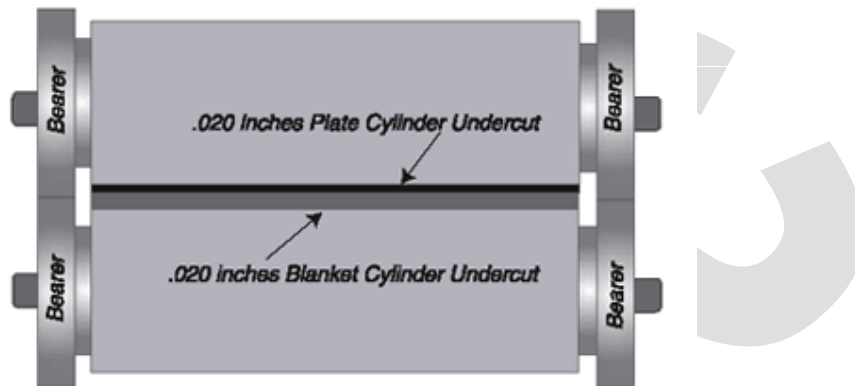


Ex. No.1 : PLATE AND BLANKET MOUNTING IN SHEET FED OFFSET MACHINE**Aim:**

To mount the plate and blanket in sheetfed offset machine.

Apparatus Required:

Offset plate, Offset blanket, T-spanner, Torque wrench, Mylar etc.

**1. Plate mounting procedures:**

1. Insert the leading edge of the plate into the leading edge Clamp of the plate cylinder.
2. Center the plate center mark to coincide with the center mark present in the cylinder.
3. Insert the packing sheet of required thickness between the cylinder body and plate.
4. Press the lock button present in the clamp so that it holds the plate, and tighten the side belts.
5. Now move the operating lever to the impression 'ON' position. This position makes the plate to firmly attach with the cylinder body due to the pressure given by the impression cylinder while inching.
6. Now inch the machine slowly so that the trailing edge of the plate reaches the trailing edge of the clamp bar in the plate cylinder.
7. Now the trailing edge of the plate is inserted into the trailing edge of the plate cylinder clamp bar.
8. Now press the lock button in the trailing edge clamp bar and tighten the side bolts in order to hold the plate.
9. Finally the operating lever is moved to its original position. Thus the plate is mounted in the plate cylinder for printing.

2. Blanket mounting procedures:

1. Measure the thickness of the blanket for giving correct thickness of packing sheet
2. Insert the leading and trailing edge of the blanket with the clamp bars and tighten the bolts in the clamp bars.
3. Mount the leading edge of the blanket with clamp bar and tight it in the leading edge of the blanket cylinder with required amount of packing sheet under the blanket.
4. Inch the press forward to reach the opposite edge of the cylinder and tighten the other end of the blanket with clamp bar with the blanket cylinder.
5. Adjust the blanket tension by tightening the blanket clamps using the torque wrench to make correct tension of blanket over blanket cylinder.

Result:

Thus the Plate and Blanket are mounted in the Sheet Fed Offset Machine.

Ex. No. 2 : MAKE READY OPERATIONS AND SINGLE COLOR PRINTING IN SHEETFEED**OFFSET MACHINE*****Aim:***

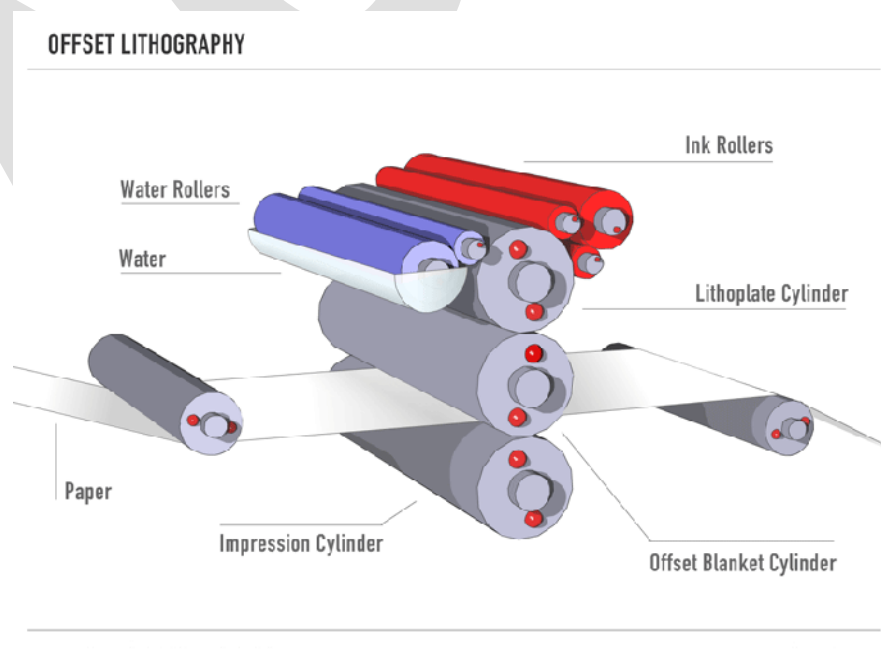
To prepare the machine for printing single color.

Make ready:

Make ready is the collection of all the operations necessary to print a specific job in the offset machine.

Make ready Procedures for printing single color consists of the following procedures:

1. Preparing the press for the new press run.
2. Checking the copy, plates, inks and paper against instructions.
3. Setting sheet handling mechanisms.
4. Packing and Mounting the plate.
5. Preparing the dampening system.
6. Preparing the inking system.
7. Preparing the make ready book.
8. Making trial impression.
9. Examine the trial impression for image registration.
10. Getting ok order.
11. Printing the single color.

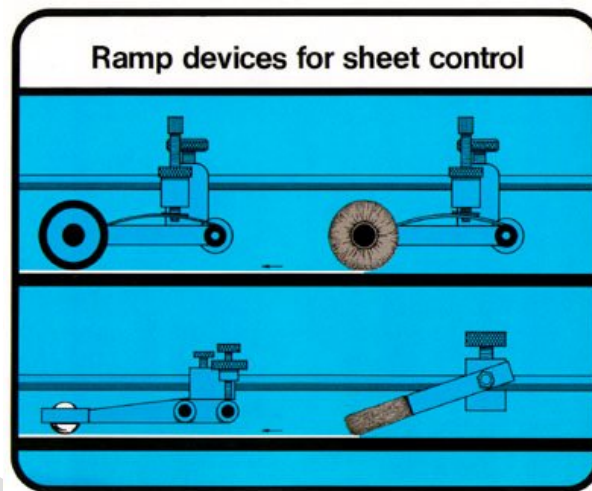


Make ready Procedures:**1. Preparing the press for new press run:**

Before the make ready begins the press is prepared for the new press run. The papers used for the previous job is removed from the delivery. Plates are removed and stored for reuse. Damaged blankets are also washed up. The dampening system is also to be cleaned.

2. Checking the Instructions:

The copy, paper, plate and ink are checked against the instructions written on the work order. Any differences must be immediately brought to the attention of the press room supervisor. Usually the instructions should be checked during the previous press run and as a part of the pre make ready procedure.

3. Setting sheet handling mechanisms:

Manually setting the sheet handling mechanism is a time consuming operation. If paper size and thickness have changed practically, all settings are adjusted. The feeder area devices are adjusted according to the size of the paper to be printed.

- i. Position the pile board and load paper stock on the press.
- ii. Adjust the various components of the sheet separation area like pile height regulator, sheet steadiers, separators, fingers, rear pick up suckers, forwarding suckers and air blast nozzles.
- iii. Adjust the various components of the feed board like forwarding rollers, double sheet detectors and all the feed board devices that transport the sheets to the front guiders.

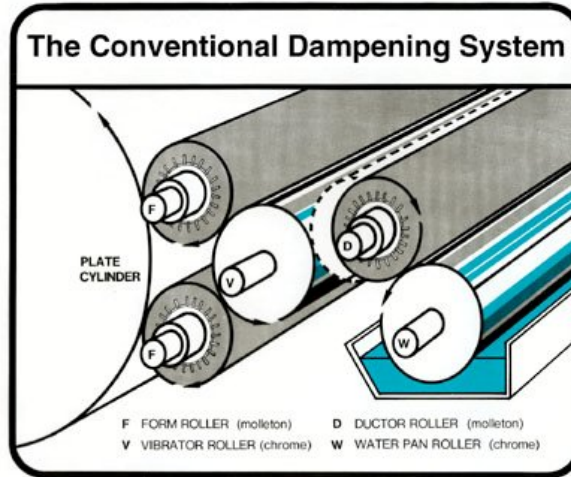
4. Inspect and Mounting the plate:

Although the plate quality have been checked by the plate maker, the machine operator should double check the plate. It was mounted on the plate cylinder with correct packing according to the substrate thickness.

The old blanket present in the blanket cylinder is checked whether it does not have any troubles on its surface. If it is not suitable it should be removed and the new blanket is mounted on the cylinder for quality reproduction.

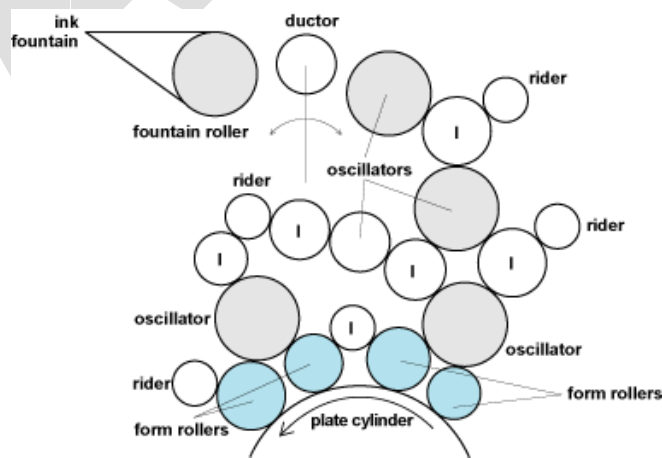
5. Preparing the dampening system:

The following sequence are involved in preparing the conventional dampening system during make ready.



- i. Install and clean rollers where required.
- ii. Measure the dampening rollers pressure.
- iii. Prepare the dampening solution according to the manufacturer's instruction.
- iv. Measure the dampening solution pH conductivity levels and temperature and adjust till the required level is reached.

6. Preparing the inking system:



The inking unit is washed and filled with new ink to be used for printing. The pressure between the inking rollers are checked in order to know whether the rollers are able to supply required amount of ink. The ink keys are adjusted according to the image in the plate

7. Preparing the Make ready book:

The Make ready of a pile of press sheets consisting of both waste sheets and unprinted sheets. The ratio of waste sheets to white sheet is 5:1 to make a book. For preparing the make ready book cut the waste sheets as the same sizes of unprinted sheets and insert the unprinted sheet between every five sheets, the completed books will have approximately 10 books and these books is placed over the pile board.

8. Making Trial Impression:

Following are the procedures for making trial impression,

- i. Clean the plate with water to remove gum at slow speed.
- ii. Turn on the dampening system and check for even dampening supply on the printing plate.
- iii. Set the inking rollers to apply ink and put the impression on up to the first unprinted paper of the make ready book gets printed. Inspect for proper sheets forwarding and delivery. Now stop the feeder, impression, dampening supply and inking of the press.

9. Examine the trial Impression:

The trial impressions are examined for the following sequence of position and register of image.

- i. Quality of print.
- ii. Ink/water balance.
- iii. Color of print.

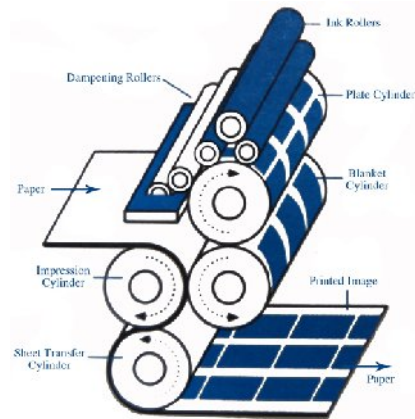
10. Image Register and position:

From the trial print examine the image register and position. If the image is not present in correct register then adjust the lateral (or) circumferential adjustments of the plate cylinder and then print another make ready book. Now also check the image register and position for correct register. This procedure is done till correct placement of image has been reached.

11. Getting ok order for printing:

After doing correct register adjustment, the correct printed paper is taken to the supervisor to get ok for printing.

12. Printing the single color job:



After getting ok order from the supervisor the machine is run for printing the required number of copies.

Result:

Thus the make ready operations are performed and single color job is printed in the sheet fed offset machine.

Ex. No. 3 : PLATE MOUNTING IN FLEXOGRAPHY PRINTING MACHINE

Aim:

To mount the plate in flexography printing machine.

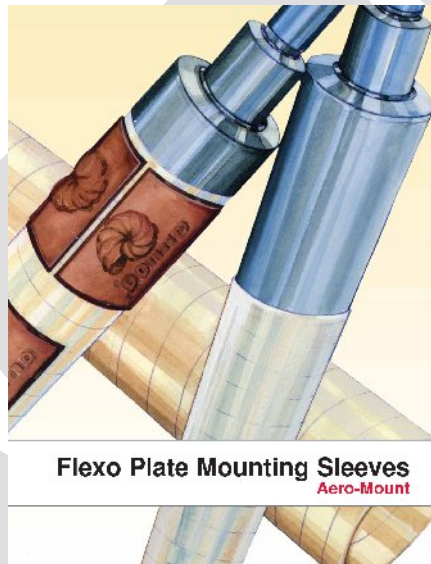
Flexography is a flexible substrate printing process. This process uses rubber or polymer plates as image carrier. The flexo plates are mounted manually by three methods,

- i. Grid method
- ii. Lens method and
- iii. Camera method

The procedure of mounting the plates by three methods are as follows.

i. Grid method:

In this method the plates are mounted by pasting accurately over the grids (horizontal vertical lines) present over the cylinder surface.



Order of Procedure:

1. Clean the cylinder surface to remove the unwanted particles and dust.
2. The plate is taken and the sticky back (double side adhesive tape) is attached.
3. The leading edge of the plate is pasted over the cylinder surface correctly without any cross by using the grids.
4. The plate is wrapped firmly around the cylinder up to its trailing edge.
5. After pasting ensure that the register mark of the vertical line of the trailing edge is coinciding correctly the register mark present in the leading edge of the pasted plate.

Thus the plate is mounted by using the grid method.

ii. Lens method:

This is the second method of the manual mounting of the flexo plate. In this method the plate mounting is viewed through a lens for accurate pasting of the plate.

**Order of Procedure:**

1. Clean the cylinder surface to remove the unwanted particles and dust.
2. The plate cylinder is removed from the machine and it is locked in a separate plate mounter.
3. The plate is taken and the sticky back is attached.
4. The plate is mounted over the cylinder from leading edge to trailing edge.
5. During mounting view the plate over the cylinder through the lens for correct mounting of plate.
6. If any cross is found the plate is removed from the cylinder and remounted for correct coincidence of register marks present in the leading and trailing edges.

Thus the plate is mounted by using lens method.

iii. Camera method:

This is the more accurate method compared to other two methods. A camera is present in the plate mounter to zoom the mounting and for pasting the plate in accurate register.

**Order of Procedure:**

1. Clean the cylinder surface to remove the unwanted particles and dust.
2. The plate cylinder is removed from the machine and it is locked in a separate plate mounter.
3. The plate is taken and the sticky back is attached.
4. The plate is mounted over the cylinder from leading edge to trailing edge.
5. The mounting operation is zoomed and it is seen in a monitor by a lens in a camera present in the plate mounter.
6. Move the camera sideways on the mounter to view the coinciding of register marks in all the areas of the plate.
7. If any cross mounting is found by viewing, remove and remount the plate and check the mounting by the monitor. If the mounting is correct, the plate cylinder is taken for printing.

Thus the plate is mounted by using camera method.

Result:

Thus the Flexo plate is mounted over the cylinder for printing.

**Ex. No. 4 : MAKE-READY OPERATIONS AND SINGLE COLOR PRINTING IN
FLEXOGRAPHY MACHINE**

Aim:

To study about the make-ready operations and how single color is being printed in the flexographic machine.



Make-ready :

Make-ready is a collective term for all the operations necessary to start a printing press for printing a job.

Make-ready operations:

Before make-ready begins, the press is prepared for new press run. The substrate from the previous job is removed from the delivery and the plates are removed and stored for re use.

The complete make-ready operations are mentioned below,

Reel loading:

The new flexo roll according to the printed size required is loaded in the shaft present in the unwind area of the feeding unit. The reel must be loaded in the centre of the shaft.

Webbing up:

After loading the reel in the shaft, the leading edge of the web is carried and it is inserted between the in feed units, guide rollers, tension rollers etc., and it is pasted in the rewinding shaft. During webbing up ensure the correct tension of the web for printing.

Plate mounting:

The plate is mounted correctly in the cylinder in correct register by using the horizontal and vertical lines present in the cylinder. The plate is mounted carefully without any cross. The plate is mounted in a way that the register in the leading edge should be

coincide with the register in the trailing edge. For mounting the plate in the cylinder double side adhesive tape is used. After mounting the plate in the plate cylinder, the plate cylinder is taken and it is mounted in its place in the flexography machine.

Pressure setting:

In flexography printing process the pressure for printing must be uniform and the correct pressure must be set for quality printing. The pressure setting must be achieved by the correct contact of anilox roller to plate cylinder and plate cylinder to impression cylinder. If the pressure is not uniform in the printing nip, then even transfer of ink is not available to get good printing. The correct pressure is also necessary between the cylinders and rollers because less pressure does not transfer required ink and high pressure causes damages to the substrates.

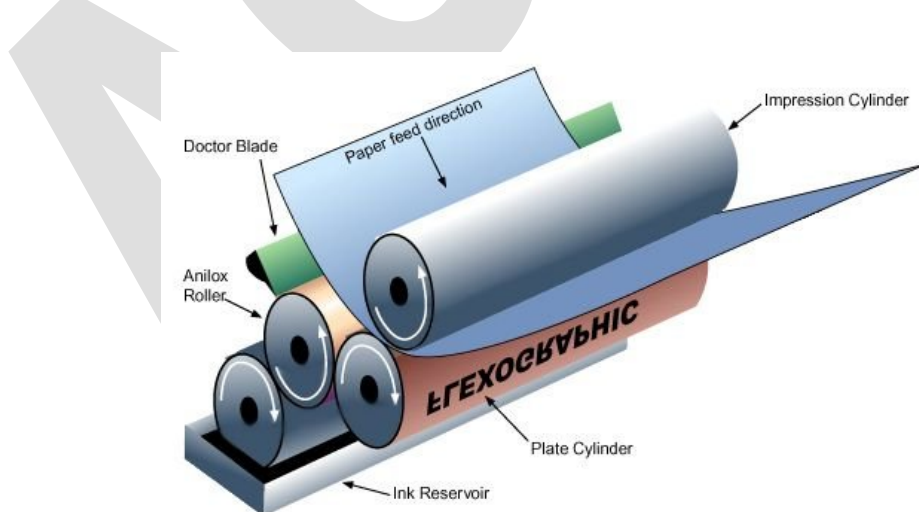
Dryers setting:

Driers are present in the path of the web of substrate from printing unit to rewind section. The driers are set in order to dry the printed web suddenly without affecting the image quality during rewinding process.

Inking unit preparation:

In the inking unit the old ink present in the duct is removed and the new ink with required color to be printed is poured in the duct to the required level. The ink is poured in the duct up to a level from which the duct roller gets dipped in the ink duct for the transfer of ink while printing cycle is happening. During preparing the inking system and if the viscosity of the ink is found more, hence the required amount of solvent is added with the ink in the ink duct.

Making trial impression:



After all the adjustments have been made the trial impression must be taken to ensure the quality of print, image register, impression pressure setting, ink flow etc., These are checked to give quality printing. During the trial impression and the machine is running

for printing the web tension must be checked for proper running of web from unwind section, between the guide rollers up to the rewind section.

Examine the trial impression:

After the trial impression have been made the ink density, color value and registration of image are checked and necessary adjustments have been made to get correct quality.

Printing the job:

After trail impression and all the adjustments have been made and if good quality result is obtain, the machine is run for printing required quantity of the substrate.

Result:

Thus single color being printed in the flexographic machine.

AGPC

Ex. No. 5 : SETTING AND CHANGING OF DOCTOR BLADE IN GRAVURE PRINTING**MACHINE****Aim:**

To set and change the doctor blade in gravure printing machine.

Doctor blade:

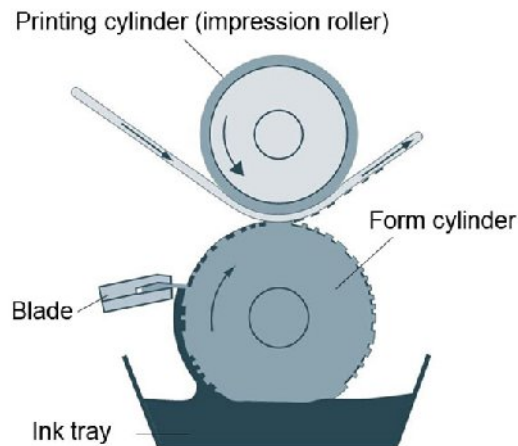
The doctor blade is a thin flexible strip usually the steel. This is held parallel against the surface of gravure printing cylinder. This removes the excess ink from the smooth and engraved surface of the image cylinder. Doctor blade is made from



Caste iron (C)	-	0.97% - 10%
Silicon (S)	-	0.2% - 0.3%
Manganese (MN)	-	0.3% - 0.4%
Lead (PB)	-	0.015% (Max.)

The doctor blade will be supplied with the following specifications,

Length	-	100 inches.
Thickness	-	0.004 inches (0.10mm to 0.015 inches).
Hardness	-	500 to 600 rickets.



Procedure for setting and changing of doctor blade:

- Inspect the doctor blade holder for damages. Dents, nicks or bends make the doctor blade setup wavy. Make sure it's clean inside the clamping area.
- Use a counter/support blade from 0,5mm thickness, preferably a stainless type.
- Cut the counter/support blade at ends to 45 degree angle. (To reduce wear from printing cylinder ends).
- Make sure the doctor blade is mounted straight in holder, so no waviness is observed. Check along the blade from the side.
- When bolts/screws are used for clamping blade holder, tighten from center bolt/screw and outwards crosswise. Use a torque-wrench if possible. Check so all treads are OK and that no bolts/screws are missing.
- Use measuring tape or other precise measuring tool for setup of blade extensions. (Preferably use fixed end-stops/pins in bottom of the blade holder clamping area).
- Extensions may vary from different machines. But try starting with the following blade extensions:
Counter/support blade 20mm and doctor blade 4mm (+-1mm. If necessary increase or decrease extensions to find the optimum for your machine).
- Check doctor blade edge for damages by lightly running your finger nail along the blade edge. Be careful, it's sharp!
- Attach the doctor blade holder securely to machine.
- Try to achieve a 55-65 degree contact angle between doctor blade and cylinder (less doctor blade pressure is needed).
- Use a blade pressure of 0,5-1,0 bar, increase more if there is no clean wipe, but try to use as low blade pressure as possible. (Less blade flex and blade/cylinder wear).
- Set blade oscillation to 20-25mm. If your machine doesn't allow that long stroke, use the max stroke length. Make sure oscillation stroke is smooth. No jerks or stops.
- If there is a need to use a slur-stick, use one with a very sharp tip. Then only low pressure force is needed. Recommended is to use a round wooden stick that can fit into a pencil sharpener for re-sharpening.

Result:

Thus we have set and changed the doctor blade in gravure printing machine.

**Ex. No. 6 : TO PERFORM PLATE CYLINDER MOUNTING AND IMPRESSION CYLINDER
IN GRAVURE PRINTING MACHINE**

Aim:

To know how to mount the plate cylinder and setting the impression cylinder in gravure printing machine.

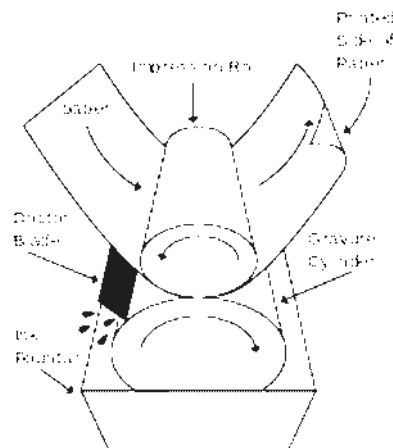
Procedure:

(a) Plate cylinder mounting:



After the cylinder surface is prepared with the image it should be mounted carefully in the machine for printing. As the plate cylinder will be very high in weight it should be carried by using trolleys in the press room. The plate cylinder is taken safely and it is placed in the locking mechanism at the two sides of the printing unit to hold the shaft present at the extreme ends in the plate cylinder. After the cylinder was placed in the printing unit the shaft holding the plate cylinder is locked in the locking mechanism of the printing unit. Then the doctor blade is placed over the plate cylinder in sweep or shallow angles correctly in contact for wiping the excess ink in the plate cylinder during printing.

Impression setting:



The pressure between the plate cylinder to the impression cylinder must be set very carefully. The pressure must be set very high in the gravure printing process between plate and impression cylinders, when compared to the other processes because the image in the plate cylinder is recessed form for that only the pressure should be high for the transfer of ink from recessed area to the substrate. The hardness or the rubber impression cylinder must be also upto 800 to with-stand the pressure during impression.

Result:

Thus we have learnt about the plate cylinder mounting and impression setting in the gravure printing machine.

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Ex. No. 7 : SINGLE COLOR PRINTING IN GRAVURE**Aim:**

To print single color in gravure machine.

Make ready for single color printing:

Single color make ready is the collection of all the operations needed to run a job in the single color machine.

Gravure make ready involves the following procedures,

- i. Reel loading
- ii. Plate cylinder loading
- iii. Doctor blade setting
- iv. Inking unit checking
- v. Webbing up the reel
- vi. Making trial impression
- vii. Checking the trial impression
- viii. Getting O.K order for printing
- ix. Printing the single color job

Reel loading:

The reel to be printed is mounted correctly in the in feed section of the machine.

Plate cylinder loading:

The image cylinder for the job or the image carrier is mounted correctly in the printing unit.

Doctor blade setting:

The doctor blade has to be set in correct angle by contacting the plate cylinder. It should be contact the cylinder by sweep or shallow angles for wiping excess ink during printing. Excess pressure or less pressure settings must be avoided.

Inking unit checking:

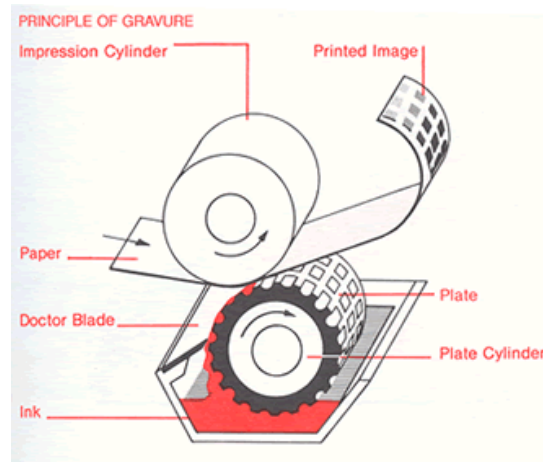
The inking unit must be checked for the ink already used has to be replaced or not. If the ink has to be replaced with another color, then the unit must be cleaned thoroughly and the new ink is filled in the ink duct.

Webbing up the new roll:

Before printing, the leading edge of the web is carried and it is inserted between the guide rollers, tension rollers, printing units etc., and it is pasted in the rewinding shaft. During webbing up we have to ensure the correct tension for printing.

Making trial impression:

After webbing up, the machine has to run slowly and the impression has to be on for getting trial printing.

Checking the trial impression:

After the trial impression has been obtained the drying of the ink printed is checked. If the ink drying is slow then the driers are adjusted for the quick drying of the substrate. The image registration has to be checked, if it is not in correct position then the lateral and circumferential adjustments has to be done for correct registration.

Getting Ok order for printing:

After all the operations has been done properly then the machine is run for printing. After the image has been obtained then it is checked and if the quality is correct, that copy is taken for getting Ok from the supervisor.

Printing the single color job:

After getting the Ok order the machine is run for printing the required number of copies in single color.

Result:

Thus the make ready operations are performed and the single color job is printed in the single color.

Ex. No. 8 : TO PREPARE SCREEN STENCIL BY DIRECT METHOD**Aim:**

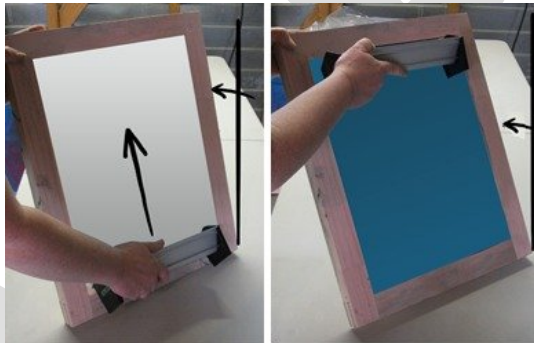
To prepare screen printing stencil with direct method.

Apparatus required:

Frame, mesh, coating solution (poly-blue), diazo sensitizer (biochromate), yellow safelight, uv light for exposing, etc.

Stencil preparing consist the following steps:

1. Washing the frame
2. Preparing the light sensitivity coating
3. Drying the frame
4. Exposing
5. Processing the exposed frame
6. Drying
7. Touching the pin holes

**Stencil preparation procedure:****(i) Washing the frame:**

The mesh fitted in the frame must be washed with water to remove the dust and dirt accumulation.

(ii) Preparation the light sensitive coating solution:

First we have to dissolve the dry diazo sensitizer in warm water. When completely dissolved add the sensitizer to the polyblue to make it light sensitive coating. The light sensitive coating must be prepared under yellow safe light condition.

(iii) Coating the frame:

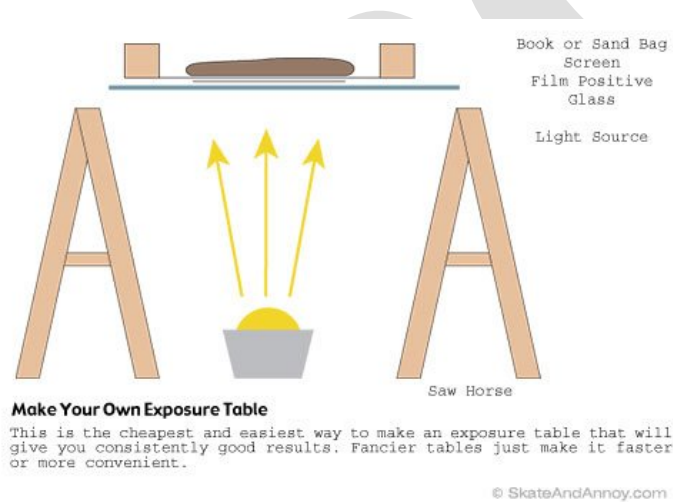
The light sensitive coating is applied evenly over the surface of the fabric material.

(iv) Drying the frame:

Then the frame which is applied with light sensitive coating is dried in a dark room by using air or hot air blowers.

(v) Exposing:

After drying the coating solution in the frame the positive film is placed over the exposing table with its readable side facing up. Then the frame is placed over the positive with its outside containing the positive readable side. Then the firm contact is given between these 2 materials over the exposing table and exposing is given for the required time. During exposing, the light passes through the non-image areas of the positive and harden the light sensitive coating in that area. The image areas in the original does not allows the light to strike the coating in contacting areas.



(vi) Processing the exposed film:

Then after exposing, the exposed frame is taken and the developing is done by using the water over the surface of the exposed frame. During developing, the coating solution present in the image areas becomes open.



(vii) Drying:

Then the developed frame is dried by using fan air or hot air.

(viii) Touching the pin holes:

After drying the pin holes obtained over the developed frame is touched by polyblue solution to avoid unnecessary passage of ink coming from these areas during printing.

Result:

Thus we have prepared the direct method of stencil for screen printing.

Ex. No. 9 : TO PREPARE SCREEN STENCIL BY DIRECT/INDIRECT METHOD**Aim:**

To prepare screen printing stencil with direct / indirect method.

Apparatus required:

Frame, mesh, coating solution (poly-blue), diazo sensitizer, bi-chromate film, yellow safe light, etc.

STENCIL PREPARING CONSISTS OF THE FOLLOWING STEPS:

1. Washing the frame
2. Preparing the light sensitive coating
3. Cutting the film
4. Adhering the film
5. Drying the film
6. Pelling the film base
7. Exposing
8. Processing the exposed frame
9. Drying
10. Touching the pin holes

Stencil preparing procedure:**(i) Washing the frame:**

The mesh is fitted in the frame must be cleaned with water to remove dust and dirt accumulation.

(ii) Preparing the sensitive coating solution:

First we have to dissolve the dry diazo sensitizer in warm water, when completely dissolved add the sensitizer to polyblue to make it a light sensitive coating. The light sensitive coating must be prepared under yellow safe light condition.

(iii) Cutting the film:

The chromeline film used for the stencil preparation has to be cut to the required size according to the image size.

(iv) Adhering the film with frame:



The chromeline film used for exposing is placed over a light flat base with the unbacked size facing up. Then the frame is placed over the film emulsion. Then the coating solution is wiped from the inner side of the frame over the mesh and chromeline film.

(v) Drying the frame:

Then the frame adhered with the chromeline film is placed in a dark room and dried by using fan air or hot air.

(vi) Peeling the film base:



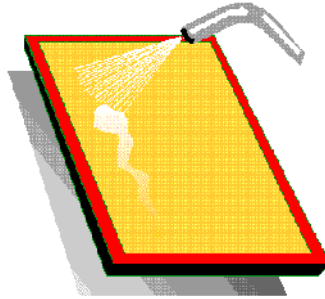
Then after drying the frame the chromeline film base present at the outside of the frame is peeled away from the chromeline film surface.

(vii) Exposing:



After the peeling of the backing layer, the frame is placed over the positive with its outside contacting the positive readable side over the film exposing table and exposing is given for the required time. During exposing the light passes through the non-image areas of the original film and hardens the coating present in the frame. The image areas does not allows the light to strike the coating solution in the contacting areas of the film.

(viii) Processing the frame:



Then after exposing, the exposed frame is taken and the developing is done by using the water over the surface of the exposed frame. During developing the coating solution present in the image areas becomes open.

(ix) Drying:

Then the developed frame is dried by using fan air or hot air.

(x) Touching the pin holes:

After drying the pinholes obtained over the developed film is touched by the polybule solution to avoid unnecessary passage of ink, coming from these areas during printing.

Conclusion:

Thus we have prepared the direct/indirect method of screen printing stencil.

Ex. No. 10 : PRINTING ON VARIOUS SUBSTRATE IN SCREEN PRINTING**Aim:**

To know printing on various substrates using screen printing.

Inks:

1. The inks used in screen printing process are classified into
2. Matt inks – Gives matt finish after printing.
3. PVC Matt inks – Gives matt finish after printing on PVC materials.
4. PVC Gloss inks – Gives slight shinning after printing on PVC materials.
5. Gloss inks – Gives shinning effect on any substrates after printing.
6. Textile inks – These inks are used for printing on textiles.

Substrates:

The substrates used in screen printing are,

1. Paper and Board.
2. PVC plastic materials
3. Glass surface
4. Tin sheets
5. Coated paper and Boards
6. Textiles



(i) Paper and boards:

The screen printing inks are used for printing on these substrates by matt inks. These inks gives matt finish after printing. These inks dries on the substrate by penetration method.

(ii) Plastic and pvc materials:

These substrates are printed by using pvc matt inks (or) pvc gloss inks. These inks dries on the substrates by the evaporation method. These inks dries on the substrates within 15 minutes to 30 minutes. Sometimes gloss inks may be needed for printing on these substrates. These inks need 5 to 6 hours for drying on the substrate.

(iii) Gloss surface:

Gloss surface mainly using gloss inks for printing. Because other inks does not give adhesion to the gloss surface after drying. The drying time taken by the gloss inks to dry over the gloss surface is upto 6 hours and the inks dries by evaporation method.

(iv) Tin sheets:

Tin sheets are printed by using foil inks (or) gloss inks according to their surface finish. The foil inks dries over these surface within 30 minutes. But the gloss inks takes upto 8 hours for drying on this surfaces.

(v) Coated paper and board:

These substrates uses pvc based inks to print on their surface. Because of these inks dries suddenly by evaporation method.

(vi) Textile printing:

These materials uses the special inks. In this inks adhesives and pigments are mixed in a proper ratio for the production of these inks. The adhesives in these inks are used as binders and pigments as coloring agents.

Result:

Thus we know the printing on various substrates by screen printing.