness.
- Equally at home on flat bed or rotary dies.
- Differs from Easi-Crease in that it has a harder cushion.
- Slightly more aggressive crushing of the corrugated board.
- Can be glued or stapled to the die.
- Height above creasing rule will vary according to the board – between 0.5mm to 1.5mm.
- Available in 4.5mm to 11.0mm.

OTHER PRODUCTS WITHIN OUR EXTENSIVE RANGE OF PROFILES.

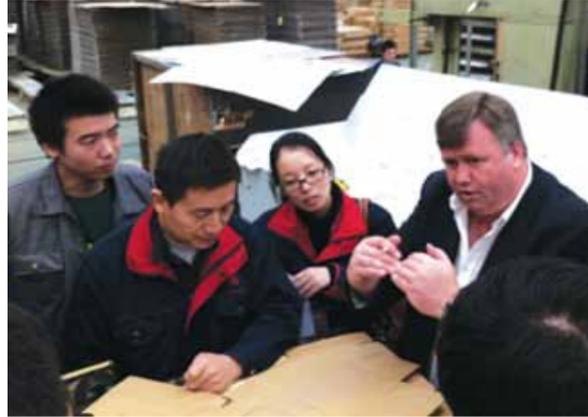
The five recommended rubbers for corrugated board form just a small part of the overall C&T designs. The following profiles are available in a variety of materials and shore densities.



We pride ourselves on the ability to offer bespoke profile solutions for both cutting and creasing.

Please contact us for further information on this service or for samples of our range.

C&T Matrix consultation service

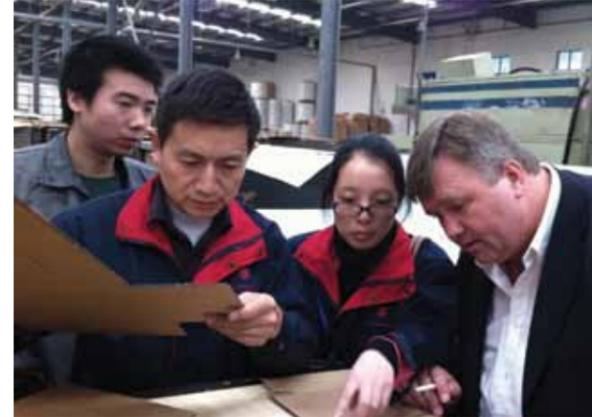


At C&T we are pleased to offer our customers a made to measure solution thanks to our many years experience within the die cutting industry.

Our team of technically trained sales people are available to visit your plant to fully audit your die cutting operation. By examining the type of board being creased, the design of the final product, the die cutting equipment on site and the average run length, we are able to advise on the optimum creasing solution to improve product quality and reduce scrap and make ready time.

Should you wish to make use of this free of charge service, please supply the following information:

- Board specification (micron, type).
- Die cutting equipment used.
- Crease rule height.
- Matrix size currently used.
- Run length.
- Problems encountered.
- Your contact details.



Please email this information to the following address and a C&T expert will contact you to discuss:

sales@candtmatrix.com

Testimonials:

Examples of how the Corrugate range has helped our customers

This is where we blow our own trumpet

C&T Matrix sell in over 80 countries worldwide and we have a lot of happy customers.

London based plant of a key international packaging group

- This client came to C&T asking for advice on how to resolve cracking and knuckling on a particular job which repeated regularly.
- They had been using a competitor's pressboard matrix to crease a B flute corrugated board with a rough white outer liner.
- The client was having to contend with a 20% scrap rate on run lengths of 50,000 pieces per month.
- After consultation with the client, C&T recommended they use our Corrugate product in 1.0 x 5.0 combined with our Soft C rubber on the creasing rule.
- Having switched to Corrugate, the client now has a scrap rate of less than 2% on the same job.

A large independent cartonboard packaging producer based in the North West of England

- This customer asked C&T to assist them with a prestigious beverage packaging job.
- The job involved creasing an E flute corrugated board with a litho printed liner and gloss laminate finish.
- The client had experienced huge difficulties with cracking with an almost 100% scrap rate on a 25,000 print run.
- The client had been using many types of pressboard/laminate matrix from two different competitors but without success.
- C&T worked with the client and recommended the Corrugate product in 0.8 x 2.7 with the flute and 0.8 x 3.0 against the flute.
- This resulted in the job being completed successfully with a zero % scrap rate.
- The client was delighted with the results and is now working with C&T on all projects.

"There is always a solution." - Matthew Sheppard Technical Sales Director.