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Do you have any of the following problems?

Gravure:

HAZING
STREAKING
EXCESSIVE BLADE WEAR
UNEVEN BLADE WEAR
CHATTER
BURR OR BREAKOUT
COLOR SHIFT

Flexo:

EXCESSIVE CHAMBERLEAKAGE
ANILOX ROLL SCORING
EXCESSIVE BLADE WEAR
UNEVEN BLADE WEAR
CHATTER
BURR OR BREAKOUT
COLOR SHIFT

Did you know that these problems might be greatly affected by the contact or running angle of the doctor blades? Over the years, more often than not, we have found that many printing problems are the result of improper contact angles.

Benton Graphics has developed a portable tool for measuring the contact angles of used doctor blades. This device takes into account the deflection of the blade for a more precise measurement. In Gravure, the lower the contact angle, the higher the loading pressure that is necessary to wipe clean. In Flexo, it is especially helpful in determining if the chamber or holder is parallel or skewed to the Anilox.

It is a must for every printing department and a great training tool for new press operators. Presses running improper contact angles can waste thousands of dollars press time alone, not to mention; wasted ink and substrate, excessive blade wear, and the potential damage to the rolls. Benchmark your process when things are running well, or if you currently have blade issues use this tool to help solve them.

This device will tell you:

- If the blades were set parallel to the roll and everything was lined up properly.
- If your running in the optimum range for the process.

Includes: microscopic system, reliable LED light source, instructions on how to examine a used blade, and tips on what you should expect to see along with the recommended contact angles for the various processes.



ARS-INDICATOR™ Description and Use Instructions

Although Benton Graphics is well known for its doctor blade manufacturing, the company also has a full time engineering staff that is dedicated to blade production machinery design and construction. In the past few years, with the help of CAD/CAM systems and CNC equipment, this group has also been able to create several tools that are available to the printer to help maintain and trouble shoot printing presses. In addition to two versions of a pneumatic cylinder and roll scrubber (PRS I and PRS II) that have been available for the past two years, this group has now created a tool to allow the press operator to check and evaluate the true contact angles that a used doctor blade has after its' press run. (Steel or Plastic)

The new "ARS-INDICATOR" stands for Angle Reflective Scope Indicator. (See figure 1) This tool allows the press operator to know immediately after pulling a doctor blade what contact angle that blade ran at. While there have been several methods developed to help a press crew set the blade angles on startup, none of these take into account issues such as blade deflection caused by wiping pressure or how parallel a blade is set from one end of the cylinder or roll to the other.

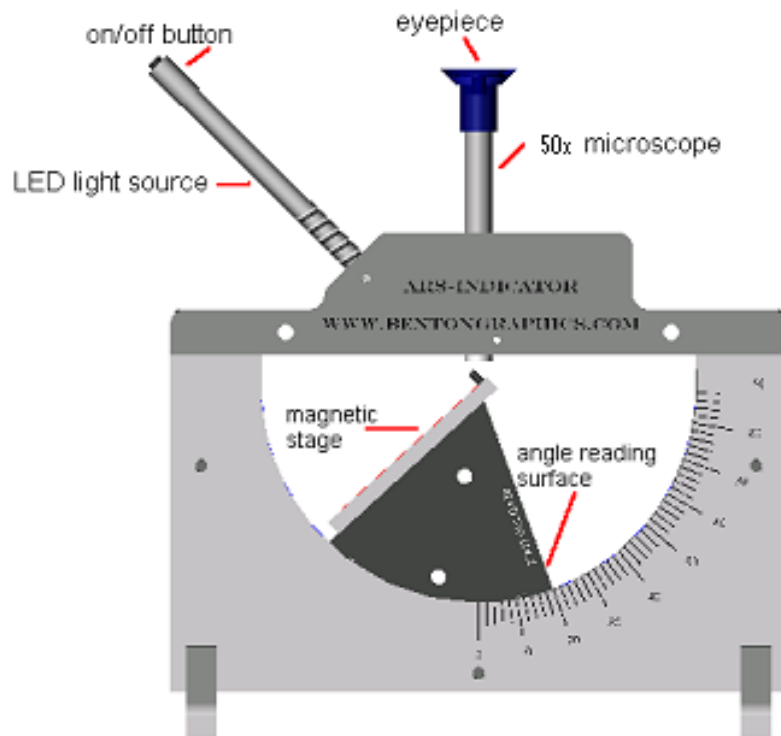


FIGURE 1

I. TOOL DESCRIPTION - The ARS-INDICATOR™ is a simple device to operate. It uses reflected light that bounces off of the flat worn into a doctor blade tip during its' use in a printing press. It is made up of a precision anodized aluminum frame, which contains a magnetic stage that rotates in an arc shaped track. To use the scope, you simply turn on the battery powered LED light source either by pushing the end button for momentary on or twisting the end cap for continuous on. (NOTE: To save battery life, be sure to turn off the LED when you are done.) You then look at the doctor blade sample through the microscope located on top of the unit. While looking through the scope, twist the tube one way or the other to focus on the blade tip. After focusing the scope, just rotate the magnetic stage around its arc shaped track and look for the brightest line of light which is reflected off of the blade contact or wear angle and up through the scope.

By using the marked edge of the black plastic swing arm, you can read the true contact angle on the degree scale engraved in the side of the aluminum frame. The microscope and the light source are mounted at fixed angles to each other. This should keep the ARS in calibration at all times (unless dropped or damaged). Your scope has been shipped with a piece of .010 stainless steel on the stage. It is labeled "calibration strip". When you rotate around the "zero" degree mark, you will reflect light off of the flat of the strip and should see the brightest light line around zero. (See fig. 2) The labeled edge of the stainless steel strip is finished at 90 degrees and can be used, in the same way, to calibrate at 90 degrees on the scale. (See fig.3)

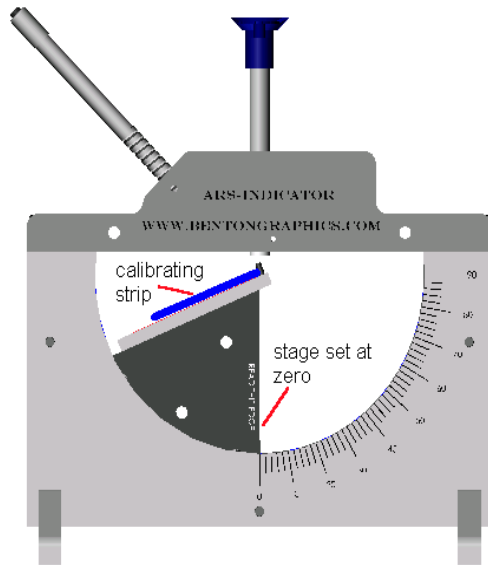


Figure 2

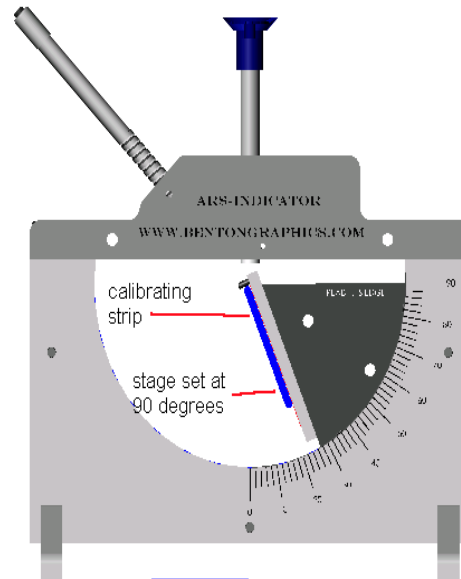


Figure 3

II. GENERAL SAMPLE PREPARATION: A few simple steps must be followed when preparing used blade samples to be checked in the ARS-Indicator.

- #1 BE CAREFUL !!! USED BLADES ARE VERY SHARP AND WILL CUT YOU VERY EASILY !!
- #2 We recommend that you do one sample at a time so that you don't get the blades mixed up. Mark all blade samples as to where they came from.
- #3 Sample pieces should be between 3" and 4" long.
- #4 Carefully clean all dried inks and/or coatings from both sides of the blade sample.
- #5 Make sure that there are no bends or residues on the blade that would prevent it from sitting flat on the magnetic stage.
- #6 Place the blade on the stage with the wear face (bevel) pointing up. Make sure that the edge of the blade is up against both reference pins on the stage.

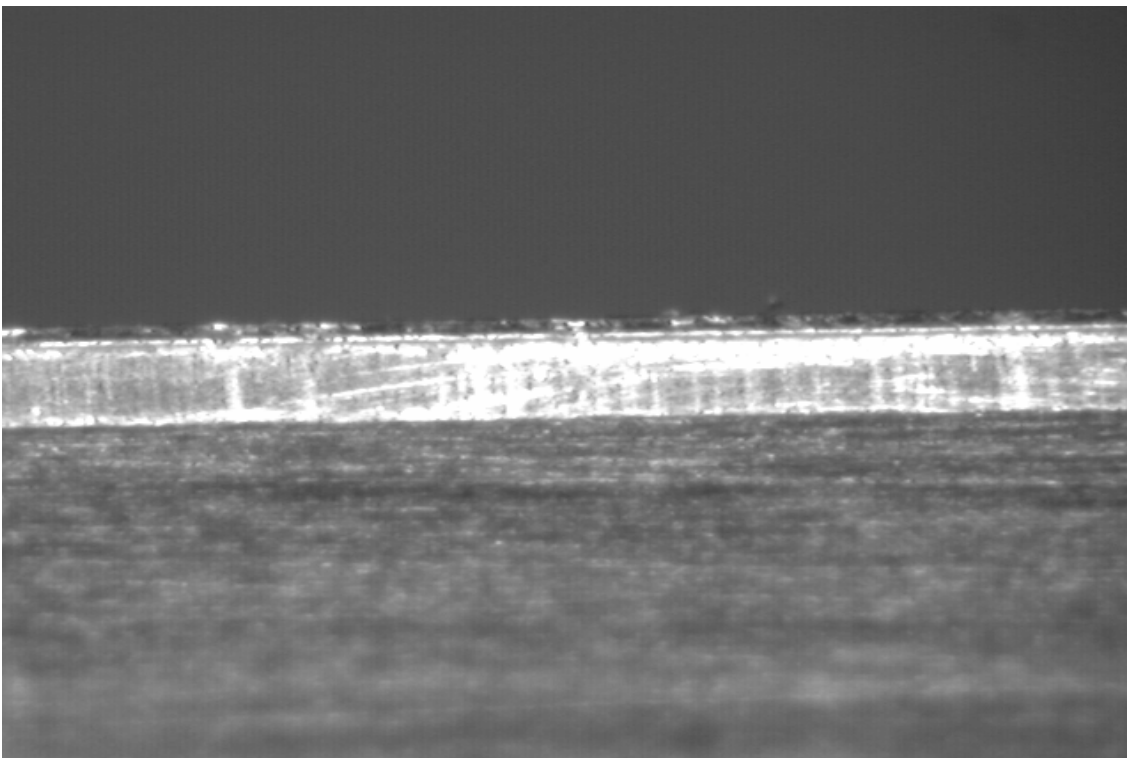
(It is important to remember that a blade must be in the press for a long enough time to wear in a bevel for you to check in the ARS-Indicator™.)
- #7 DO NOT hold or grab the blade itself to move the stage - hold only the stage by both sides.
- #8 If you are checking plastic blades, use a small piece of masking tape to hold the blade against the edge reference pins.

III. CHECKING GRAVURE DOCTOR BLADES: There are several ways in which you may check doctor blade angles from a gravure press. First is by cutting a 3 to 4" long piece from the center of the blade and measuring this angle. This single reading will give you an average running angle on a given blade. The preferred method is to take a sample piece from each end. This will give you the running angle and tell you how parallel the blade holder was set to the cylinder. These samples should be cut from an area of the blade that falls about 3 to 5 inches in from each end of the cylinder face. You may mark the blade before pulling from the press or look at the blade tip after cleaning to find the start of the wear face area.

When you are looking in the ARS unit, be sure to scan from "zero" up to 90 degrees. This is to make sure you can find and measure ALL the contact angles on a given blade. Many Gravure Blades are adjusted during a run, causing multiple contact facets to be worn into the blade tip. It is important to find and record all wear angles that are present in any one given blade. This can indicate that there were problems with the blades during that print run. If, during your scan, you see a bright line that is present for more than 5 to 10 degrees, this indicates a rounding of the wear tip. This may indicate one of two possible problems. The first is excessive cylinder run-out. This can be caused by worn cylinder bearings or bent journals. The second is worn doctor blade oscillating mechanisms. Either one of these conditions causes the blade tip to continuously shift its contact angle to the cylinder while the press is running. This condition may show up in the print as scumming, hazing, tailing, or streaking that comes and goes in a cycling pattern.

IV. WHAT WILL I SEE? There are two different appearances that you will observe when looking at the reflected light of a used Gravure Blade. The first is a bright light caused by a mirror type finish on the wear face. This is caused by metal-to-metal contact between the blade tip and the cylinder surface. This can happen when high angles and/or heavy loading pressure were used in setting or running the blade. The second appearance is a duller light caused by a matte or dull finish on the blade tip. This can be caused by light wiping pressures or by highly abrasive ink such as TiO₂ whites. While the dull finish is preferred, both the dull and the mirror surfaces have been observed on good running presses. NOTE: If you see scratches across the blade tip running in the same direction of the cylinder, you may have one other problem. (See fig. 4) Scratches are usually caused by foreign particles in your ink. These could be dried ink, doctor blade steel particles, or board dust. Ink filtering is important to protecting both you blades and your cylinders. If your blades are getting scratched, then it is likely that your cylinders are too.

Figure 4 - gravure blade tip scratches



V. CHECKING FLEXOGRAPHIC BLADES: While sample preparation is similar to gravure Blades, there are a few slight differences when checking flexo blade tips. The used blades should be clean and flat on the magnetic stage. The area to be checked for contact angles should be taken 1 to 2 inches in from the end of the anilox roll. The samples should be 3 to 4 inches long. If you are checking a narrow web blade (such as labels), a single sample from the center should give you an accurate indicator of the contact angle across the blade. If you are checking a mid range (30 to 50" wide) web blade it is important to check a piece from both ends to check parallelism. If you were looking at a wide web blade it would be a good idea to check both ends and the middle of the blade. This will help determine the straightness of the holder/ chamber. If you are checking blades from a closed chamber system, it is a

good idea to check both the metering and the containment blades. Be sure to mark which end is which before cutting samples to be checked. *NOTE- the ARS unit is designed so that a long blade will fit across the magnetic stage. This feature will allow you to check both ends and/or the middle without cutting the blade up. It is preferred for ease of operation, however, to cut the blade into 3 to 4 inch long pieces. This will insure that the sample stays flat on the stage while you rotate it to find the contact angles. If you are checking plastic blades, just hold the sample on the stage, up against the reference pins, and tape it down using small pieces of masking tape to hold it in place. Be sure to place the wear face of the blade UP (towards the microscope).

VI. WHAT WILL I SEE? - When looking at used metering blades that have run on anilox rolls, you will see a pattern along the edge. (See fig. 5) Because your blades are riding on a honeycomb style pattern (anilox surface) without oscillating back and forth, a scalloping pattern will be visible in the ARS scope. This is normal in a flexographic metering blade. Thicker plastic blades will not show this pattern as distinctly as a thin metal blade does. The containment blade may show this same pattern but it should not be as distinct as the metering blade. If your anilox rolls contain dead bands on the ends for improved seal wear, you will not see any true pattern in the wear tip where it rides on this band. It is a good idea to try and measure your contact angles a few inches in from any dead bands. If you see heavy scratches across the tip that are deeper than the anilox roll pattern, you may have one other problem. These scratches are usually caused by foreign matter in your inks. These can be dried, old inks, blade, pump wear or cylinder wear particles. Any of these can be filtered out of your ink system with high quality filter assemblies. Leaving any foreign matter in your system can lead to severe roll and doctor blade scoring.

Figure 5 - Anilox wear pattern



VII. WHAT DOES IT MEAN? Many conditions may be analyzed by reading the contact angles of your used blades. On a closed chamber system, checking both the metering and the containment blade are very important. Reading average contact angles between both blades will tell you if the chamber is centered on the anilox roll centerline. NOTE: Some presses will run a longer extension on the containment blade, which reduces the wiping angle of it when compared to the metering blade. If you

check the contact angles on both ends of each blade, it will provide you with valuable information and the chamber settings. As an example, if the gear side shows the metering blade wear angle is higher than the containment blade, but on the operator side the metering blade wear angle is lower, this would show that the chamber is skewed or out of level, with the anilox roll center line. On the other hand, if the gear side angles on both blades show a lower setting than on the operator side, this would indicate that the chamber is not parallel to the roll.

VIII. CONTACT ANGLE SUGGESTIONS: Based on our experience, the following contact angles are recommended: (NOTE: On longer blades, it is rare to have the contact angles exactly the same on both ends. A variation of 1 to 3 degrees would be considered normal. If you are any more than 5 degrees off, you may need to investigate any problems with the setting of the blade)

Gravure - Publication - 55 to 70 degrees
 Packaging - 45 to 55 degrees

Flexographic - Metering - 25 to 35 degrees (Reverse doctoring)
 Containment - 20 to 30 degrees** (Forward doctoring)

****NOTE-** When using thin plastic containment blades, some chambers work well with a flat contact angle (0 to 10 degrees)

Please feel free to give us a call or E-mail if you have any questions or problems regarding using the ARS-INDICATOR™ and we will be glad to help.

info@bentongraphics.com