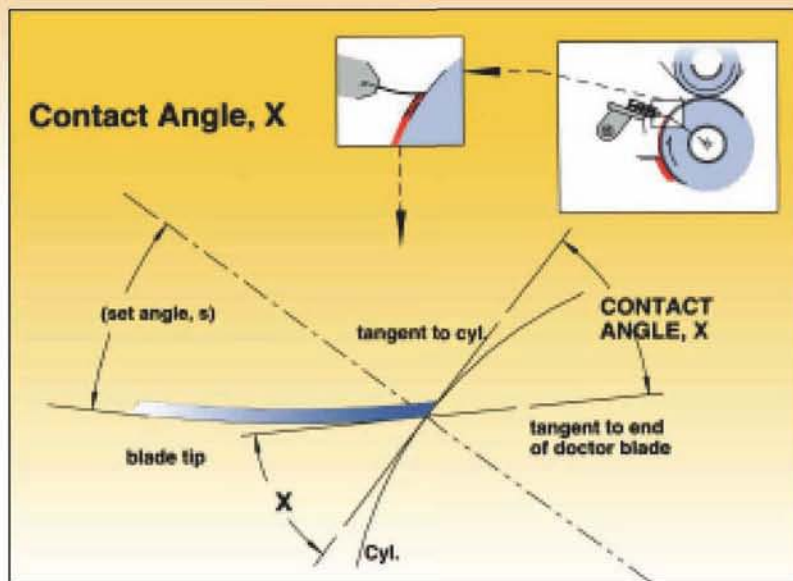


ALLISON

Systems Corporation

GRAVURE



GRAVURE BLADE ANALYSIS SERVICE

SIGNIFICANCE OF GRAVURE CONTACT ANGLE:

Controlling contact angle is important: For most gravure work, contact angles of 55 to 75 degrees are recommended. By working on the tip of the blade, good flushing of particles behind the blade and a small "footprint" against the cylinder is achieved.

The small footprint allows the blade tip to cut through the lubricating layer of ink on the cylinder and wipe without "haze" in most situations. A too-sharp angle can cause some problems however, since blades, blade holders and cylinders are not perfectly straight. Cylinders and blade holders/systems "sag" a few thousandths or more under their weight and applied doctoring and impression loads. To compensate for this and get a perfect "fit", blade angles less than or equal to 75 degrees are needed. Excessively sharp contact angles may result in high blade loading required to get a wipe, vibration problems and/or cylinder damage.

However "flat" contact angles and/or too much force are a common cause of various print problems. (Some of the more common ones are described on the following pages). Contact angles down to 45 degrees may be used for certain special situations, big solids, horizontal decorative lines on the cylinder, etc.

CONTACT, ANGLE, WEAR, AND FLAT MEASUREMENT ANALYSIS

SIGNIFICANCE OF GRAVURE DOCTOR BLADE CONTACT ANGLE

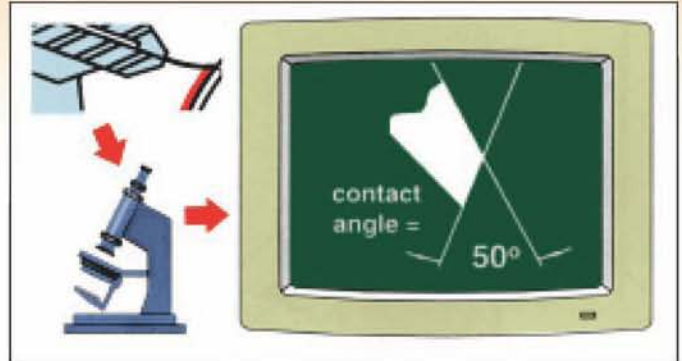
| Contact angle essentially determines the hydraulic lifting or "lubricating" force of the ink under the doctor blade tip.

| Contact angles less than 45° usually result in significant surface ink films passing under the doctor blade tip causing a "haze" to print in non-printing areas of the cylinder and/or a dirty wipe or slurring of type, etc.

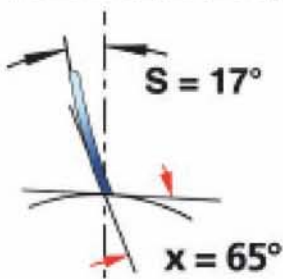
| Contact angle is also a measure of the force applied to a doctor blade at a given set angle.

| Applying more force to correct a wiping problem doesn't work, (except perhaps for a short "wear in" period just after more force is applied).

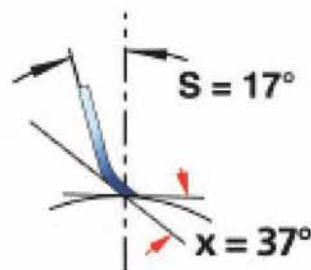
Note that contact angles and blade footprint on the cylinder can be checked by micro-viewing worn doctor blade cross sections.



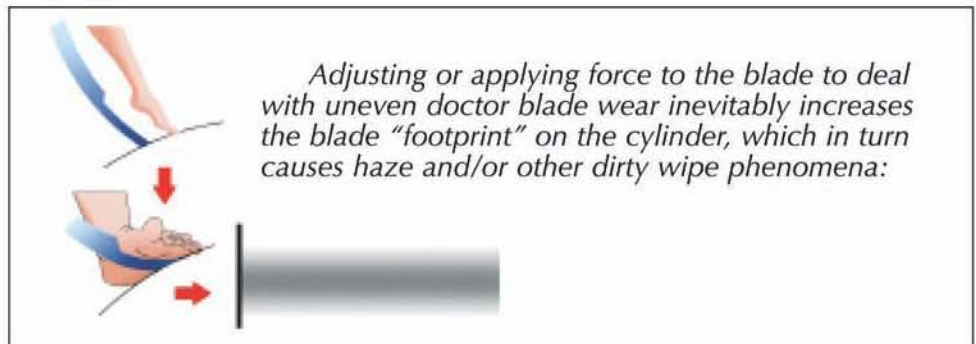
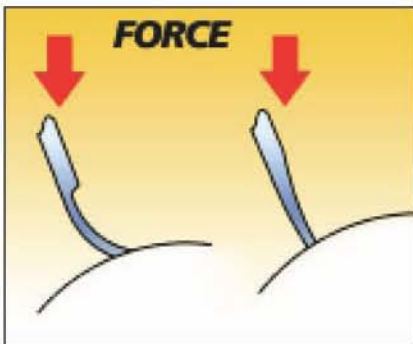
**Set angle of 17°
(Contact angle of 65°)**



Effect of extra force



To put it another way,



Adjusting or applying force to the blade to deal with uneven doctor blade wear inevitably increases the blade "footprint" on the cylinder, which in turn causes haze and/or other dirty wipe phenomena:

WHY USE SUPERHONED® DOCTOR BLADES?

| The blade tip doesn't get too fat, too fast, when the blade wears.

| More effective tip control in real world doctoring situations, that is, where there is too much force.



GRAVURE BLADE ANALYSIS



GRAVURE STATION SETUPS

To simplify control of contact angles on existing gravure presses, we offer gravure setup software. Referenced to simple position indicators on the equipment, it makes it easy to record the good settings by press and by job. It tells you how to get to these settings for new, similar jobs with different cylinder repeats just by moving the mouse.

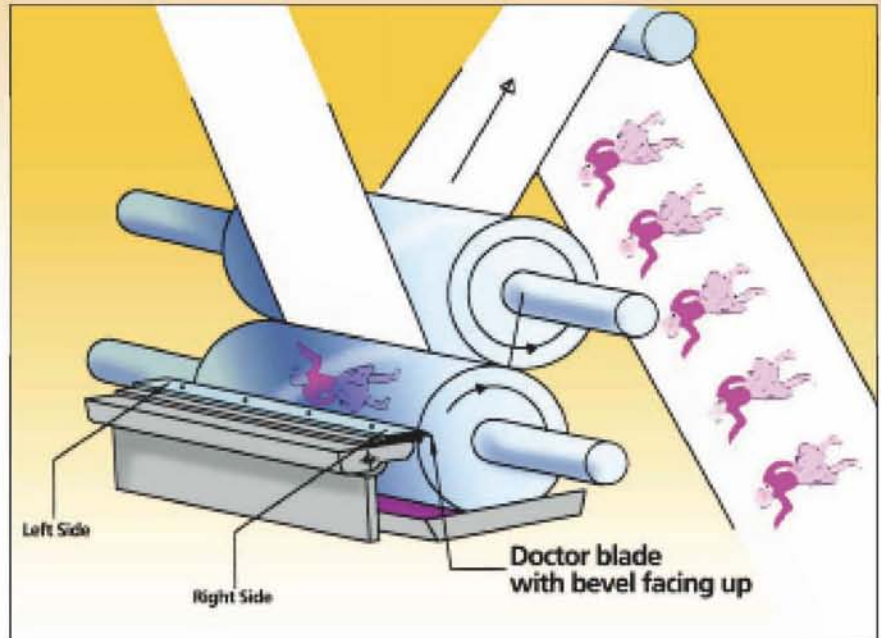
It shows pictures of the doctor blade systems in the chosen position rather than requiring operators to study positioning charts or graphs – or guess.

The set-up pictures are instantly available and retrievable on a press side or other computer terminal. (They can also be quickly printed out for attachment to a paper job setup package.)

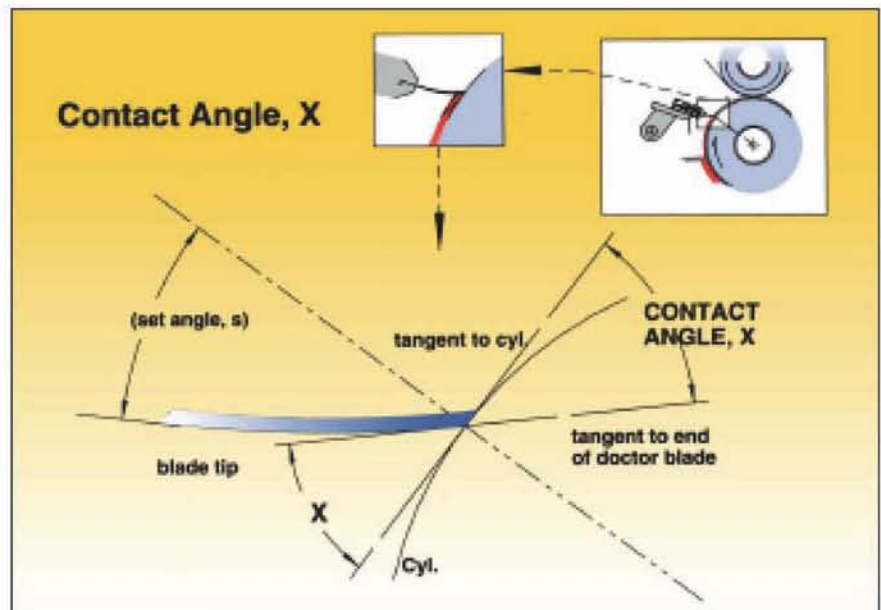
Training keyed to these setup pictures can start new operators off right and cut make-ready time and waste.

GRAVURE CONTACT ANGLE DEFINITION

We at Allison Systems identify our blades with our bevel facing up and away from the observer. The press operator, however may have a different view. In order to keep us on the same page, the left and right sides of the doctor blade (as seen by the operator) are shown below:



The contact angle of the doctor blade and the anilox cylinder is described below. The following microscope photos are examples of sample blades that we have analyzed for contact angles.



MICROSCOPE PICTURE ANALYSIS – SAMPLE 1

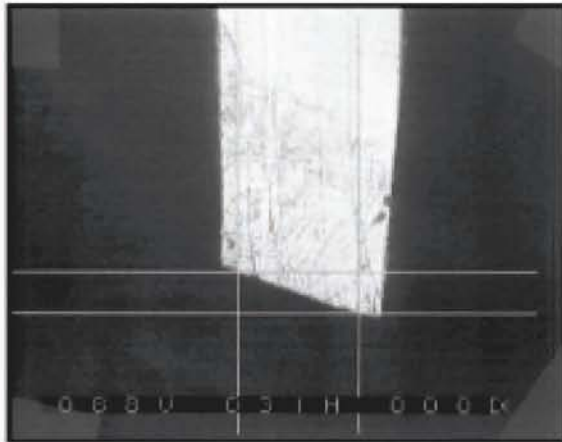
Company Name X4Z
Date 3/22
Test _____ Sample #1
Other Identifier #3-Orange

Left Side
Contact Angle
is 70.59°

Sample



Left Side Microscope Picture

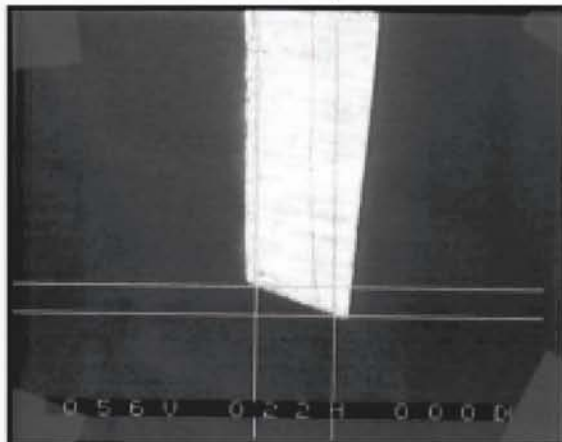


Center
Contact Angle
is 68.55°

Sample



Center Microscope Picture

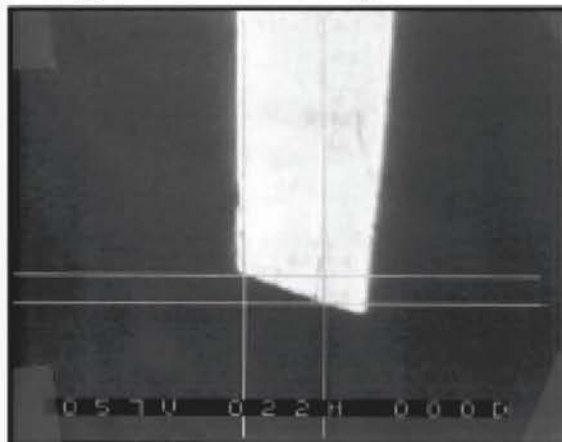


Right Side
Contact Angle
is 68.89°

Sample


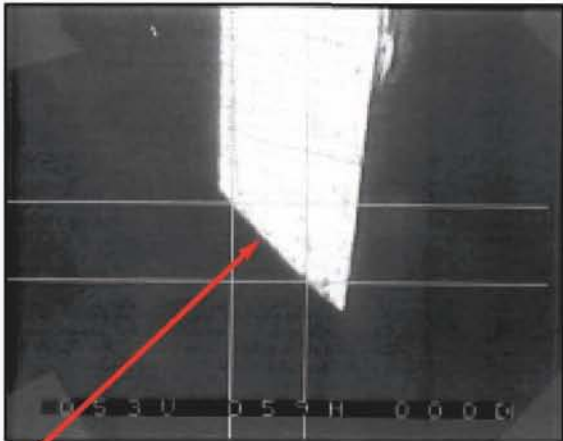

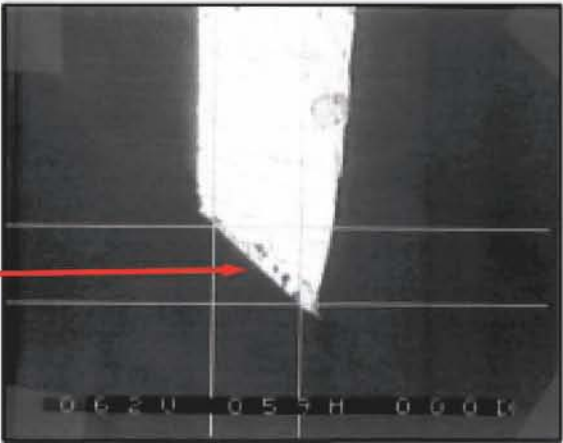

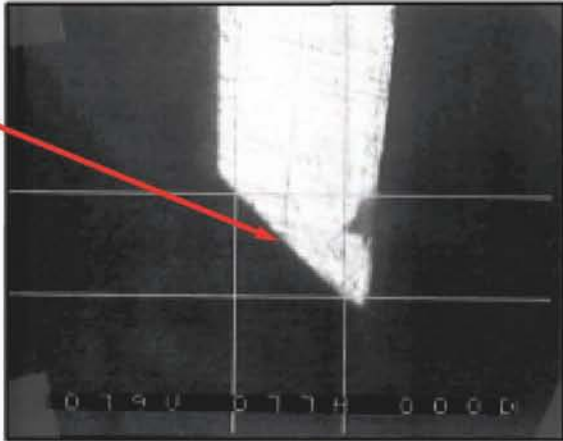


Right Side Microscope Picture



ALLISON SYSTEMS GETS THE EDGE,

MICROSCOPE PICTURE ANALYSIS – SAMPLE 2

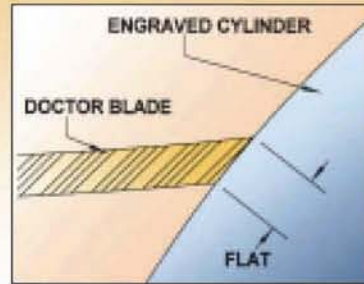
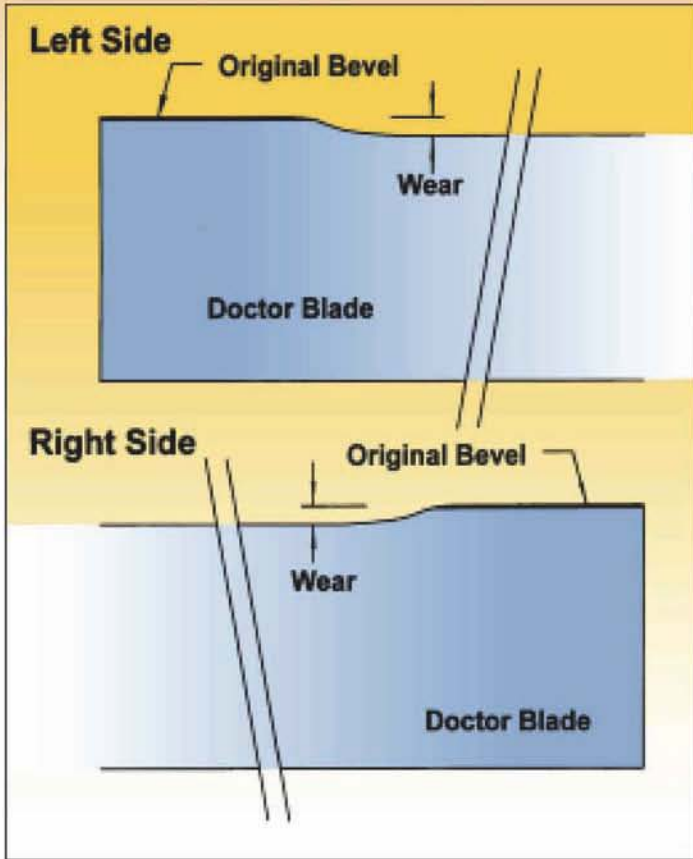
<p>Company Name <u>XYZ</u> Date <u>3/22</u> Test _____ Sample <u>3</u> Other Identifier <u>#6-Brown</u></p> <p>Left Side Contact Angle is <u>47.93°</u></p> <p>Sample</p> 	<p>Left Side Microscope Picture</p> 
<p>Center Contact Angle is <u>46.42°</u></p> <p>Sample</p> 	<p>Center Microscope Picture</p> 
<p>Right Side Contact Angle is <u>68.89°</u></p> <p>Sample</p> 	<p>Right Side Microscope Picture</p> 

Flat & may cause haze

GETS THE QUALITY, AND DOCUMENTS IT.

FORCE

Excessive wear on the doctor blade usually means that too much force is being applied to the blade. The following picture illustrates the wear on a doctor blade:



The tip of the blade that actually contacts the cylinder is referred to as the flat of the blade. The picture at left illustrates the flat.

The chart below contains sample wear calculations:

Wear Calculations

Sample	Original Width	Left side	Center Side	Right Side
1	2.7555	2.7480	2.7500	2.7500
Wear		0.0075	0.0055	0.0055
2	2.7610	2.7525	2.7555	2.7570
Wear		0.0085	0.0055	0.0040

All measurements are in inches

Sample flat measurements are shown in the table below:

Flat Measurements

Sample	Left Side	Center Side	Right Side
1	0.0021	0.0025	0.0022
2	0.0032	0.0030	0.0029

All measurements are in inches

Caution: Installation or removal of doctor, containment, fillers, shims or back-up blades represent a cut hazard since hands may come in contact with sharp edges. Use of cut-resistant gloves is recommended. Follow all plant safety rules for handling and disposal of blades.



LEADING THE WAY IN DOCTOR BLADE INNOVATION SINCE 1968.

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 Website: www.allisonblades.com