TRELLEBORG
SEALING SOLUTIONS

TROUBLE SHOOTING GUIDE

Blanket Surface	The offset blanket surface structure, profile, and hardness are extremely important and contribute significantly to the printing performance of an offset blanket. Additionally, **surface imperfections will certainly cause printing problems**; therefore, production standards are set to guarantee the highest quality of printing surface. . **It is not an easy task to develop a suitable rubber compound for the printing surface of an offset blanket utilized for high quality offset printing. The difficulty is due to the conflicting chemical and mechanical requirements which can be found during the printing operation** The blanket surface must exhibit a "dual" personality. The surface rubber compound must have the capacity to take the maximum amount of ink possible from the printing plate without distorting the image and transfer it almost half way around the cylinder to the printing stock. This precise operation must be done at very high circumferential speeds. The tack of the printing surface must remain low in order to ensure a minimum build-up of paper dust, dirt, and ink.
Compressibility and Reboundability	In a compressible offset printing blanket, **compressibility is the single most important factor influencing dynamic performance on press and print quality**. With reference to offset blankets**, compressibility is defined as the volume reduction capacity of a substrate under load**. Vulcan compressible blankets have in their carcass a specially designed compressible layer which allows the blanket structure to be compressed in the printing nip without creating "bulges" on either side of the nip (see illustration) **Offset blanket compressibility is a very important factor in the printing process. Having the proper range of compressibility will prevent excessive printing pressures and should help to lengthen the lifetime of the press, blankets, and plates**. Furthermore**, the compressibility factor also allows the blanket to recover sufficiently and quickly after smashes without resulting in distorted print quality**. And, last but not least, it considerably shortens make-ready times. **In addition to blanket compressibility, there is the factor of reboundability or resilience. This characteristic should not be confused with compressibility as it is quite different and can not be measured with the same instruments. In fact, reboundability or resilience is measured with a Rebound Tester and/or Resiliometer. Compressibility, on the other hand, is tested with a Cady-Fag or laboratory equipment like an Instron Tester**.
Dot gain	Dot Gain is the **difference between the original intended dot and the one reproduced**. Dot gain **is caused when an image is transferred from one source to another**. Consequently this **includes the transfer of ink from the plate to the blanket and then again from the blanket to the substrate**. Other things that influence **dot gain include the absorption rate of the substrate, inks and press settings**. Dot gain is planned for throughout the print process and can be regulated in the pre press area. Acceptable degrees of dot gain vary depending on the substrate.
Durability	The ability of a **blanket to last for a long time without significant deterioration is dependent on several factor**s. It is **dependent on the substrate being run, the balance of chemistry, the craftsmanship used and the blanket itself. Each one of these factors impacts the life of the blanket**. **Substrates** – some substrates are tougher on blankets then others. Plastic, paper with lots of Calcium, coarse stocks or

	unusual finishes all add to the demise of blankets. **Chemistry** – Well balanced chemistry impacts blankets more than people think. Having the wrong chemistry allows ink build up causing problems such as wear, window framing as well as a slew of other printing problems related to both ink and blanket. Then there is the question of intermixing applications such as UV, conventional and hybrid printing. This requires testing before recommending a blanket. **Craftsmanship** – There are two sides to the usage of every product. On one side, the manufacturer has to make it properly and on the other side it has to be used properly. No matter how good the blanket is, it won't perform to its potential if it is not packed properly, torqued properly or is not maintained during the run. **The Blanket** – Not all blankets perform the same. Manufacturers make a variety of blankets for a reason. Blankets are made for different substances, different applications, to fight pricing or different types of presses. The trick is to find the best blanket for the press and application . Each shop has its own characteristics and can only compare blankets in its own environment. There are shops that can run blankets for millions of impressions while others are changing them out constantly. It is difficult to compare two shops. Every shop looks for different qualities in a blanket, to some it's durability to others it's printability and yet others look for release.
Elongation	**Blanket stretch** can be defined as **"the amount of elongation under a given load"**. **The elongation measurement is determined** by the design and **quality of the textile fabrics** used in the manufacturing process. In Vulcan-Rollin blankets, the fabrics utilized are woven from only high quality cotton yarns and this fact contributes to their resilience, stretch- resistance and overall strength flexibility. The raw cotton used in the fabrics (textiles) is spun on state-of-the-art machinery, into yarns which are then woven into specially designed fabrics. After weaving operations are complete, the rolls of fabrics are inspected for defects like small knots, ruptures or small holes. Some fabrics, depending on their function or position in the blanket design also go through a stretching process which helps to reduce their elongation factor to an extremely low level. In fact, a blanket with very low elongation will be easier to tension to the proper load during mounting. **Also fewer retensioning operations will be necessary and the blanket will lose less thickness during and after installation**.
Edge Marking	**Edge marking is caused by paper fiber left on the blanket causing a buildup on the surface**. The buildup cuts into the surface of the blanket. Edge marking happens on the blanket surface, at the edge of the sheet or web and is influenced by a couple of different factors; the surface rubber of the blanket and the husbandry of the pressroom.
Feeding	(Paper) **A positive feed blanket**, tends to "give more paper", the tension of the paper after the printing unit will decrease compared to the in-feed unit. This means that the web will tend to flutter, due to its tension loss. **With a negative/neutral feeding blanke**t the tension of the paper will be higher than the in-feed. This means that the web will get to the next printing unit properly tight. **Example of blanket with positive feeding**: Reel stand: 200 N In-feed: 220 N Load cell: 170 N or < than in-feed unit. **Example of blanket with negative feeding**: Reel stand: 200 N In-feed: 220 N Load cell: 220 N or > than in-feed unit. With a blanket with positive feeding, the web will tend to follow the leading blanket cylinder, resulting in bad paper release.

Guage Loss	**An offset blanket will lose some of its thickness during mounting as a result of the initial tension applied during the mounting process as well as during initial printing operations**. **A new blanket**, once tensioned on the cylinder**, loses gauge** because the textile layers are stretched during installation. In the early days of offset printing blankets, the textile fabrics utilized in blankets had a high elongation factor e.g. 2-3%. Current press performance requirements call for low(er) stretch blankets which "settle" very quickly on the cylinder with the lowest loss in thickness possible. **A 1,95 mm thick printing blanket, once tensioned on the blanket cylinder, may lose 1-2% in thickness, with an additional loss of another 1% during the press run (see illustration 10). The lower the gauge loss, the more stable a blanket is on the cylinder and, consequently, fewer blanket retensioning operations during printing will be necessary**
Ghosting	Edge marking When an image from the preceding job shows up in the next job. Specifically what happens is an image such as type from the preceding job effect the blanket surface in a way that it changes the face of the blanket. This in turn shows up as a faint image in the next job. We call **this memory or Ghosting because this image looks like a ghost image in the next job**.
Hardness	The hardness of offset blankets is normally measured on the **Shore A scale**. Many printers are aware that there are on the market so-called soft, semi-hard and hard blankets. **When a printer requests a "hard" blanket from his supplier, does that mean the printer wants a blanket that is hard or a blanket with lower compressibility**? Even today there still exists some confusion regarding Shore hardness and how to correctly measure this characteristic. As mentioned before, **an offset printing blanket can be divided into two components: the printing surface (face) and the carcass (normally 3 or 4 ply configuration). The printing surface is 100% rubber whereas the carcass is a composite structure of textile fabrics and rubber or polyurethane cements between the plies**. Taken separately, these two parts have different hardnesses. A portable Shore A durometer, if used on the printing surface of the blanket, will give a certain reading until its needle penetrates the printing surface and encounters resistance from the blanket carcass. Therefore, when the hardness of a printing blanket is measured, it will be the top fabric layer that substantially alters the durometer reading. Bear in mind that Shore A durometer measurements have not been designed to accurately measure the hardness of a fabric and rubber composite. Durometer testing is normally associated with the measurement of the hardness of a small pièce of sheet rubber containing no fabric. Therefore the average load value gives the printer a much better understanding of the hardness of the blanket
Indentation	**It is defined as the amount of compression of an offset printing blanket when squeezed in a printing nip. It is expressed in hundredths of a millimeter or thousands of an inch. Indentation should not be confused with other terms such as height over bearer, pressure or impression** **Due to the blanket design or intended use, it may require either a high or a low indentation value to achieve proper print characteristics**. Low indentation blankets such as conventional blankets must be packed with extreme accuracy, especially after smashes. **The minimum indentation required for successful performance of. an offset blanket should not be less than 0,08 mm (.003").** Printers should always bear in mind that although every compressible offset blanket has a proper indentation value, field surveys show a preference for blankets having an indentation range of 0,10-0,15 mm (.004"-.006").

Packing	**Creep Creeping or the movement of packing along the cylinder surface can be caused if the cylinder surface speeds are not synchronized or if the blankets are improperly tensioned**. Even self-adhesive foils installed on blanket cylinders will creep if there is a speed differential between the blanket and impression cylinders
Release	**Is the ability of paper to come off or be released from the blanket, during the printing process. It is one of the most over used terms in printing**. As an industry we call for better release any time we see an elongated dot but there are many factors that influence this phenomenon. Presses - In sheetfed, registration devises, including grippers, may be dirty or require calibrating. In web formats forms may be laid out improperly placing all of the coverage on side of a form and nothing on the other side causing an unnatural pull from side to side. Machine layout also impacts the way stock pulls off of a blanket. Some web presses have staggered units with the upper unit being slightly forward of the bottom unit. This causes additional concerns and plays an even larger role in how forms are laid out. **-Ink – Ink impacts release in a couple of different ways. Tack and viscosity have a direct influence on release, the higher the tack/viscosity the worse the release. However, too low a tack produces a slew of other printing problems not to mention ink spraying throughout as it's milled through the press rollers**. **-Surface tension –** ***Some blankets have a better release than others. Some are constructed in layers allowing for better release and buffed a little more coarse allowing the paper to leave the blanket easie***r. **-Blanket washes – Another factor in release are different types of chemistry used as a blanket wash. There are many different types of washes, all designed for different applications. Some rejuvenate blankets to their velvety soft surface, some use harsh chemicals designed to cut through calcium and ink almost melting the blanket surface**.
Smash Resistance	***Edge marking is caused by paper fiber left on the blanket causing a buildup on the surface. The buildup cuts into the surface of the blanket. Edge marking happens on the blanket surface, at the edge of the sheet or web and is influenced by a couple of different factors; the surface rubber of the blanket and the husbandry of the pressroom***. Blanket surfaces can and do make a difference in edge cutting. Some blankets have a tough surface and resist edge cutting while others have a softer surface and cutter easier. Chemical compounds that formulate the surface rubber make a difference in edge cutting but another big factor is the stock itself. All blankets cut at some point or another but the difference is frequency.
Sinking	**It is the process of where a blanket falls to a new lower level than when brand new. This could be a small section, the lead edge or the entire blanket**. A small section of the blanket sinking could be a manufacturing defect or could be a situation where the sinking is actually a smash but the perpetrator is not found. In some cases there are ways to tell the difference using a high powered scope**. A smash will have sharp edges around it** where as ***sinking may have soft edges leading into the rest of the blanket.*** The lead edge of a blanket may not be able to withstand the sharp edge of the cylinder drop off and collapse right before the drop off of the cylinder. Printing in that area is now very difficult unless the cylinder is built up to make up for the crashed fibers in the blanket. **Lead edge sinking can also come from improper torque techniques**. *Once a blanket is over torqued the layers in the center are crushed and thus not able to perform as intended*. New blankets have a settling property about them.

	Once placed on the cylinder the fibers settle and air is defused from the material itself causing the blanket to settle one or two thousands. This is not considered sinking. The blanket is merely settling. Once that happens and the blanket gets re- torqued it should run effortlessly with any further assistance. However there are blankets that are poorly manufactured where they sink every few thousand impressions and cannot hold gage . These are blankets that are poorly constructed in the planning stage or are defective.
Tensioning	**Tensioning a blanket on the cylinder is a very crucial operation** and it must **be done precisely** in order to: 1) guarantee blanket conformance to the blanket cylinder surface, particularly at the gap area. 2) prevent the shifting of underpackings. 3) avoid blanket movement, due to insufficient tension, during printing operations. The exact amount of tensioning will depend on the press type and design of the blanket lock-up system. **It is extremely difficult, if not impossible, for the blanket manufacturer to provide precise tensioning details and recommendations**. EACH PRESS TYPE can require different amounts of tensioning due to: ♦ type and design of the blanket lock-up system. ♦ amount of tension transmitted to the blanket from the lock-up system. It is very important to understand that the printer applies tension to the lock-up system which, in turn, applies tension to the blanket. The lock-up system, depending on its mechanical (gear) ratios, can transmit either a fraction of or a multiple of the initial tension to the blanket. ♦ diameter of the blanket cylinder. ♦ type of underpacking used. ♦ cleanliness, lubrication and wear of the blanket cylinder lock-up system. ♦ variations in the stretch properties from one blanket type to another. ♦ variations in mounting techniques from operator to operator. **Overtensioning can cause high gauge loss, cracking at the gap and bar pull-off.** ***Insufficient tension, on the other hand, can create problems like doubling, slurring, blanket movement, registration shifts and plate wear***. Of the two practices, overtensioning is by far the more prevalent cause of problems.
Thickness	Thickness (blanket) In the printing field**, the required thickness of a blanket is normally indicated either by use of the terms 4 ply and 3 ply or by indication of a thickness such as 1,95 and 1,70 mm (.077" and .067") with appropriate tolerances**. Both these indications stand for nominal values! A 4 ply blanket normally has a 4 ply structure (4 textile layers in the blanket carcass) whereas thickness reference will always be in the range of ± 1,95 mm (± .077") due to the nature of the blanket manufacturing process. In some cases when printers reference a ± 1,95 mm thick blanket, they may be referring to a 4 ply blanket which, instead, has a 3 ply structured carcass. Normally, a true 4 ply structured blanket will have higher stability on the blanket cylinder during the printing process as compared to a 3 ply structured 1,95 mm thick blanket. Today's trend, in the case of 4 ply thick blankets, appears going more towards the range of 1,94 - 1,98 mm (.0765" - .078") rather than 1,90 - 1,94 mm (.075"-.0765"). European offset printing machinery requires for the greater part ± 1,95 mm - 4 ply blankets, with a very limited number of presses using 3 ply - 1,70 mm thick material. The situation with USA built machinery is just the reverse. It is understood that thicknesses It's obvious that a large thickness variation in a single blanket will influence print quality. To obtain the best printing conditions possible, the blanket cylinder should be in impeccable condition, the packing material used should be hard with the lowest possible variation in gauge and instructions given by the press manufacturer should be followed as accurately as possible.

	According to international standards, a total of 0,02 mm (.0012") variation in thickness within a one square meter compressible blanket is acceptable