

Mitsubishi Silver DigiPlate™ Technical Guide



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Introduction

Mitsubishi Silver DigiPlate™ material is an offset printing plate based on Silver Halide Photographic principles. The plate is imaged by a laser imagesetter or platesetter and then processed in SilverMaster® Activator and Stabilizer. This direct-to-plate process eliminates the need for intermediate steps such as film making, masking and stripping.

Silver DigiPlate™ materials provide excellent printability with minimal effort. Digiplate is compatible with almost any laser imagesetter and virtually all offset presses.

This manual is intended to give an overview of Silver DigiPlate material, explain its properties and provide some set-up and troubleshooting techniques for operators working with this material.

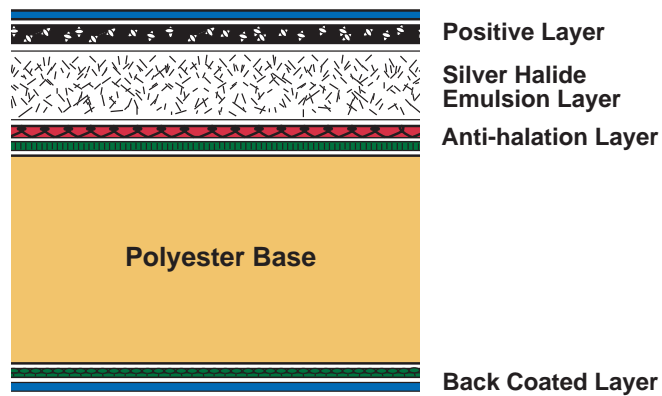
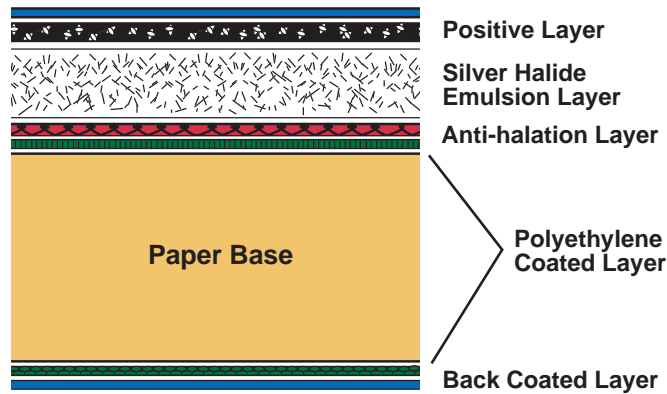


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Structure

Silver DigiPlate™ material is a direct offset plate material based on the diffusion transfer reversal process.



Silver DigiPlate™ is a POSITIVE working material.

This means:

- The area exposed to light becomes visibly black.
- The area which has **NOT** been exposed to light turns silver.

The actual silver precipitated on the image area of the plate surface has a high lipophilic property and is receptive to printing ink (oil). The non-image area has a hydrophilic property, which means that it is impervious to printing ink but receptive to fountain solution (water).



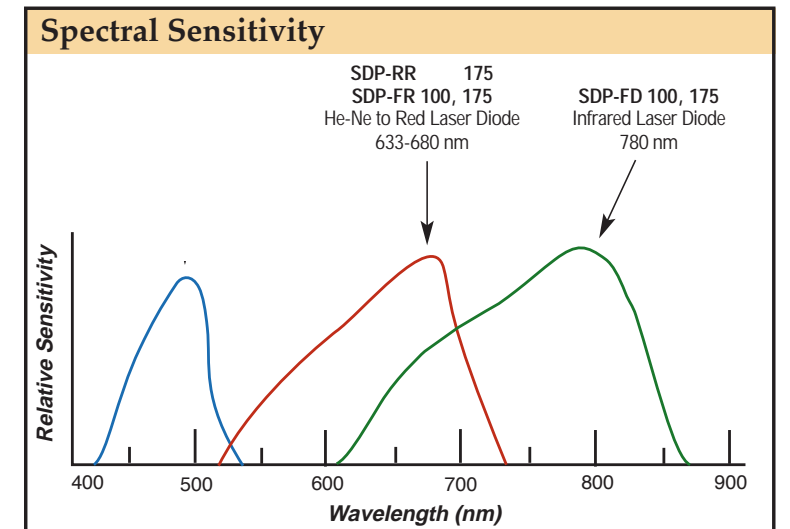
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Spectral Sensitivity

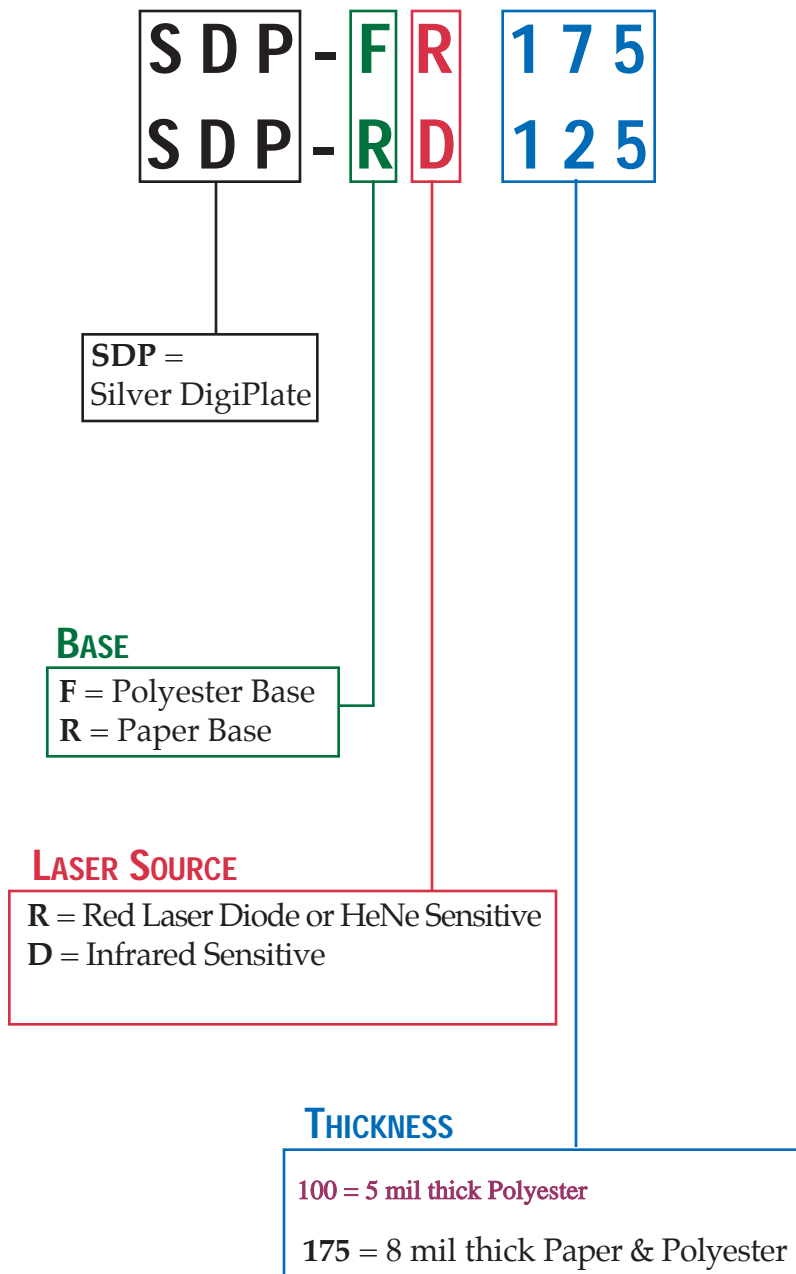
Silver DigiPlate™ material is available for different laser exposure devices.

Thickness (Approx.)		
Helium Neon 633nm to Red Laser Diode 680nm		
SDP-RR 175	Paper Base	.008" (.020mm) thick
SDP-FR 100	Film Base	.004" (.010mm) thick
SDP-FR 175	Film Base	.008" (.020mm) thick
Infrared Laser Diode 780nm		
SDP-FD 100	Film Base	.004" (.010mm) thick
SDP-FD 175	Film Base	.008" (.020mm) thick



Run Length Information:	
Polyester Base	25,000 impressions
Paper Base	10,000 impressions

How to read the Label on Silver DigiPlate™ Materials



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Silver DigiPlate™ Material Specifications

Silver DigiPlate is shipped to the end-user in roll form. Refer to the chart below for current material specification information.

Current Silver DigiPlate (SDP) Specifications

Spec. #	Core I.D.	Emulsion Winding	Description	Base Material
28	2.0" (50.8 mm)	In	Bulk Roll	Paper
28SD	2.0" (50.8 mm)	In	Simple Daylight	Paper
28R	2.0" (50.8 mm)	Out	Bulk Roll	Paper
28RSD	2.0" (50.8 mm)	Out	Simple Daylight Cassette Limited Daylight	Paper Paper Paper
820	2.0" (50.8 mm)	In	Bulk Roll	Polyester
820SD	2.0" (50.8 mm)	In	Simple Daylight	Polyester
820R	2.0" (50.8 mm)	Out	Bulk Roll	Polyester
820RSD	2.0" (50.8 mm)	Out	Simple Daylight	Polyester
867	2.0" (50.8 mm)	In	Cassette	Polyester
989SD	2.805" (72.5 mm)	Out	Simple Daylight	Polyester
989LD	2.805" (72.5 mm)	Out	Limited Daylight	Polyester
989RSD	2.805" (72.5 mm)	In	Simple Daylight	Polyester
989RLD	2.805" (72.5 mm)	In	Limited Daylight	Polyester
			Bulk Roll	Polyester

Cassette = Disposable roomlight handling cassette

Simple Daylight Load (SD) = Paper end flanges, No black leader

Limited Daylight Load (LD) = Plastic end caps, No black leader

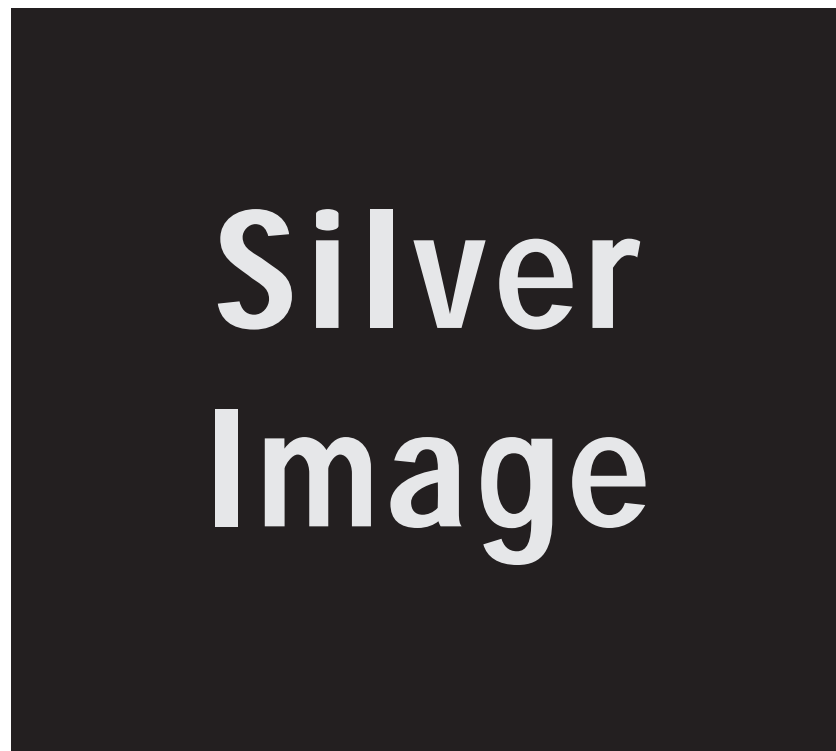
100' lengths have 3mm core wall thickness

200' lengths have 5mm core wall thickness

Exposure

Silver DigiPlate material is a **first-generation** plate. The image is transferred directly onto the plate and does not go through the interim step of making film and transferring the image to plate. Because it is first-generation, it is imperative to expose and process this material under proper conditions.

When exposing Silver DigiPlate material, always employ the **negative exposure mode**. The finished product should be a negative image (silver image on black background) and a right-reading copy (used for offset printing).



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Follow the steps below to determine and maintain correct exposure on Silver DigiPlate material.

Recommended Exposure Method

Determine Initial Exposure Settings:

- Prepare a digital file consisting of positive and negative thin lines which will be output by the imagesetter (see figure #1) or use the Mitsubishi Paper Mills digital exposure target (See figure #2, below, and next page). This target is available at the Mitsubishi Imaging (MC), Inc. website, located at www.mitsubishimaging.com.
- Output this file at different exposure settings.
- Use a loupe (30-50 Power) to inspect the point at which the positive and negative lines intersect. Optimum exposure is reached when the positive and negative thin lines are equally reproduced.

Figure #1 — Exposure Level

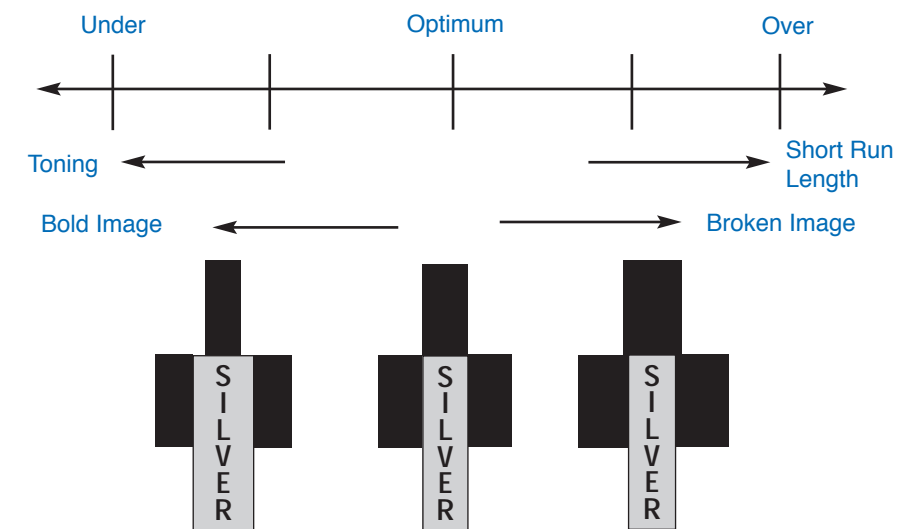
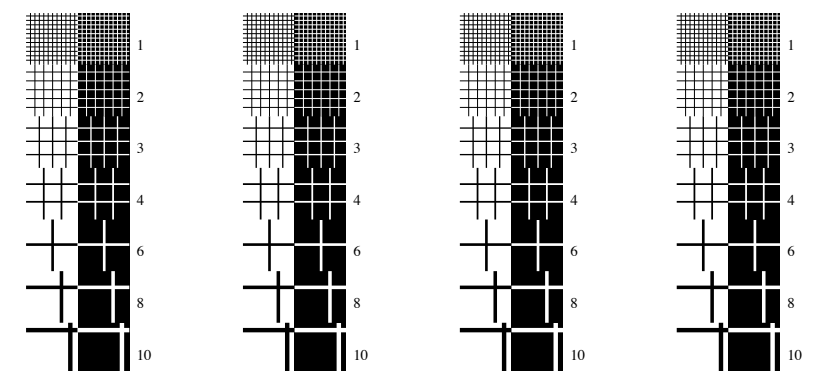
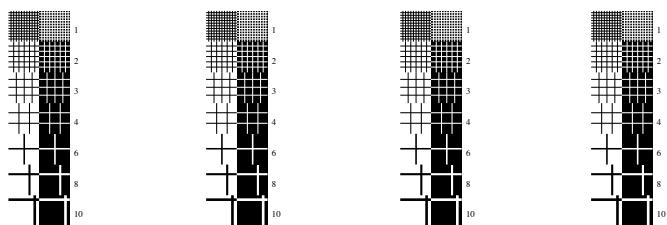


Figure #2 — Digital Exposure Target (partial)



Mitsubishi Silver DigiPlate Test Pattern



Nega/Posi Line (beam)

BW/Pattern 1 (Ver1.0b2)

Times-Roman
abcdefghijklmnopqrstuvwxyz

Times-Italic
abcdefghijklmnopqrstuvwxyz

Times-Bold
abcdefghijklmnopqrstuvwxyz

Times-BoldItalic
abcdefghijklmnopqrstuvwxyz

Helvetica
abcdefghijklmnopqrstuvwxyz

Helvetica-Oblique
abcdefghijklmnopqrstuvwxyz

Helvetica-Bold
abcdefghijklmnopqrstuvwxyz

Helvetica-BoldOblique
abcdefghijklmnopqrstuvwxyz

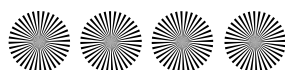
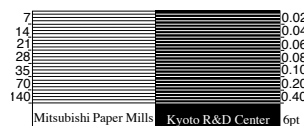
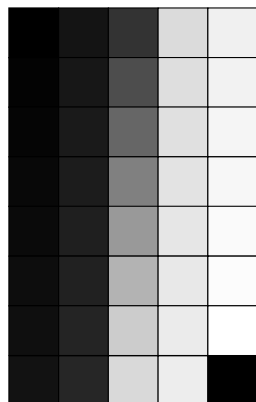
Courier
abcdefghijklmnopqrstuvwxyz

Courier-Oblique
abcdefghijklmnopqrstuvwxyz

Courier-Bold
abcdefghijklmnopqrstuvwxyz

Courier-BoldOblique
abcdefghijklmnopqrstuvwxyz

Font



Tint Wedge Chart
StarBurst Chart
Nega/Posi Fine Line
(Adobe Illustrator™)

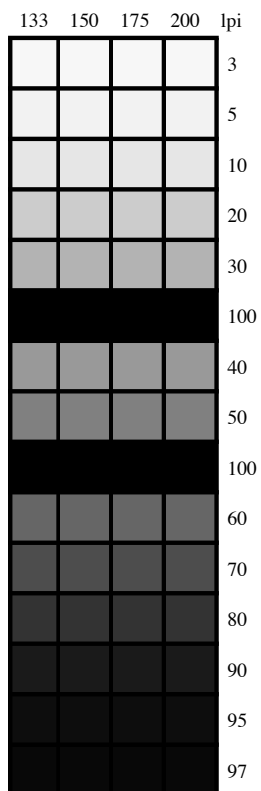


Image Wedge Chart

SDP TEST PATTERN

DATE : / /
 MATERIAL :
 IMAGESETTER:
 RESOLUTION :
 DENSITY :

Optional Exposure Method

An alternate method of checking exposure follows:

- Expose a piece of SDP material to daylight for approximately 2 minutes.
- Process material under optimum conditions (correct chemistry temperature, pH & speed parameters).
- Using a reflective densitometer, measure the background density of the plate that has been exposed **ONLY** by daylight. This represents the **Maximum Density** of the plate, also referred to as D-Max. Examples of Maximum Density:

SDP-FD > 1.43 SDP-FR > 1.39 - 1.40
 SDP-RD > SDP-RR >

- Subtract (.06 to .07) from the value read. This new value represents the **Optimum Density** of the plate. For SDP-RR use (.03 to .04) to subtract from maximum density.
- Output and process a plate that has been exposed by the laser imagesetter's light.
- Adjust the laser setting to reflect the Optimum Density.

Refer to the following Sample Exposure:

Maximum Density reading	1.43
To reach Optimum	- .06
Optimum Density (+/- .01)	1.37

Output a sample plate of the work to be printed to optimize exposure.

Increase the laser intensity if the background is too low or not black enough. Decrease the laser intensity if the background is too dark or too black. **Symptoms of an incorrectly exposed plate include:**

Under Exposure

Some of the silver emulsion comes to the plate surface. This may result in background toning and printing of the lines.

Over Exposure

Excessively thin characters are observed or fine lines drop out. If a plate is overexposed, fine lines become thinner and may break up when printed. The run length of the plate may also decrease, even though the image looks good.

Calibration

The focus and exposure conditions must be set before performing the imagesetter dot size calibration. The procedure for calibrating the imagesetter is done in two steps. The first step is to linearize the imagesetter so that the input data dot % values and output recorded dot % values on film (or SDP) are equal or linear. The second step is the calibration for the printing process. The objective in this calibration step is to generate a transfer curve that is characteristic of the printing conditions for the job. The transfer curve is used in the RIP to generate film or plates that will print with the optimum tone reproduction.

Note that the procedures are given for calibration of a conventional system (film output and aluminum metal plates). The transfer curves for the conventional system will be used as targets or standard curves for calibration of the imagesetter to output Silver DigiPlate.

Standard Calibration:

Use delivered value on imagesetter RIP

Process Calibration:

1. Make output of dot wedge pattern on the SDP with standard screen gradation curve for imagesetting film.
2. Print with this plate under the same conditions as the metal plate.
3. Measure the dot % of the printing copy.
4. Evaluate the actual dot % values compared with the values of metal plate. If you notice a difference, change the screen gradation curve in the RIP.

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Processing Conditions

Silver DigiPlate is processed in SilverMaster SLM-AC Activator and SilverMaster SLM-ST Stabilizer. This is the same chemistry used to process SilverMaster camera plate material.

Both the Activator and Stabilizer come in a concentrate solution of 4x1 gallons (15.2 liters) to the case.

- Activator should be diluted with water at a 1:1 ratio.
- Stabilizer should be diluted with water at a 1:3 ratio.

Development Time	20-30 Seconds
Activator Temperature	82-88° F (28-31° C)
Stabilizer Temperature	Room Temperature
Dryer Temperature	100° F Paper (38° C) 110° F Polyester (43° C)
Activator Replenishment Rate	.5 oz/ft ² (150 ml / m ²)
Stabilizer Replenishment Rate	.625 oz/ft ² (200 ml / m ²)
Water (if provided in processor)	Room Temperature Batch or Replenishment

Chemistry

What happens in the Activator?

As the plate enters the activator the latent image in the emulsion layer is turned black. Meanwhile, the unexposed silver halide in the emulsion layer is dissolved and diffuses onto the positive layer. The dissolved silver halide reacts with physical developing nuclei in the positive layer and results in the formation of metallic silver.

What happens in the Stabilizer?

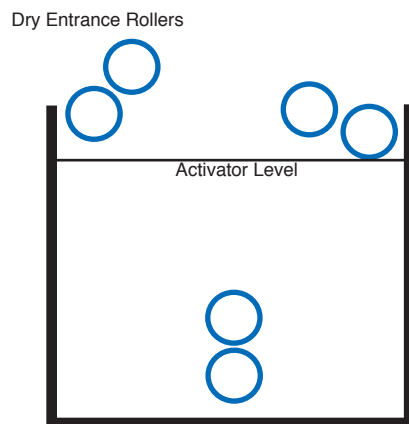
After the development is completed, the plate enters the stabilizer solution where the high pH on the plate is neutralized.

The pH of the silver image is lowered to a value more suitable for offset printing. Other properties that ensure stable storage for a period of time are also imparted during stabilization.

Why is the Roller configuration in my processor so important?

The optimum roller configuration of the rack inside the Activator tank is where the entrance rollers are completely outside the chemistry or are completely submerged in liquid.

Note that wet entrance rollers can cause pre-development to occur on the plate. This means that the plate starts to develop and then stops because it does not have enough Activator to complete the process. Once this occurs, areas of the plate are only partially developed and will not continue to develop fully as it continues through the tank.



If processor is not as described, please check with your processor manufacturer to determine if a conversion kit is available for your make or model machine.

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pH

Consistent output requires maintenance of the processing conditions. By monitoring the pH of the SilverMaster Activator and Stabilizer you will always know when it's time to change your chemistry.

pH is a measurement of the value of acidity or alkalinity of a particular solution. The pH scale goes from 0 to 14 with 0 being the most acidic and 14 being the most alkaline.

Calibrate your pH meters using a buffered solution. Both SilverMaster Activator and Stabilizer are highly buffered solutions. Use undiluted chemistry fresh out of the bottle to calibrate the pH meter.

Use separate pH meters for each chemistry.

pH meters are normally calibrated at 3 standard buffer solutions. These solutions are at a pH reading of 4.0, 7.0, 10.0. Because the Activator pH is so high (13.6), the range of the meter cannot measure it accurately.

On this scale, each successive number is 10 times the pH value of the last number. For instance, 8 is ten times as alkaline as 7, and 9 is 100 times as alkaline as 7.

The ability of a relatively simple pH meter to measure accurately at both the bottom of the scale and at the top of the scale at the same time is doubtful with one meter. For this reason, two meters are needed for monitoring. Your meters should be calibrated just before use and they should be calibrated to the solution of a known pH fairly close to the pH of the solution to be tested.

Measure and chart your pH readings daily.
(See chart at end of Technical Guide)

Activator

In the Bottle	13.6 pH
Diluted 1:1 with water	13.5 pH
Change when pH reaches	12.8 pH or lower

Stabilizer

In the Bottle	5.6 pH
Diluted 1:3 with water	5.8 pH
Change when pH reaches	7.0 pH or higher

Replenishment

The replenishment of fresh chemistry into the processor is done to maintain stable performance and chemistry life. As long as the pH of the chemistry stays within operating range, there should be no loss of chemistry performance.

The replenishment rate for SilverMaster Activator is 0.5 oz/ft² (150 ml / m²) of material. To allow for the carryover of the Activator into the Stabilizer, the Stabilizer should be replenished at a slightly higher rate. Stabilizer should be replenished at 0.625 oz/ft² (200 ml/m²) of material.

If the processor has Oxidation Replenishment, the Oxidation Replenishment should turn over the entire volume of the tank at least once between chemistry changes.

Example:

A 12" x 200' roll of plate material will require around 100 oz. or about .75 gallons (2.85 liters) of replenishment for Activator. The Stabilizer will require approximately 1 gallon (3.85 liters) of replenishment.

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Printing

Silver DigiPlate material can be mounted on press immediately after it has been completely processed and dried. The plates can run on virtually all offset presses using their existing dampening systems and fountain solutions. In some cases Mitsubishi fountain additives such as OA-1 and OA-2 can improve printability.

Punching / Bending for Press

Imagesetters designed for color work usually have their own punching systems in order to aid in registration. Press-specific punch holes are achieved by re-punching in a separate device. Re-punching can be done on the puncher provided by the press manufacturer or a special transfer punch and trimmer from Ternes or Stoesser.

Unfortunately some imagesetters don't have a punch system. In this case, it is necessary to develop a system of punching by use of registration marks and the existing press punch.

Bending Polyester Plates:

Many types of web and some sheetfed presses equipped with an automatic plate-loading system require the plate to be bent before mounting. Polyester plates that are used in these presses must be bent by thermal means.

Mitsubishi also offers machine solutions for this application. Please contact your local Mitsubishi dealer or Mitsubishi Sales Representative for information.

Press Conditions

Silver DigiPlate material **initially** requires 5-10% more water than a metal plate on start-up. Confirm roller settings and roller durometer before start-up. In general, the press should be adjusted according to manufacturers' recommended specifications.

Standard settings are as follows:

Ink form roller	1/8 - 3/16" (3-5mm) Stripe
Moisture form roller	5/32 - 3/16" (4-5mm) Stripe

Be sure not to over-pack the plate-to-blanket cylinder as this can cause printing problems and shorten the life of the plate. Refer to the Press Specifications and use as light a pressure setting as possible without hindering ink transfer.

Fountain Solutions

The major brands of commercial fountain solutions will work well with Silver DigiPlate material. Changing between Silver DigiPlate and metal plates can be done easily with the correct fountain solution mixture. Acid-based, neutral-based and alkaline-based solutions used in conjunction with Mitsubishi wetting agents OA-1 and/or OA-2 will work very well.

Check Conductivity and pH to establish a starting point for the chemistry mix and to monitor the solution during its use. Conductivity is a measurement of how easily a current passes through a solid or, in this case, a liquid. By increasing the solution strength you will normally increase the conductivity of the working solution. Some solutions are formulated to work at an extremely low conductivity. Most solutions not containing alcohol substitutes will range from 900-1500 in conductivity. Use the recommended directions on the solution for mixing ratio.

Mitsubishi produces two fountain solution formulas; **SLM-OD** for conventional dampening systems and **SLM-OD50** for continuous dampening systems.

SLM-OD is formulated for use with conventional and integrated dampening systems. The solution should be mixed as directed, although some adjustments may have to be made to accommodate for differences in tap water and press conditions. Start with a dilution of 15 to 1. Normal conductivity range is 900-1500.

SLM-OD50 is formulated for continuous dampening systems and large web presses. This product is very concentrated and should be mixed 1 to 50. As with SLM-OD, adjustments may have to be made to accommodate for differences in tap water and press conditions. Normal conductivity range should be 100 to 300. OA-2 may be mixed to provide better performance of the plate surface.

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Fountain Additives OA-1 and OA-2

Under some conditions, Mitsubishi fountain additives OA-1 and OA-2 can improve printing conditions.

OA-1 is an alcohol substitute. It helps the ink and water to blend together better in the ink train to help establish ink and water balance more easily. OA-1 is recommended for use on presses with continuous dampening systems and should be mixed at 1/2 oz. to 1 oz. per gallon (15-30 ml / 3.785 liters).

OA-2 is a much milder wetting agent. It helps to attract and keep more water on the plate surface. It does not affect solution conductivity and should be measured at 1/2 oz. to 2 oz per gallon (15-60 ml / 3.785 liters). Excessive amounts of OA2 may cause foaming in solution recirculators. OA-2 is recommended for use on presses with conventional dampening systems and with continuous dampening systems when fountain solution includes alcohol or alcohol substitute.

Press Start-Up

To prevent scumming on Silver DigiPlate during press start-up, the plate must be sufficiently wet before the ink form rollers are lowered onto the plate.

Lightly wipe down the plate surface using a soft sponge or cotton pad soaked with either water or fountain solution.

For separated systems that separate the inking systems and dampening systems, pre-wet the plate by engaging the moisture form roller to the plate and allow 8 to 10 cylinder revolutions prior to engaging the ink form rollers. This will prevent ink building up on the plate prior to printing the copy.

NOTE: Silver DigiPlate material **initially** requires 5-10% more water than metal plates on start-up. Once the plate is running, less water is usually required than metal plates. If stopping the press to make adjustments, you may have to pre-wet the plate again.

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Inks

Three kinds of basic inks that work well with Silver DigiPlate are rubber-based, oil-based and soy-based. Magnetic and UV inks will work but will usually shorten the run-length just like metal plates.

Plate Storage

The following procedure should be followed for storing Silver DigiPlate plates after they have been exposed and processed. If not stored properly, they will not print properly. Observe the following precautions:

- Dry the plates thoroughly.
- Avoid direct exposure to sunlight or other intense illumination.
- Do not store under extreme conditions such as high temperature or humidity.
- Do not store in places susceptible to harmful gases or dust.
- Store in a drawer or black bag.

Under these conditions, the plates can be safely stored for about one month.

NOTE: Plates that have been used on the press should be discarded. It is not recommended to store or rerun plates.

Deletion

There are two types of deletion products to remove the silver image on Silver DigiPlate™ Plates:

- SLM-OE liquid (2 x 100cc bottles per box)
- SLM-OEIII Pens (3 pens per box)

Troubleshooting

Symptom	Possible Cause	Remedy
Thin Image	Over-Exposure	Decrease exposure
Image drop-out — Thin Line — Partial	Over-exposure Fogged image, parts missing	Decrease exposure Inspect for light leak
Insufficient density	Under-exposure	Increase exposure
Thin silver lines covering the entire plate area	Under-exposure	Increase exposure
Incorrect image size, deformed image	Poor material transport Poor press packing	Inspect the transport section Inspect blanket packing
Uneven image	Uneven development by processor Uneven ink pressures Dirty mirrors on output device	Service rollers & gears Check form roll pressures Contact imagesetter manufacturer
Scratches	Too high chemistry temperature Contact with foreign material in processor	Check temperature and adjust Service rollers & guides
Discolored Image	Plate left for long period of time in a bright place Low processor temperature Weak Activator	Store in black plate bags or sealed file Check Activator temperature Change Activator
Uneven Density	Deviation in light source Optical pollution of laser Deterioration of Activator Low processing chemistry level	Adjust output device Clean light path (mirrors) Replace Activator solution Adjust chemistry level

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Troubleshooting Toning and Scumming

Toning/Tinting is a breakdown of the ink vehicle. It cannot be cleared by adding water. Additional water will make the condition worse.

Scumming is a dry plate. It can be cleared by adding water. When more water is applied the scum disappears.

1. Remove the ink from the plate:
If the non-image area has received ink, use a mild plate cleaner, diluted, to remove the ink. After removing the ink apply fountain solution to a sponge and wet the plate. Plate cleaner for metal plates is not recommended.
2. Check Press Conditions:
Check press conditions such as form roller settings and durometer to confirm they are within the manufacturer's tolerances.
3. Use Mitsubishi Additives:
The addition of fountain solution additives OA-1 and OA-2 to the fountain solution will help prevent scumming, especially in the case of a press equipped with a continuous dampener. For Alcolor and Komorimatic dampeners add up to 1% OA-1. OA-1 improves the water supply similar to an alcohol substitute. For Dahlgren and conventional dampeners add between 1-2% of OA-2. OA-2 will improve the water receptiveness of the plate.
4. Change the Ink:
In the case of toning or tinting problems it may be necessary to change to a higher tack ink. Low tack inks will require monitoring of Fountain Solution pH.

