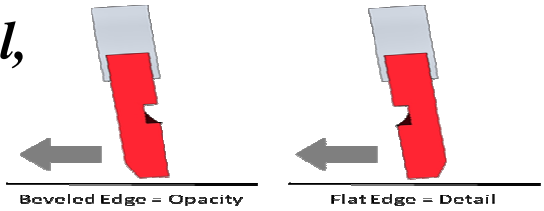
Smilin' Jack
T-shirt Operating Manual

Quick-Start Instructions

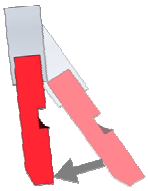
- Just got your first Smilin' Jack?
- Have a "problem" color?
- No time to lose?

Here are the 5 fundamental steps required to upgrade your old-fashioned blade to Smilin' Jack for higher speed and quality at less pressure:

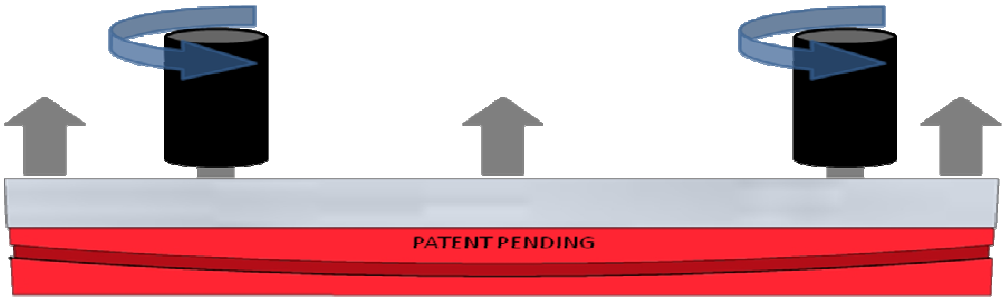
1. Choose an edge; flat for detail, beveled for opacity



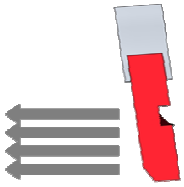
2. Straighten the angle



3. Reduce the pressure



4. Increase the speed



5. And enjoy the ride

Revision 1.3
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Jack has become weary of buying a product and finding the instructions inadequate, in error or conspicuously absent. So he has gone the "extra mile" to give you complete, accurate instructions. Jack will update these and make them available on his web-site www.cprknowsjack.com. If you see any errors, disagree or you'd just like to offer an opinion, we will review it and hope we can use it in the manual. Thank you!

The Smilin' Jack Solution

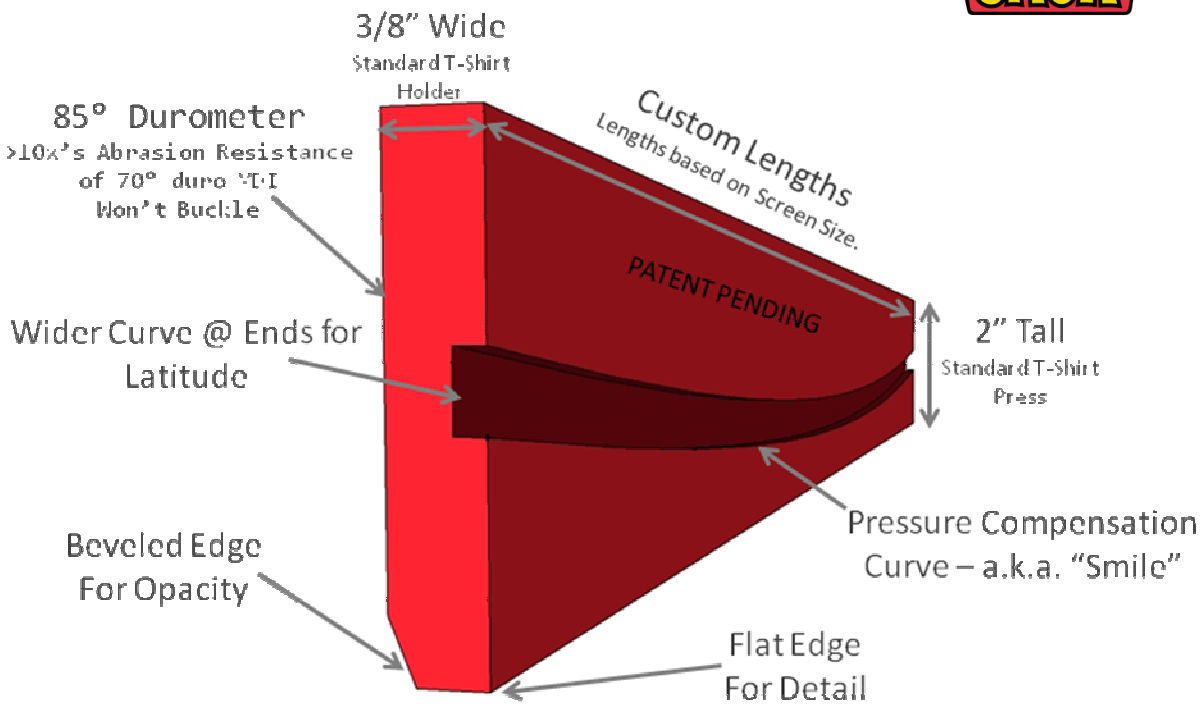

Figure 1: Smilin' Jack Overall Dimensions & Components

Smilin' Jack blades are the first product from CPR geared towards solving problems that have long plagued the Screen Printing Community. Jack utilizes a proprietary pressure compensation curve to allow the blade to adapt to the tension differential across the mesh. By following the simple instructions for proper installation, you can achieve:

1. ***Faster print speed – 25% to 75% increase or more***
    a. Increases productivity
    b. Reduced absorptive (central) build-up

2. ***Lower printing pressure - 20% to 70% reduction***
    a. Less image stretch
        i. Reduces set up time
        ii. Reduces printed reject rate

    b. Extended stencil and mesh life
        i. Fewer blown screens
        ii. Less Down-Time

    c. Reduced hydraulic (perimeter) build up

3. ***Reduced ink build-up; hydraulic, absorptive & thermal***
    a. Less hydraulic [perimeter] build up – reduced shear stress
    b. Less absorptive [central] build-up – less dwell time
    c. Less thermal [flashing] build-up – lower blade-mesh contact

4. ***Improved print quality & consistency***
    a. Consistent layer of ink on shirt-top
    b. Flexibility to choose a thinner [or thicker] deposit
    c. Increases flash speed due to ink film consistency
    d. Lower rejection rate
    e. Lower setup time

5. ***Dual blade flexibility & performance***
    a. Flat edge for detail and reduced ink consumption
        i. Moderate flexion for high speed

    b. Beveled edge for white ink ETC
        i. Maximum flexion due to pressure curve

    c. Engineered per blade length and standard frame I.D.

6. ***Longer blade life than you have ever experienced!***
    a. Abrasion resistance
        i. ≈ 10 times better than a 70° duro, old-fashioned blade
        ii. Don't grind or slice – See Cleaning & Maintenance Instructions

    b. Chemical resistance
        i. Completely resistant to all standard T-shirt Inks
        ii. Resistant to all plasticizers
        iii. Re: Cleaning & Maintenance Instructions

Installation Instructions:

1. **Cut Smilin' Jack to proper length**
   Smilin' Jack blades are designed with a proprietary ***pressure compensation curve*** based on the blade length. If you require a shorter blade length, you can simply cut "Smilin' Jack" down an equal dimension from both ends. For example if you have a 16" blade and want to print with a 14" blade, cut 1" from each end. This way the pressure curve remains functionally in tact.

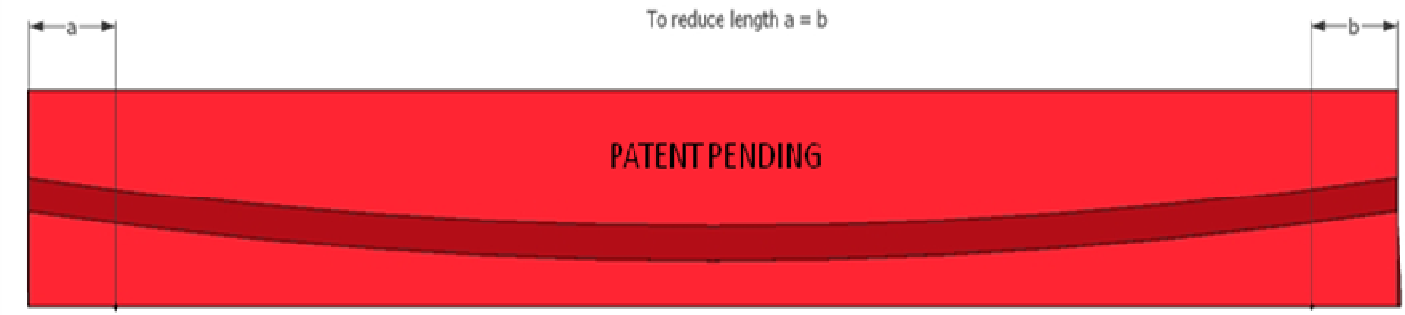

Figure 2: Cutting Smilin' Jack

2. Select the proper edge

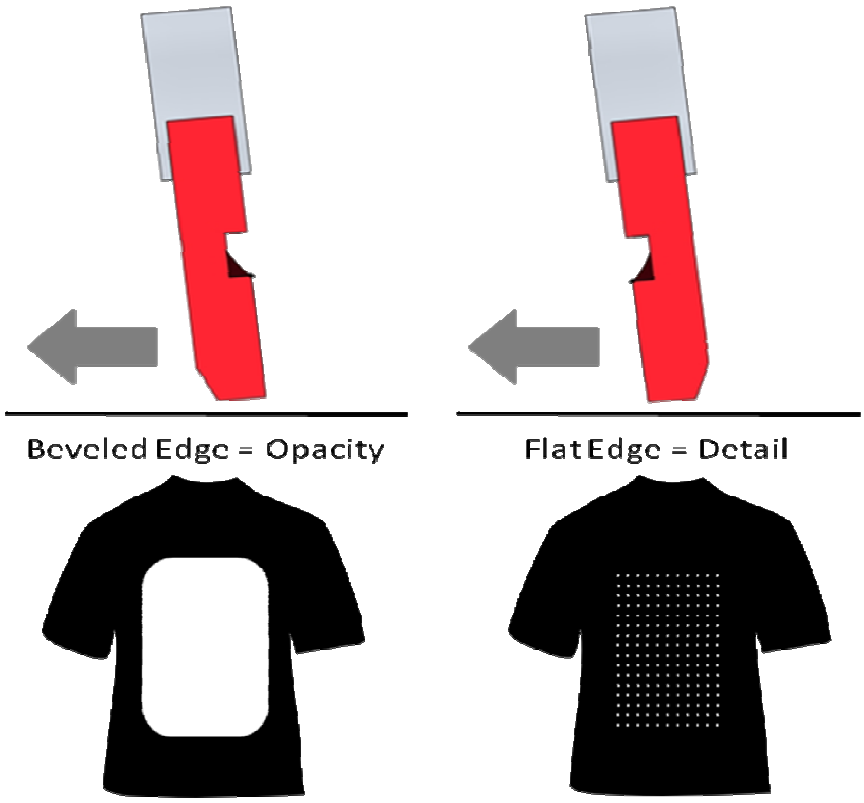

Figure 3: Proper Edge Selection

Smilin' Jack has two printing edges; one flat edge the other beveled

a. The flat edge is used for thinner deposits, finer detail and dark inks on lighter backgrounds.
b. The beveled edge is used for opaque colors, white ink, high density, metallic inks and many special effect colors.

3. Install Smilin' Jack

Insert Smilin' Jack" into any standard squeegee-blade holder so when it is in the printing position, Jack is always "smiling" never "frowning"

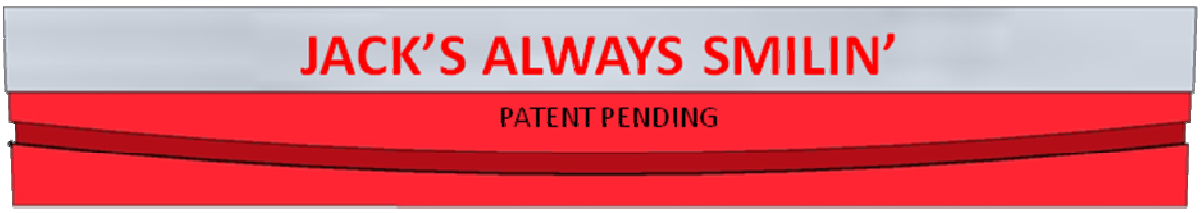

Figure 4: Jack is Always Smilin'

4. Straighten the angle

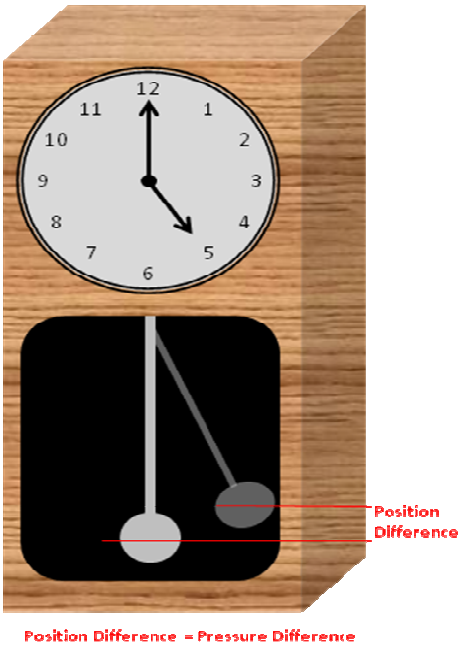

Figure 5: Pendulum Effect

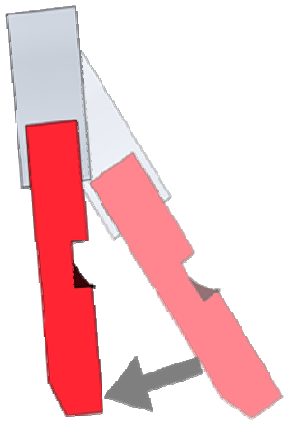

Figure 6: Straighten Blade Angle

Squeegee blades are like the pendulums of grandfather clocks: In a vertical position they reach closer to the bottom of the clock [like when the blade is straight up and down or "vertical"] swing the pendulum upwards and it moves further from the bottom [like when the blade is angled or more "horizontal"].

a. As a result of "The Pendulum Effect" you can adjust the pressure on the mesh by adjusting the blade angle
    i. Increase the blade angle (more horizontal) reduces pressure
    ii. Decreasing the blade angle (more vertical) increases pressure
b. In addition to changing the pressure, adjusting the blade angle also dictates the contact area between the blade and the mesh
    i. Increase in contact area for more fluid pressure – larger deposit
    ii. Decrease in contact area for more speed & detail
c. Smilin' Jack is designed to print at a much lower blade angle (nearly vertical) than is required for an old-fashioned blade
    i. Due to the pendulum effect and the optimum contact area (proper edge selection – per #1) the pressure or force to print with Jack is substantially less
    ii. After installing Smilin' Jack – set your blade angle as low as possible (nearly vertical)
    iii. Small angle increases to optimize printing may be helpful, but the angle will still be much lower than you are accustomed to

5. **Decrease the pressure**

You will find you need to reset the pressure on your automatic press much lower than with old-fashioned blades. If your printing conditions and ink are reasonable you should be able to print around 30 psi. The limitation is based upon the specific relationship between your press, screen and ink. Your automatic is likely to have up to two "pressure adjustments" a threaded "positioning adjustment" and possibly a pneumatic "balancing" adjustment.

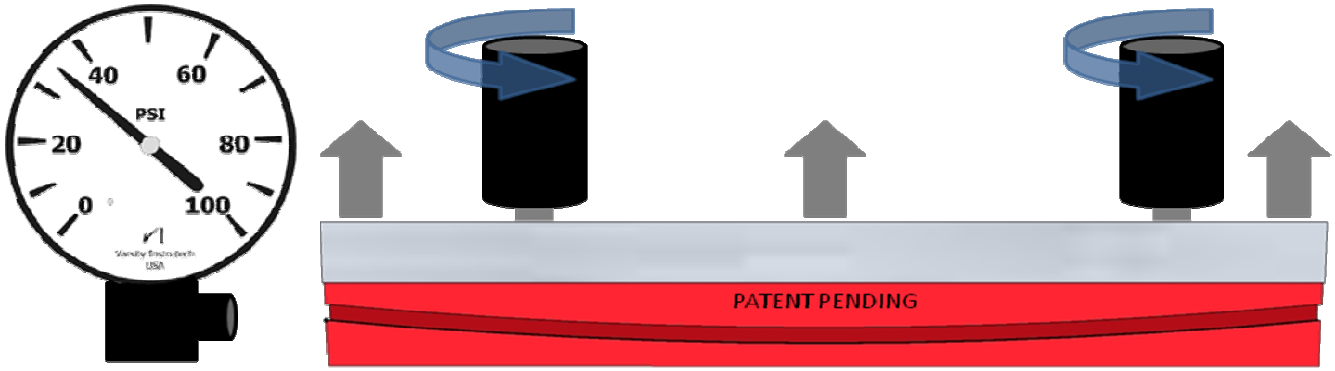

Figure 7: Pressure Adjustments – Jack Runs with Less Pressure than Old-Fashioned Blades

a. Decrease the pneumatic adjustment to 30-40 psi. If your press does not have pneumatic adjustment, move on to step b.
b. Raise the threaded "positioning adjustment" so the blade will barely print or not print at all – make a test print
c. Observe the top of the screen:
    i. If it prints & the residual ink film is thin and consistent, raise the "positioning adjustment" slightly and test again. Continue until you no longer print, then lower the "positioning adjustment" back to the last position and test.
    ii. If one side prints but not the other, raise the side which is printing until both sides match. Now the blade and platen are parallel. While maintaining this parallelism between blade and platen lower the blade a small amount and run a test. Repeat until you print the test consistently.
    iii. If the residual ink film is inconsistent – See Troubleshooting section for details

6. **Increase the speed**
   Smilin' Jack prints at higher speed than any other blade. The actual print speed is limited by the shear rate of your ink. Typically we see a minimum increase of 25% and have experienced greater than 50% increases for certain printing conditions. Your maximum print speed will now be limited by the shear rate of your ink
   a. Increase your print speed incrementally
   b. On the flood pass – if there are pockets and gaps in the ink layer you have exceeded the maximum speed of the ink
   c. Back of on the speed until the flood pass produces a consistent layer

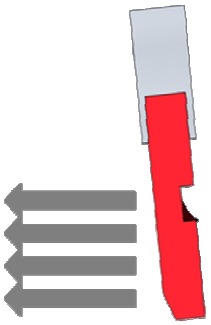

Figure 8: Print Faster with Smilin' Jack
(Now only your ink limits your speed)

You will find Smilin' Jack prints faster with less pressure and more consistency end to end than any old-fashioned blade. If this is not the case see our troubleshooting section below or contact us for assistance.

Now that you have installed Smilin' Jack once, all you have to remember is:

- ***Straighten the angle…***
- ***Reduce the pressure…***
- ***Increase the speed…***
- ***And enjoy the ride!***

Cleaning & Maintenance Instructions:

Cleaning and maintaining Smilin' Jack is quite simple and in general is very similar to proper care for an old-fashioned blade. However, there is one significant difference when maintaining Smilin' Jack:

DO NOT GRIND OR SLICE Smilin' Jack

- ❖ Smilin' Jack is an 85° durometer (manufactured to +3° / -2°)
- ❖ Abrasion resistance is approximate ten times a 70 duro blade
- ❖ Based on abrasion & chemical resistance

NO GRINDING/SLICING REQUIRED

Following these simple steps will allow for significantly longer blade life with more consistent performance.

Daily Cleaning

1) Use your favorite press wash or wash-up
    a. The high abrasion resistance and high chemical resistance of Smilin' Jack permit you to use virtually all press wash-ups and screen wash.

2) Use a stiff bristled brush for Jack's "smile"
    a. The pressure compensation curve requires maintenance and attention just like the old-fashioned blades. It contains no "point-of-propagation" for potential cracks or cavities which could entrap ink.

3) Wet the blade & clean as you would an old-fashioned blade

4) Use brush to scrub Jack's "smile" until clean

Alternative:

There may be times when you find ink lingering in the nuts and bolts of the holder or you have a lot of blades to clean at one time. In those cases, you might use a water miscible wash-up and a pressure washer as you use in your screen room.

a. Apply the ink degradent or wash up to the blade and holder as you would for a ink laden screen frame.
b. Use a stiff bristled brush to clean all parts of the holder and blade
c. Use the pressure washer to remove all degradent and ink residue completely and post haste.

5) Let Smilin' Jack sit unused overnight
    a. The "down-time" will allow Smilin' Jack to release any residual solvents and recover its chemical and abrasion resistant properties
    b. This may not always be practical but rest the blades as often as possible

- If daily cleaning takes more than "a minute" please give us a call
- When you and Jack are ready – Ask us about our sonic blade washer/dryer – ***Jack Wabbit*** and ***Spotless*** the environmentally responsible wash up. The pair cleans blades and holders automatically and then dries them completely, returning them to pristine condition.

<u>Periodic Maintenance</u>

1) Wet an emery cloth with WD-40 (or equivalent lubricant)
    a. Emery cloth to be 600-1200 grit
    b. Emery cloth grit to be selected/adjusted based on printing conditions and indication of wear patterns over time
2) "Wet-sand" Smilin' jack with the wet cloth

Troubleshooting Smilin' Jack (SJ)

- Print & ink residue inconsistent left to right after print
  - Blade setting may be off
    - Check print quality on multiple platens
    - If problem is consistent – adjust blade settings

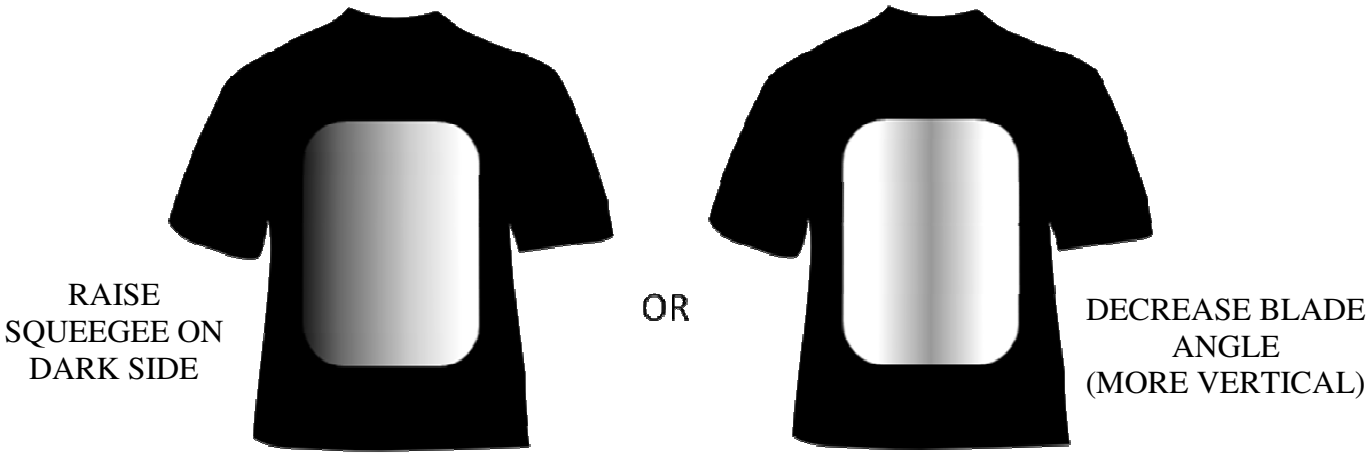

Figure 9: Inconsistent Print Left to Right
(This can be observed in print or in residue on top of screen – check both)

- Print & ink residue inconsistent front to rear after print
  - Screen & platen are not parallel
    - Adjust or re-calibrate press
    - The squeegee blade is not the problem

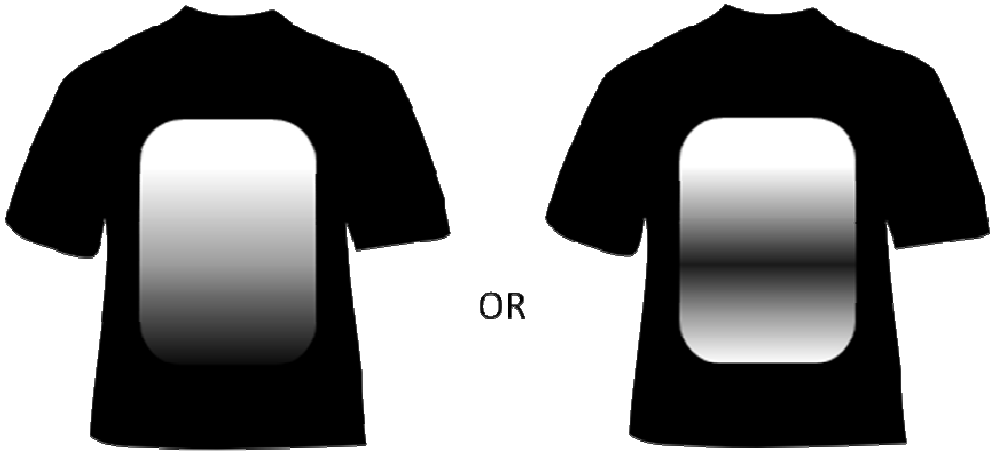

Figure 10: Inconsistent Print Front to Rear
(This can be observed in print or in residue on top of screen)

❖ Print & ink residue inconsistent platen to platen after print
- ➢ The planes of the press beds vary
  - o Adjust or re-calibrate press

Figure 11: Inconsistent Print Platen to Platen
(This can be observed in print or in residue on top of screen)

❖ Print & ink residue inconsistent head to head after print
- ➢ The planes of the screens vary
  - o Adjust or re-calibrate press

❖ Ink is not clearing screen – excess ink left on top of screen (both ends of SJ)
- ➢ Blade angle too high – flat
  - o Decrease blade angle – make it more vertical
- ➢ Off-contact & screen tension high
  - o Reduce blade angle first, then off-contact if needed
- ➢ Blade end too close to frame wall or over edge of platen
  - o Reduce length of SJ by equal amounts on each side *(see figure 2)*

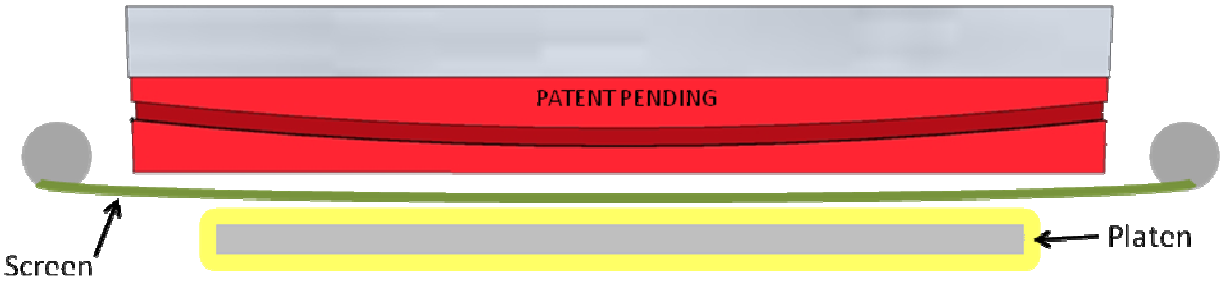

Figure 12: Smilin' Jack Too Long
(See figure 2 for cutting instructions)

❖ Incomplete ink transfer
- ➢ Blade misaligned
  - o DON'T increase the pressure
  - o Raise "low-side" to get consistent ink residue on mesh
  - o Drop both sides equally until print clears up
  - o Index to confirm press is in calibration
  - o Confirm sufficient off-contact distance

❖ Less opacity than shirt, ink & mesh are capable of
- ➢ Pressure too high for SJ
  - o Reduce pressure
- ➢ Using flat edge of SJ
  - o Use beveled edge of SJ for increased opacity
- ➢ Blade angle too low – too vertical
  - o Increase blade angle (lay flatter) on beveled side of SJ

❖ There is only a slight increase in speed with SJ vs. old-fashioned blade

Observe if ink is flooding cleanly without gaps
- ➢ Ink is flooding with gaps – speed has exceeded limit of ink (Shear Rate)
  - o If ink is flooding with gaps – you have reached the limit
- ➢ Ink is flooding cleanly without gaps – surface tension of ink is too high
  - o Reduce surface tension of the ink you are using
    - • Such additives are available from your ink supplier
- ➢ You are using the flat edge of SJ
  - o Use beveled edge of SJ for increased fluid pressure
    - • Increased fluid pressure allows for increased speed

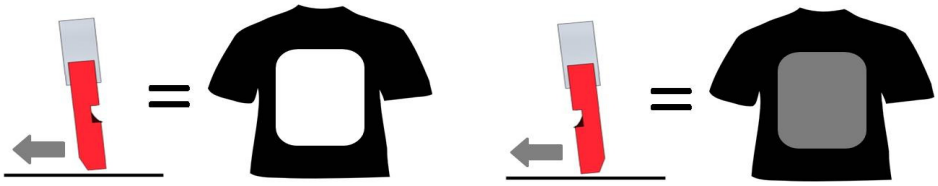

Figure 13: Beveled Edge vs. Flat Edge

❖ Minimal pressure reduction with SJ vs. old-fashioned blade
- ➢ Ink & Mesh are not compatible
  - o Reduce surface tension of the ink you are using
    - • Such additives are available from your ink supplier
  - o Or change the screen mesh to:
    - • Thinner thread w/ same mesh count
    - • Larger opening w/ same thread diameter

Troubleshooting Quick Reference

The quick reference contains the same information as the troubleshooting section above, but is presented in a different manner so that you can access the information in the manner that works best for you.

Issue	Possible Cause	Recommended Action
Print & ink residue inconsistent left to right after print	Blade setting may be off	Check print quality on multiple platens If problem is consistent adjust the blade settings
Print & ink residue inconsistent front to rear after print	Screen & platen are not parallel	Adjust or re-calibrate press
Print & ink residue inconsistent platen to platen after print	Planes of the press beds vary	Adjust or re-calibrate press
Print & ink residue inconsistent head to head after print	Planes of the screens vary	Adjust or re-calibrate press
Ink is not clearing screen – excess ink left on top of screen (at both ends of SJ)	Blade angle too low - flat	Increase blade angle – make it more vertical
	Off-contact & screen tension high	Reduce blade angle first, then off contact if needed
	Blade end too close to frame wall	Reduce length of SJ by equal amounts – each side
Incomplete ink transfer	Blade misaligned	1) DON'T increase pressure
		2) Raise "low side" to get consistent ink residue on mesh
		3) Drop both sides equally until print clears up
		4) Index to confirm press is in calibration
		5) Confirm sufficient off-contact distance
Less opacity than shirt, ink & mesh are capable of	Use beveled edge of SJ	1) Reduce pressure
		2) Switch SJ to print w/ beveled edge
		3) Reduce blade angle (lay flatter) on beveled side
Only slight increase in speed with SJ vs. old-fashioned blade	Exceeded ink speed limit (shear rate)	1) Observe if ink is flooding cleanly w/o gaps
		2) Voids in flood coat = over ink's shear-rate limit (max speed)
	Surface tension of ink too high	2) Ink floods evenly = surface tension of ink too high
		3) Reduce surface tension of ink to increase speed
Minimal pressure reduction with SJ vs. old-fashioned blade	Ink & Mesh Are Not Compatible	1) Opt for mesh w/ high flow rate (thin thread/large opening)
		2) Opt for mesh w/ low pressure drop (thin thread/high count)
		3) Reduce surface tension of ink