



Creasing/Scoring Methods Report

The following report has been compiled using a combination of results obtained through research carried out by Tech-ni-fold Technicians and also research undertaken by Sappi Fine Paper Europe based in Brussels, Belgium.

During the folding stage of a finishing process; large amounts of stress can be subjected to material as it is pushed through plates located within folding machines. Stretching and compression of fibres within the material can lead to splitting and breaking of the outer coat.



Fibre-Cracking – a result of pressure applied to material during folding

Splitting and breaking of material during folding is made worse when using coated papers. The thicker the coating the more prone to damage the material will be when folded.

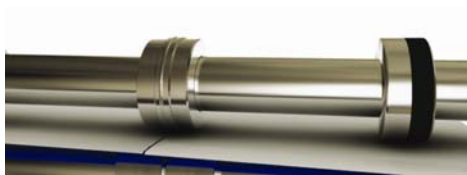
Scoring Methods

In investigating why fibre-cracking occurs and what measures may be put into place to reduce the effect of material damage during folding, we researched the use of existing scoring methods. Four principle points were highlighted suggesting that existing scoring methods are unsuitable.

The four **key** reasons why common scoring devices fail to eliminate fibre cracking:

Key Reason 1

Existing scoring devices all use steel scoring blades



Traditional metal scoring system
Splitting sheet

The steel male/female construction is too harsh for the material. The fibres of the substrate are often crushed, split or damaged, particularly if it has a UV varnish or gloss finish. Dry and brittle toner based digital stocks stand little chance and are usually cut in half.

Key Reason 2

Normal scoring devices produce a V-shaped impression

All the pressure from the steel scoring disc is exerted at the point of the V instead of spreading it evenly across the impression like creasing methods. If you were to look at the newly applied score through a magnifying glass, you would already see fibres breaking away along the thin line in the centre of the impression. Scoring techniques simply do not create the correct depth and shape required for successful results.



V-shaped impression

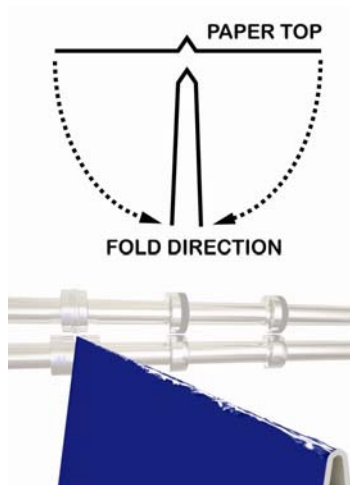
Key Reason 3

Common scoring devices produce only one score setting

Scoring devices rely on the skill of the operator to create an acceptable score width by opening up or closing two collars directly underneath the blade. It's more like a balancing act to achieve a reasonable width and depth of score without either cutting the sheet in half or creating such a weak and ineffective impression.

Key Reason 4

Conventional scoring devices all apply the score to the inside of the subsequent fold



All scoring devices work the opposite way to the proven cylinder creasing method in that they operate from the inside pushing the fibres of the stock outward. As a result the inside of the folded product will sometimes be acceptable, but the depth and shape of the score isn't sufficient enough to prevent the outside fibres on the fold from bursting open and this is the most critical area.

Tested Cylinder Creaser and the Tech-ni-fold Solution

After researching why existing methods of scoring fail we studied the mechanics of the tried and tested flatbed cylinder crease; noticing a remarkable **distinction between common scoring as opposed to conventional creasing**. With this in mind we set to work on producing a simple device that would produce an array of quality cylinder style creases as opposed to linear scoring. In fact the **only** similarity we wanted to inherit from a common scoring device was that our solution would also fit onto the shafts of a folding machine. The device had to be **much easier to use** than the drawn out process adopted in letterpress creasing where the operator applies adhesive matrix strips to a drum. We wanted to



incorporate all the settings in one device so that **instant results were achievable** without the users having to make any kind of fine adjustments themselves.

After many years of research we developed the Tri-Creaser. The Tri-Creaser successfully combats the problem of fibre-cracking by addressing the 4 key issues previously highlighted:

Fibre-Cracking
eliminated 100%

Key Reason 1

Existing scoring devices all use steel scoring blades

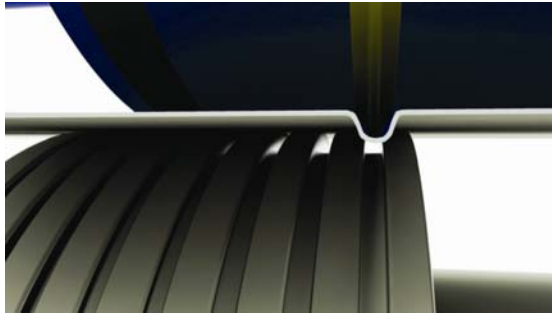


The Tech-ni-fold Tri-Creaser

The Tri-Creaser adopts a softer patented creasing solution that penetrates the material up to three times deeper, without splitting or damaging the stock. The forgiving and gentle rubber application manipulates and stretches even the most difficult print and stock combinations known to us, including oven baked web offset and toner based digital applications.

Key Reason 2

Normal scoring devices produce a V-shaped impression



A perfect U-shaped crease

The Tri-Creaser produces a rounded or U-shaped crease that spreads the impression evenly across the width without the distortion to the centre. The much greater depth of the crease simply forces the material to form the shape of the set female channel opposite and this is the **BIG** difference.

Key Reason 3

Common scoring devices produce only one score setting

The Tri-Creaser boasts 8 crease options that easily stop the cracking on the full range of materials that run through your folding machine from 85-350gsm, regardless of

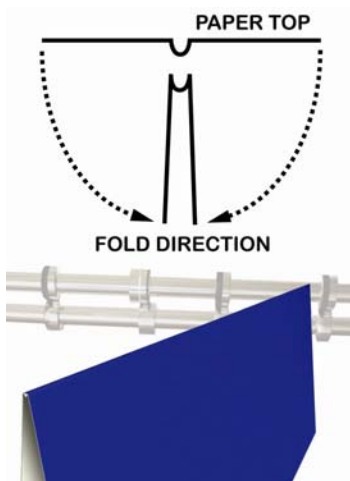


8 crease options to choose from

grain direction, solid ink coverage or whether it has been UV varnished or laminated. The Tri-Creaser has all the crease settings machined into it so the user doesn't have to spend endless hours experimenting, in fact all the thinking has been done so that all the guess work is eliminated.

Key Reason 4

Conventional scoring devices all apply the score to the inside of the subsequent fold



The Tri-Creaser works directly on top of the area that is prone to cracking, gently pushing the fibres back inside the product. We know that cracking to the outside is eliminated this way but also see that a perfect bead has formed on the inside and is highlighted once the folded product is re-opened. This demonstrates the depth of crease penetration from the outside through to the inside of the product and conclusively proves that the perfect letter press method can be replicated on a folding machine.



U-Shaped bead with no damage to the material

The Conclusion

It is clear when studying the above evidence that scoring systems simply do not eliminate the effect of splitting and breaking fibres when folding. Creasing devices in their design are more suited to eliminate the effect of damaged fibres.

The following definitions then, can be giving to the processes of scoring and creasing:

***Scoring:** '...any means of reducing paper stiffness along a line to aid in folding.'

***Creasing:** '...manipulation of material through a combination of compression and bending round a bead.'

*Courtesy of Mark Beaudreau,
Technifold USA

The above report has been compiled by Tech-ni-Fold technicians after years of research and development into the key features of Creasing and Scoring. The details included within this report are under copyright and should not be replicated.