# DeAnza College

# ***Photography Department Lab Manual***

Revised in 2004 by Greg W. Serniuk

# OUTDOOR EXPOSURES WITHOUT A METER

**How to estimate daylight exposures without a meter:**

Four basic exposure considerations:
1) Outdoor light conditions (cloudy, sunny)
2) I.S.O. or A.S.A. of film (film speed)
3) Aperture (lens opening size)
4) Shutter speed (time of exposure)

***HOW TO PERFORM DAYLIGHT EXPOSURES WITHOUT A METER***

1) Set your shutter speed of your camera to the closest equivalent of 1 over the A.S.A. (example: A.S.A. 125 = shutter speed 1/125 or A.S.A. 400 = shutter speed 1/500)

2) Set your aperture according to the table below:

| | |
|---|---|
| **Bright or hazy sun on light sand or snow** | **f/22** |
| **Bright sun, distinct shadows, normal subject** | **f/16** |
| **Hazy sun, poorly defined shadows** | **f/11** |
| **Cloudy, bright conditions, no shadows visible** | **f/8** |
| **Cloudy, dark conditions, gray overcast, high fog** | **f/5.6** |
| **Cloudy, dark with thick fog, heavy rain or snow Very poor light conditions** | **f/4** |

*This is only a general guide and must be modified for darker or lighter than average subjects, early or late daylight hours, backlit subjects, etc. Bracketing your exposures over one stop and under one stop will also help to ensure that you get a good exposure.*

## EQUIVALENT EXPOSURE COMBINATIONS

Exposure settings indicated above are only one of the many shutter speed/aperture combinations that could be used. Remember that *equivalent exposure combinations* can also be used in order to capture specific effects. The following settings are only examples of *equivalent exposures*. You will need to make your own meter reading.

1/30 at f/32, 1/60 at f/22, 1/125 at f/16, 1/250 at f/11, 1/500 at f/8, 1/1000 at f/5.6

# *GENERAL INFORMATION*

A few suggestions to help you work more efficiently in the lab and studio. When darkrooms are used by several people, the combination of people, equipment, materials, and chemicals in such confined spaces presents special problems in general cleanliness and housekeeping. (Let your own good sense and regard for equipment, supplies and fellow students be your guide).

***PLEASE FOLLOW THE DO'S AND DON'TS OF THE PHOTO LAB BELOW:***

## ***DO:***

1) Respect wet and dry areas in the lab and studio.
2) Thoroughly wash and dry your hands whenever you get them into chemicals.
3) Use paper cutters, dry mount presses, and other equipment with care.
4) Handle film and paper only by the edges. (fingerprints are very hard to remove)
5) Use a tray to carry prints or films around the building to avoid dripping on floor.
6) Read all instructions, labels and charts. (if in doubt ask)
7) Use only Sharpie type waterproof markers to write on prints. (NEVER BALLPOINT)
8) Promptly return items to equipment room so that other people may use them.
9) Keep the darkroom area free of spills by cleaning up after yourself.
10) Have any questions or problems ask instructors, tech, or assistant for help.

## ***DON'T:***

1) Don't force equipment which appears to not be working properly. Report the problem to the lab technician, assistant, or instructor immediately.
2) Don't open closed doors without knocking first. Someone may be exposing paper or film in the dark.
3) Don't use ballpoint pen on any prints or film.
4) Don't leave new unexposed photo paper out in the open. The white lights may be turned on at any time.
5) Don't cross contaminate chemicals by going in the reverse order of processing.
6) Don't dry unwashed or unwanted prints.
7) Don't dry test strips or anything smaller than 5"x7"paper through the dryer.
8) Don't leave the chemical bottles outside of the secondary containment when not in use. Please return them to the secondary containment when finished.

# B + W PHOTOGRAPHIC PAPERS

*THE TWO CATEGORIES OF PAPER AVAILABLE ARE RC (RESIN COATED) AND FIBER BASE. HERE IS A SHORT LIST OF SOME OF THE DIFFERENT MANUFACTURERS OF BOTH:*

## ***RC (RESIN COATED) PAPERS:***

1) AGFA
   - Multicontrast Premium RC
2) ILFORD
   - Multigrade IV RC Deluxe
   - Multigrade RC Warmtone
   - Multigrade RC Portfolio
3) KODAK
   - Polycontrast III RC
   - PolyMax II RC
   - P-Max Art
4) LUMINOS
   - Flexicon VC RC
   - RCR Art
   - Pastels
5) ORIENTAL
   - Oriental VC RC

## ***FIBER BASE PAPERS:***

1) AGFA
   - Multicontrast Classic
   - Portriga-Rapid
   - Insignia
2) ILFORD
   - Multigrade IV FB
   - Multigrade FB Warmtone
   - Ilfobrom Galerie
3) KODAK
   - PolyMax Fiber
   - PolyMax Fine Art
4) LUMINOS
   - Flexicon VCFB
   - Flexicon VC Warm FB
   - Charcoal R
5) ORIENTAL
   - Oriental VC FB

# B + W FILMS

***THIS IS A SHORT LIST OF SOME OF THE BLACK AND WHITE FILMS THAT ARE AVAILABLE BY DIFFERENT MANUFACTURERS.***

1) AGFA
   - APX 25
   - APX 100
   - APX 400

2) ILFORD
   - Delta 100
   - Delta 400
   - Delta 3200
   - FP4 Plus 125
   - HP5 Plus 400
   - Pan F 50

3) KODAK
   - TMAX 100
   - TMAX 400
   - TMAX 3200
   - Plus X Pan 125
   - Tri X Pan 400

4) FUJI
   - Neopan 400
   - Neopan 1600

## *OTHER SPECIALTY B+W FILMS:*

ILFORD SFX 200 (infrared)
KODAK HIE (infrared) (speed varies according to what filter is used)
KONICA INFRARED

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## ***Please don't use the following films:***

*KODAK TMAX 400 CN (process C-41)*
*KODAK SELECT 400 (process C-41)*
*ILFORD XP-2 (processC-41)*

# ***STEPS TO PROCESSING ROLL FILM***

1) ***IN TOTAL DARKNESS***: load film onto stainless steel reel, insert reel into tank, and secure the lid on the tank. You may now turn on the lights.

***The remaining steps may be done in white light.***
***ALL OF THESE STEPS MUST BE DONE OVER A SINK NOT THE FLOOR.***
***If you spill something please notify the instructor and then clean it up.***

2) Dilute developer as indicated on chart, check temperature, and set timer as indicated on the chart on the next page. (If using TMAX presoak in water for one minute)

3) Pour the diluted developer quickly and evenly from the graduate into the opening in the tank cover, and start the timer. Tap the tank gently against the edge of the sink a few times to loosen air bubbles. Agitate the tank constantly for the first minute, then every thirty seconds agitate by inversion five times over the sink or as instructed.

4) When the timer sounds, pour out the developer into the sink drain. **BE CAREFUL NOT TO OPEN THE TANK.** Fill the tank with water and empty three times then let running water run through lid for one minute.

**5)** Fill the tank with fixer from the tank. **USE IT STRAIGHT OUT OF THE BOTTLE WITHOUT DILUTION.** Fix the film for 5 minutes (TMAX films 10 minutes). Agitate constantly for the first minute, then every thirty seconds by inversion five times over the sink. ***Pour film fixer back into the tank with the funnel that is provided. (RECYCLE)***

6) Fill the tank with water and empty three times then remove the tank cover and wash the film for one minute under running water, with the water entering the hallow core of the reel. Next, discard the water and fill the open tank with PERMA-WASH solution. Agitate the reel for two minutes then return the PERMA-WASH solution to it's tank with the funnel provided. Now fill the tank with water and empty three times then let running water flow through the hallow core of the reel for one more minute.

7) Bathe the film in clean PHOTO-FLO solution for thirty seconds, then remove the film from the reel. Punch a hole in the end of the film and suspend it from the rack in the dryer. Place a clip on the other end to hold the film straight. Leave it there until it's dry (about ten minutes).

8) Rinse all items used with warm water and completely dry them. Dry everything and return it to the checkout window. Clean up your darkroom area.

9) Carefully remove your film from the dryer when dry (if it curls, it's not yet fully dry so wait until it flattens out). Take your film out to the light table and cut it into strips and put them into negative preserver.

# ***SUMMARY OF HOW TO DEVELOP B+W FILM***

ALL OF THE STEPS BELOW MUST BE DONE OVER A SINK AND NOT THE FLOOR.

**1)** Development **Time/ Temperature** = 65˚-75˚F (if using TMAX presoak one minute)
2) Stop Development (rinse with tempered water)= 1 minute
3) Fixer = 5 minutes (TMAX=10 minutes) (recycle)
4) Wash = 1 minute (tempered)
5) Perma Wash = 2 minute (recycle)
6) Wash = 1 minute (tempered)
7) Photo Flo = 30 seconds
8) Dry = about 10 minutes (not over 100 degrees)

**TIME / TEMPERATURE CHART**

| | | ***(IDEAL)*** | | | |
|---|---|---|---|---|---|
| ***Lauder Formula 76*** | ***65˚*** | ***68˚*** | ***70˚*** | ***72˚*** | ***75˚*** |
| ***Dilution 1:1*** | | | | | |
| KODAK | | | | | |
| TMAX 100 | 14.5 | **12** | **11** | 10 | 8.5 |
| TMAX 400 | 14.5 | **12.5** | **11** | 10 | 9 |
| Plus X Pan | 9.5 | **8.5** | **8** | 7.5 | 6.5 |
| Tri X Pan | 11 | **10** | **9.5** | 9 | 8 |
| ILFORD | | | | | |
| Delta 100 | 13.5 | **12** | **11** | 10 | 8.5 |
| Delta 400 | 12 | **10.5** | **10** | 9.5 | 8 |
| Delta 3200 | | **10.5 stock** | | | |
| SFX 200 | | **14.5** | | | |
| Pan F | | **10.5** | | | |
| FP4 Plus | | **8.5** | | | |
| HP5 Plus | | **11** | | 9 | 7.5 |
| AGFA | | | | | |
| APX 25 | | **11** | | | |
| APX 100 | | **12** | | | |
| APX 400 | | **14** | | | |
| FUJI | | | | | |
| Neopan 400 | 10.5 | **9.5** | | 8.5 | 7.5 |
| Neopan 1600 | 11 | **9** | | 7.5 | 6.5 |
| KONICA | | | | | |
| Infrared | | **8.5** | | | |

| ***Lauder Formula 76 stock*** | ***65˚*** | ***68˚*** | ***70˚*** | ***72˚*** | ***75˚*** |
|---|---|---|---|---|---|
| KODAK HIE (infrared) | 13 | **11** | **10** | 9.5 | 8 |
| KODAK TMAX 3200 | | **15** | **13.5** | 12.5 | 11 |

# PROCESSING RC PRINTS

*HOW TO PROCESS RC BLACK AND WHITE PHOTOGRAPHIC PAPER AT DE ANZA'S PHOTOGRAPHY LAB.*

PREPARATION

1) ***Get your enlarging equipment from the checkout room and set up the enlarger.***
2) ***Mix all chemical trays according to diagram below.*** (1 gallon = 128 ounces)

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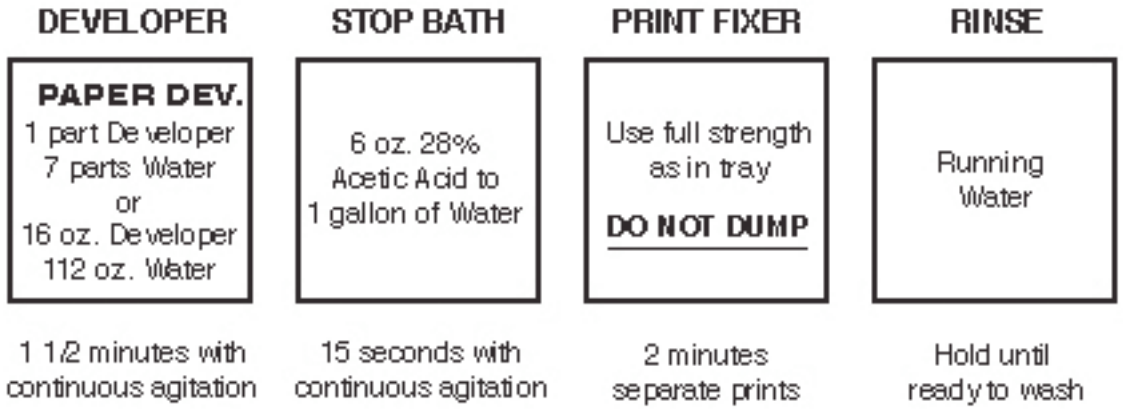



***PROCESSING B+W PHOTO PAPER MUST BE DONE ONLY UNDER TYPE OC SAFELIGHT CONDITIONS IN THE DARKROOM***

1) Immerse print face down in the ***developer*** and when evenly wet turn over with tongs using great care. Rock the tray gently and continuously during development. Time your print for 90 seconds.

2) Carefully transfer the print from the developer into the ***stop bath*** for 15 seconds with continuous gentle agitation. **(be sure not to transfer the tongs from the developer)**

*3)* Transfer the print from the ***stop bath*** to the deep tray containing ***fixer*** for 2 minutes with occasional agitation and separation. Do not prolong fixing time for RC paper.

4) Transfer the print from the ***fixer*** tray to the holding tray that contains running water and rinse for at least one minute. You may leave it there until you have enough prints to do a wash cycle.

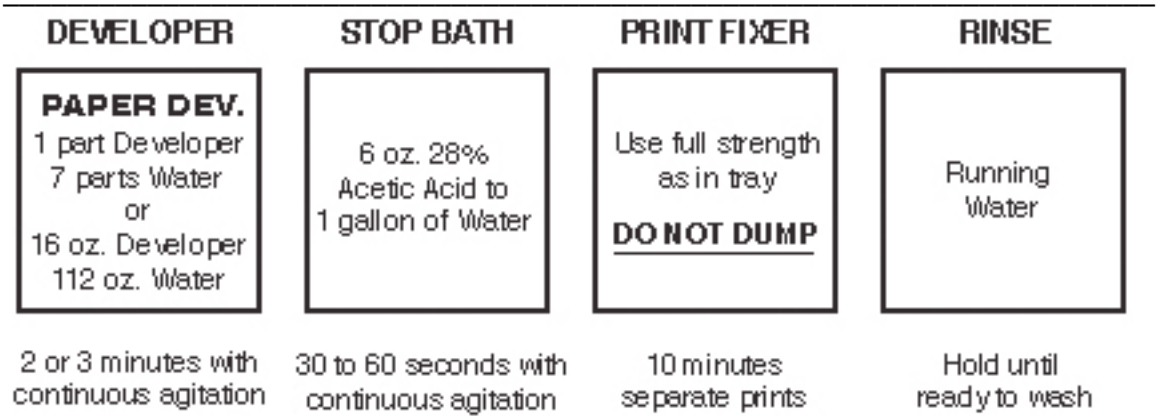
5) The next step will be to go through the washing and drying process which will be talked about later on in this manual. Everything else from this point on may be done in white light in the print finishing room.

# PROCESSING FIBER PRINTS

*HOW TO PROCESS FIBER BASE BLACK AND WHITE PHOTOGRAPHIC PAPER AT DE ANZA'S PHOTOGRAPHY LAB.*

# ***PREPARATION***

1) Get your enlarging equipment from the checkout room and set up the enlarger.
2) Mix all chemical trays according to the diagram below. ***(1 gallon = 128 ounces)***




***PROCESSING FIBER PAPER MUST BE DONE ONLY UNDER SAFELIGHT CONDITIONS WHICH ARE IN THE DARKROOM***

1) Immerse print face down in the ***developer*** and when evenly wet turn over with tongs using great care. Rock tray gently and continuously during development. Time your print for two or three minutes or as instructed.

**2)** Carefully transfer the print from the developer into the ***stop bath*** for 30 to 60 seconds with continuous gentle agitation. (being sure not to transfer the tongs with the print)

3) Transfer the print from the ***stop bath*** to the deep tray containing ***fixer*** for 10 minutes with occasional agitation and separation. After 2 minutes the print may be examined in another room in white light. Use a tray to carry prints around the building. After you are done examining your print return it to the fixer for the remainder of the time.

4) After print has fixed for 10 minutes transfer it to the holding tray that contains running water and rinse for at least one minute. You may leave it there until you have enough prints to do a fiber base wash cycle.

5) The next step will be to go through the washing and drying process which will be talked about on page 9 of this manual. Everything else from this point on may be done in white light in the print finishing room.

# ***PROCESS FOR WASHING AND DRYING RC PRINTS***

Collect 10 to 15 **RC** prints from the running water holding tray in the darkroom and transfer them into the wash/dry room. Start the washer by flipping the switch on the front of the washer on. Let the washer fill then place **RC** prints into the washer one at a time face up. Wash the prints for 5 minutes then remove and put through the dryer. They will exit the other end of the dryer all dry. ***DO NOT ADD OR REMOVE ANY PRINTS DURING A WASH CYCLE. DO NOT COMBINE RC AND FIBER BASE PAPER IN THE SAME WASH. DO NOT USE FIXER CONTAMINATED TRAYS TO TRANSFER PRINTS FROM THE WASHER TO THE DRYER. USE ONLY THE TRAY DESIGNATED FOR THAT USE.***

(SETTINGS FOR THE RC DRYER ARE HEAT 7 AND SPEED 6)

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## ***PROCESS FOR WASHING AND DRYING FIBER BASE PRINTS***

1) Collect 10 to 15 **Fiber** prints from the running water holding tray in the darkroom and transfer them into the fiber wash room. Let the washer fill then place the **Fiber** prints into the washer one at a time. Wash the prints for 5 minutes.

2) Remove the prints from the washer and place them carefully into the Perma Wash solution one at a time face up. Leave in Perma Wash solution for 5 minutes with occasional agitation.

3) Remove from Perma Wash and place back into washer one at a time face up. Wash in the washer for another 5 minutes.

4) Squeegee the back of each print. Place the print on the fiber base drying racks or a blotter book to dry.

# DRY MOUNTING PROCEDURE

*Working in a clean, dry area plug in the tacking iron and dry mount press to heat up. Set the press temperature between 190˚-210˚F. Go by the needle on the gauge and not by the knob settings.*

1) Place a sheet of dry mounting tissue on the backside of the print to be mounted. Make sure the tissue is at least the same size as the print

2) Attach the tissue to the back of the print with the tacking iron by pressing the iron in the middle of the tissue and moving it in one direction about 1" to 1 1/2" in length.

3) Trim evenly both the print and the tissue at the same time on the rotatrim cutter to the the desired size. Brush off any loose pieces of grit that may be in between the print and the tissue.

4) When finished, heat the mount board in the press to remove any moisture. (1 minute)

5) Position the trimmed print visually and mathematically on the cool mount board.

6) Holding the print tightly in the center against the mount board, gently lift up one corner of the print but not the tissue. Be sure to leave the tissue flat on the board.

7) Using the tacking iron attach one corner of the tissue to the board, moving the iron from the inside toward the outside in one movement about an inch long. Be careful not to move the print in the process. Do not run the iron past the edge of the tissue onto the board because it will leave a mark on the board.

8) Then lift up a second corner of the print on the same side and repeat step #7.

9) Brush off any stray dirt or grit from the print and mount tissue. Make sure the blotter sheets are clean as well.

10) Insert the tacked print/mount board between the blotter papers in the press and pull handle of the press over the top and toward you completely. Push down on the handle to lock it into position. Leave in the press for 45 seconds then check to see if the print is attached properly.

11) Remove the print from the press at the end of the time by grasping the handle and lifting it up and over to the back side of the press.

12) Place the mounted print on a cool dry clean surface. Place a weight on top of the mounted print during the cooling process to keep the print and board flat.

13) Turn off the mount press and tacking iron. Return iron to the equipment room.

# FILTERS AND FACTORS

| *Filter* | *Factor* | *Used For* |
|---|---|---|
| Yellow (#8) | 2X | Absorbs U.V. and some blue. Renders colors to what you see. |
| Green (#11) | 4X | Absorbs red, lightens yellows, lightens greens. |
| Orange (#15) | 3X | Absorbs U.V. and some blue, darkens skies, haze reduction. |
| Red (#25) | 8X | Absorbs U.V. and some blue. Extreme darkening of skies. Haze penetration. |
| Infrared (#87) | | Absorbs visible light. Lets Infrared rays pass through. |
| Neutral Density-3 (#ND-3) | 2X | Reduces exposure without changing color. |
| Neutral Density-6 (#ND-6) | 4X | Reduces exposure without changing color. |
| Neutral Density-9 (#ND-9) | 8X | Reduces exposure without changing color. |

## *FILTER FACTORS*

| Filter Factor | Exposure Increase | Filter Factor | Exposure Increase |
|---|---|---|---|
| 1.5X | 1/2 stop | 10X | 3.25 stops |
| 2X | 1 stop | 12X | 3.5 stops |
| 3X | 1.5 stops | 16X | 4 stops |
| 4X | 2 stops | 24X | 4.5 stops |
| 6X | 2.5 stops | 32X | 5 stops |
| 8X | 3 stops | | |

*When using two filters together multiply the factors of each filter together to get the new filter factor for your exposure.*
*The exposure increases one f/stop each time the filter factor is doubled.*

# CLEAN-UP PROCEDURE

*PLEASE FOLLOW THESE CLEAN-UP PROCEDURES WHEN USING THE DE ANZA PHOTOGRAPHY FACILITIES*

## FILM PROCESSING AREA:

1) Rinse thoroughly all film developing equipment, trays, thermometers, reels, and tanks with warm water and ***thoroughly dry*** everything before returning it to the room.

2) Clean and wipe dry the outside of all chemical bottles.

3) Wipe down the tabletops and the edges of the sinks. Clean and wash out all beakers and leave them upside down in the sink. If you spilled anything please clean that up also.

## PRINTING ROOM:

1) Secure the enlarger as follows:

2) Turn off the light. Remove your negative from the negative carrier.

3) Return the filter, lens, and negative carrier to it's proper kit.

4) Close the negative stage, return the filter drawer to the enlarger and lower the enlarger to the baseboard so that it will be stable and not top heavy.

5) Return to the checkout window all of the equipment that you checked out. When returning equipment place the kit on top of the easel and film proofer. ***Be sure to pick up your lab card, you will need it every time you come in.***

6) Unless your instructor indicates otherwise, clean up the sinks at the end of each class period as follows: ***Never dump the fixer down the drain!!!***

7) Dump the developer into the sink.

8) Dump the stop bath solution into the empty developer tray, and then into the sink.

9) Rinse both trays *thoroughly* inside and outside. Dump the holding water tray to wash down the sink. Take that tray and cover the fixer tray. Place all trays upside down in sink so they will drain and dry.

10) Place all test strips, paper trimmings, soiled towels, etc. in the garbage can. *TURN OFF ALL WATER!!!!*