RICHMOND
Graphic Products, Inc.

Proudly Introduces…

DirectJET CTS

Computer-To-Screen Direct Imaging System

This latest, innovative technology is now available to screen printers for the digital production of screens.

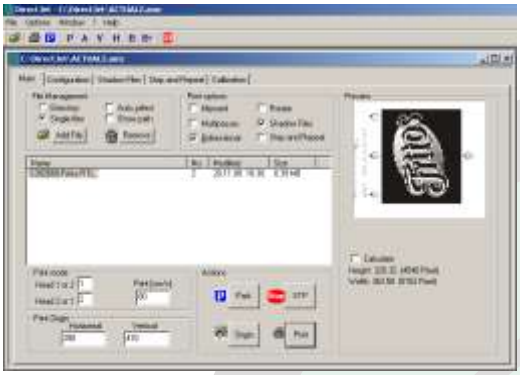
Screens are produced at a higher technical standard and lower cost than screens produced with film.

The decision to reduce costs and improve processes that will increase profits is important to the future of any screen printing operation.

The multi-functional capabilities of the **DirectJET CTS** *not only allow low cost 'film-less' screen making but also; low cost samples, accurate reproductions, faster image transfer, production integrity & operating flexibility, faster machine set-up, faster screen exposures, and higher resolution half-tone screens with precision of 2% - 3% to 95% - 98% dot in excess of 120 lines per inch and sharp crisp line copy below 4 point type while eliminating all the time consuming and costly processes associated with conventional screen making.*

How Does the DirectJET Function?:

DirectJET work station (hard and software)



The DirectJET computer and operating software is an integrated part of the CTS system and is the control station for the operator. The 'glue' that binds the print head technology with the plotter is the Richmond DirectJet software that synthesizes two separate technologies into an advanced screen making system while eliminating costly film and provides maximum image performance in high speeds and error free production. The art department operates as normal, creating what has to be imaged and using proven criteria for items such as dot shapes, lpi, screen angle, half tone patterns, etc. The DirectJet operating software is postscript compatible and accepts files that in most cases have been processed by RIP (raster image processor) software. The output files are automatically sent to a work folder (via network) located on the network or DirectJET work station which the operator accesses to build a queue ready for imaging.

Printing Head

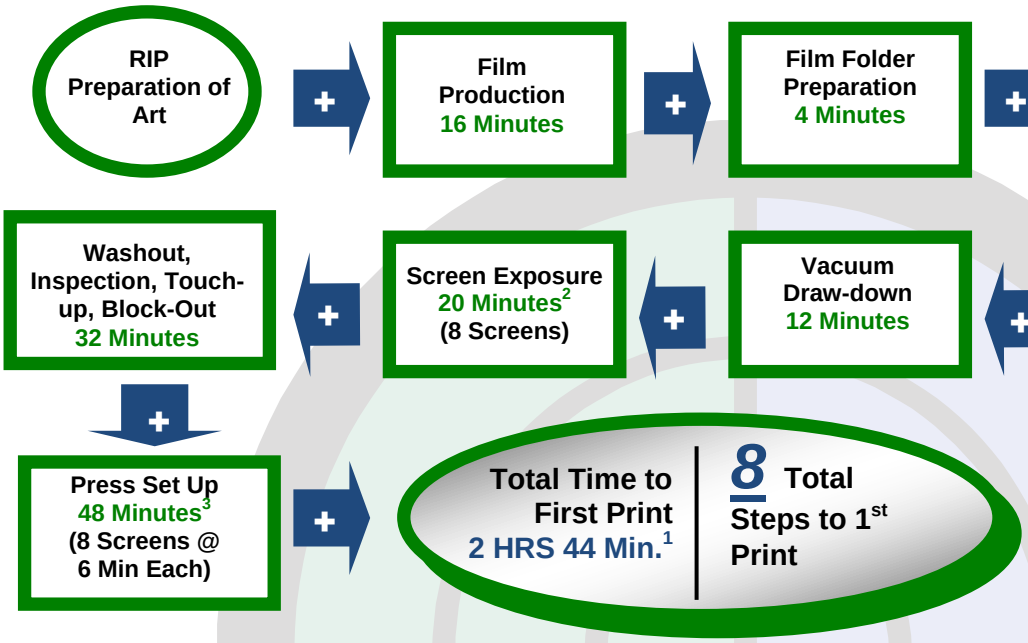
The DirectJET uses two piezo print heads, each featuring a total of 384 jets that lay down a UV resistant "liquid film" onto all standard emulsions. NO SPECIAL EMULSION IS REQUIRED. *They are engineered to meet resolution demands of 2-3% dots, in excess of 120 lpi, imaging in various combinations of 360, 720, 1080 and 1440 dpi with the finest line of .05mm. The UV masking ink is specially designed for complete compatibility with all standard emulsions, capillary films, exposure systems and screen development procedures. The ink is delivered to the heads in a protected closed loop, sealed cartridge system. If service of a print head is required, it can be exchanged quickly.*

Plotter

The plotter is designed and built for commercial purposes with rugged, welded construction, slip free steel band drives, linear guides for superb quality and precision and a safety light barrier to control the work area. It has been engineered to achieve imaging speeds in excess of 100 ft^2/hour. The accuracy of image placement from screen to screen, color to color is .01mm. Each plotter is equipped with an easy load/unload registration/hold down system designed and built according to the specific frames used by the customer.

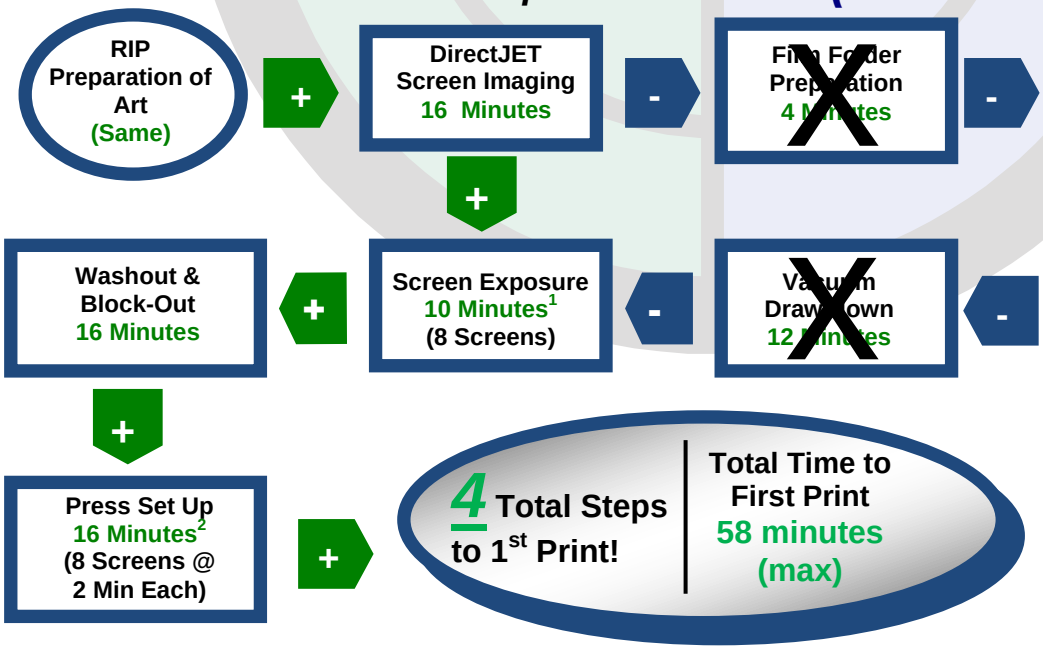
Faster Workflow:

OLD Time Flow of Screen Making with Film - (8 Color Job)



1. Times for RIP, inspection, art filing, vacuum drawdown, screen-prep and film production are conservative estimates. Times can be longer depending on equipment & methods used.
2. Exposure times are greater because of glass and film.
3. Registering jobs on press takes longer using film because the images are not located in the precise position from screen to screen.

NEW Time Flow with Computer to Screen - (8 Color Job)



1. The lack of film, glass and vacuum drawdown eliminates pinhole re-touching and overall screen making time.
2. X-Y homing with *DirectJET CTS* results in faster setup times. Exact positioning of every image on every screen insures 100% repeatability of image location screen to screen, color to color resulting in fast registration of printing machines.

Digital File and Color Separation:

The easy to use DirectJET operating software is postscript compatible and can be used with third party RIP software. The art department continues to generate artwork using their current graphic software (I.e., Illustrator, Freehand, CorelDraw, QuarkExpress, CAD systems, etc.) whether using a PC or Mac and generating color separations with their current RIP software or one purchased through Richmond. Richmond creates custom templates within the graphics software that match each screen size used. The computer &/or server that hosts the rip software is typically networked to the DirectJET workstation. The ripped files land in a designated work folder on the DirectJET workstation or network which the operator accesses to build a production queue for screen making.

Screen Frame and Mesh Preparation:

Selection of screen frame & profile, screen meshes, mesh counts, mesh colors, types of emulsion or capillary film, number of coating passes, stencil thickness, exposure system and developing techniques remain unchanged. However, in the event a shop uses a self contained Exposure unit with glass and vacuum, Richmond recommends purchasing an exposure system geared specifically for CTS imaging.

UV masking - Digital Image Transfer:

UV masking is the main function of the DirectJET CTS system as a screen making unit. The digitally prepared artwork is imaged directly on an emulsion coated screen with high density, UV masking ink. The DirectJET operating software controls the printing heads and plotter speed to accurately transfer defined imaging data with a very high degree of precision and productivity. The software uses advanced seek and skip plotting technology allowing the print heads to travel directly to the areas of the screen being imaged.

Screen Exposure:

Much time and productivity is gained in the screen exposure step with the elimination of glass and film and vacuum draw down. Exposures are faster since each surface (side) of film and glass can absorb as much as 7.5% of the light that passes through it. Combine the 30% decrease in UV exposure time with the elimination of vacuum draw down time and the total exposure process takes HALF the time of conventional film exposing. Once a screen has been imaged with the DirectJET it is ready for exposure. The UV resistant mask does not need to dry. Imaged screens can be immediately exposed or exposed at a later time. The other great advantage of DirectJET imaging is increased image quality. Since the UV masking ink is in perfect contact with the emulsion, it is impossible for light to penetrate under a dot causing undercutting. With the DirectJET it is possible to hold 2% dots that get blown away using film.

Screen Development:

Using the same methods currently used, the unhardened emulsion that is imaged with the UV mask is washed out and the screen is dried. However, no touch-up is required because there are no pin-holes from vacuum frame, glass or film dust.

Benefits...

- ✓ **The *DirectJET* CTS *ELIMINATES FILM…***
  NO FILM AND FILM LABOR EXPENSES!

- ✓ *The **DirectJET** CTS pays for itself in savings with or without "new revenue."*

- ✓ *The **DirectJET** CTS provides cost savings beyond eliminating film. Your payback analysis is focused to three areas*

1. *elimination of actual film and output costs, cost of storage folder and its maintenance cost,*
2. *reduced time/labor from screen production requirements,*
3. *reduced press set-up time yielding greater press production.*

Advantages of DirectJET system:

- High resolution halftone screen with precision of 2%-3% to 95% - 98% dot up to 120 LPI and sharp crisp line copy below 4-point type.
- The DirectJET CTS allows every screen to have the image in exactly the same location on each screen, color to color and screen to screen. Printing press set-up times are reduced drastically.
- Accurate alignment of the printing image on screen reduces set-up times of finishing equipment, such as die-cutting, embossing platens, vacuum forming etc.
- The positive imaging procedure means the screen is imaged only where it needs to print. Ink consumption is subject to the imaged area only. Unlike film, there is not waste. Save up to 80% cost.
- Registration of image to image is +/- 0.01 mm.
- Pre-press set-up features in DirectJET software. No need to step & repeat, tile or gang images etc. in artwork.
- Precise imaging of screen to screen means remakes can be reproduced accurately and at lesser time than conventional procedure – reducing press downtime.
- Up to 50% faster exposure. No vacuum frame, glass or film to expose screen.
- No touch up. No pin-holes from glass and film.
- No under exposed image as UV masking ink is perfectly in contact with emulsion coated Screen.
- No special skills are required to operate the DirectJET CTS.
- Eco friendly, water based ink. *"It may look black, but it's very green."*

Unchanged standard screen making processes:

- Selection of screen frame and profile.
- Selection of screen mesh or mesh color.
- Use of new screens or used screens.
- Types of emulsion or capillary film.
- Emulsion coating methods or emulsion thickness.
- Exposure lamp and distance.
- Screen Development.

Elimination of Cost and Tasks associated with film:

- Elimination of film cost.
- Time element and communication problems with the service bureau.
- Separation of film.
- Enlargement or reduction of film.
- Inspection of film.
- Preparation of film.
- Cataloguing and Storage of film.
- Retrieval of film.

Saving of Labor, Time and Cost with DirectJET CTS:

- Labor and time for pre-press work, such as step & repeat, tile or gang images etc. in art file.
- Waiting time for film from service bureau.
- Cost of storage folders of film.
- Labor for management of film.
- Accurate alignment and mounting of film onto screen.
- Waiting for vacuum to secure screen frame to film.
- Up to 50% faster exposure times. No vacuum, glass and film.
- Vacuum exposure frame - No more glass breakage, scratches, replacement rubber, seals, emulsion residues, film edges, newton rings, static problems, dust etc.
- Touch up of pin-holes from glass and film dust.
- 8% to 10% failure of expose and screen damage.
- Faster press set-up.

Look at all art and screen factors and compare the new opportunities for cost reductions with the DirectJET CTS.

Screen Room:

*The reduced number of procedures increases the value added by the **DirectJET** CTS*

DirectJET CTS Payback Analysis...

*The DirectJET CTS system improves your workflow and your cash flow from the day of installation. It is easily paid for by cost reductions - film savings, screen production efficiencies and press turn. An ROI on **DirectJET** CTS investment is approx. 12 to 24 months depending on capacity utilization.*

DirectJET CTS

Standard Specifications:

Resolution	360 / 720 / 1080 / 1260 / 1440 dpi
Halftone Resolution	Up to 120 lpi
Finest Line	.05 mm
Image Density (opacity)	4.2 UVA resistance
Compatible File Formats	PS, EPS, TIFF, PDF & more
Stencil Ink Chemistry	Water Based (HMIS rating: health 1, fire 0, reactivity 0)
Stencil Ink Delivery	Closed loop, easy load 220 ml cartridges (6)
Print Head Type	Piezo (2)
Cleaning	Automatic cleaning station for piezo heads
Stencil Ink Cost	On average 15¢/ft^2 for solid, 4¢/ft^2 for half tones
Imaging Speed	Over 100 ft^2 / hour (> 9.3 $m^{2)}$
Operating Conditions	60-85° Fahrenheit (16-30° Celsius), 50-80% Humidity (non condensing)
Electrical (DirectJET & computer)	110/220V, 20 amps, 50/60 Hz, 1 phase (outside US: 220v, 10 amps)

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