Acufine Developers

Chemistry for Black & White Films and Papers

- **Acufine** *film developer*
- **Diafine** *two-bath film developer*
- **ACU-1** *film developer*

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Acufine film developer

ACUFINE DEVELOPER

Acufine is a maximum acutance, ultra-fine grain film developer combining optimum quality, with higher than normal effective film speeds. It is a modern developer formulated for modern emulsions and is outstanding in its ability to fully exploit the inherent capabilities of any film. Acufine's higher speed ratings permit the use of slower films, with superior grain structure and resolution in situations that previously required high speed films.

Acufine is packaged in single-mix dry powder form, readily soluble in water (70° to 90°F). Although the water in most areas is suitable, we recommend the use of distilled water wherever the mineral content or alkalinity is high. **The developer may assume a slight coloration, when mixed, which in no way will affect its chemical properties.** To minimize oxidation, Acufine should be stored in full, tightly capped bottles of amber glass or polyethylene. At frequent intervals, soak overnight all storage and mixing equipment in a solution of approximately one ounce of sodium sulfite per gallon of water, and then rinse thoroughly. **Never mix partial container quantities.**

The chart on the next page lists the time/temperature relationships of the films most commonly available. Noted in the last column, on the far right, are maximum exposure indexes and a single developing temperature (70°F) to be utilized in minimal light situations. The grain, tonal scale and contrast will be less than optimum for this listing.

PROCESSING

The developing times listed on the chart will produce negatives of ideal contrast for printing in modern condenser enlargers. For cold light and diffusion enlargers, development may be increased by 25% to increase contrast.

Agitation: The listed developing times are based on very gentle agitation for the first 10 seconds after immersion, and 5 seconds every 30 seconds thereafter. **Excessive or vigorous agitation is to be avoided.** Two inversions of the tank within a 5 second cycle is recommended.

Replenishment: Acufine replenisher should be added and stirred into the developer after each batch of film has been processed. Average replenishment is at the rate of 1/2 fluid ounce per 80 square inches of film (one roll of 36 exposure 35mm, or 1 roll of 120 or four 4x5 sheet film). Replenishment can be continued until a volume equal to the volume of the original developer has been added. **Without replenishment, four rolls of film may be developed at normal times. Increase the developing times by 2% for each additional roll. Develop no more than 16 rolls per quart in this manner.**

EXPOSURE and DEVELOPMENT

Development has definite effect on the sensitivity or speed of a film, but since each emulsion differs in its reaction to changes in developing time, no fixed rule can be made. The chart on the next page gives the correct exposure index and developing time for negatives of normal contrast (gamma 0.70) and density, which will give excellent prints on a normal grade of paper, using a condenser enlarger. As you will note, the indexes given in the table are higher than those given by the film manufactures, but are correct for use with Acufine, and are not "pushed" development ratings. You must remember that this table is a guide, and some photographers will wish to make slight changes in the index or developing time to meet their own requirements.

Even though the degree of development affects film speed, it is recommended that developing time be changed only for the purpose of adjusting contrast. If changes are made only to change the speed of the film, the contrast of the negative may not be correct for the subject matter, and good prints will be difficult or impossible to obtain.

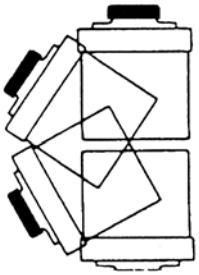
1. LOAD

load reels in total darkness
completely fill tank with reels

2. POUR

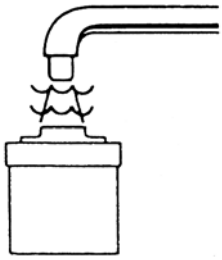
start timer and pouring simultaneously

3. AGITATE GENTLY



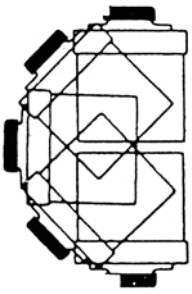
10 seconds initial agitation
5 seconds every 30 seconds thereafter

4. WATER RINSE



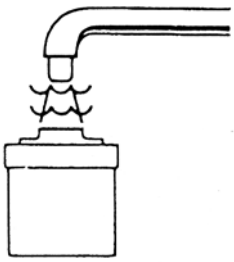
rapid running water for 30 seconds

5. FIX VIGOROUSLY



constant agitation
we recommend rapid fixers

6. WASH & DRY



rapid running water for 15 minutes
1/2 strength wetting agent - 15 seconds

Maintain Temperatures ±3 Degrees Throughout The Entire Processing Cycle

Acufine film developer

Acufine

Film	ASA	Dilute	35mm	Roll	Sheet	Temp °C	Temp °F
APX 100	160		5		5	21	69.8
APX 100	200			5.5		21	69.8
Delta 100 Pro	200		5.5	5.5	5.5	20	68
Delta 400 Pro	200		7	7		20	68
Delta 400 Pro	400		9	9		20	68
Delta 400 Pro	500		11	11		20	68
Delta 400 Pro	800		13	13		20	68
Delta 400 Pro	1600		16	16		20	68
Delta 400 Pro	3200		19	19		24	75.2
Efke KB25/R25 (KB14/R14)	64		4	4		21	69.8
Efke KB50/R50 (KB17/R17)	160		2.75	2.75		20	68
Efke KB100/PL100 (KB21)	250		3.25	3.25	3.25	20	68
Ektapan	250				4	21	69.8
Fomapan 100	100		3.5			20	68
Fomapan T200	200		3			20	68
Fomapan 400	400		6			20	68
Fomapan T800	800		5			20	68
FP4+	125		4	4	4	20	68
FP4+	200		6	6	6	20	68
FP4+	200			5.5	5.5	21	69.8
FP4+	320		5			21	69.8
HP5+	400		4.5		11	20	68
HP5+	650			12		21	69.8
HP5+	800		6.5			20	68
HP5+	1600		9.5			20	68
HP5+	640-800		6.5			21	69.8
Neopan 100ss	200		3.5			20	68
Neopan 100ss	400		5			20	68
Neopan 400	400		3.25	3.25		20	68
Neopan 400	800		4.5	4.5		20	68
Neopan 400	1600		7	7		20	68
Neopan 1600	1600		4			21	69.8
Pan F+	50		3.5			20	68
Pan F+	80		5	4.5		21	69.8
Plus-X [PX]	250		4	4		21	69.8
Plus-X [PX]	320				8	21	69.8
Recording Film	1600		9			21	69.8
TMax 100 [TMX]	160				4	21	69.8
TMax 100 [TMX]	200		4.5	5		21	69.8
TMax 400	650				4	21	69.8
TMax 400	800		4.5			21	69.8
TMax 400	1000			4.25		21	69.8
TMax P3200 [TMZ]	3200		7.5			21	69.8
Tri-X Pan [TX]	1000		5	5.5		21	69.8
Tri-X Pan Pro [TXP/TXT]	800			5.5	5	21	69.8

Diafine two-bath film developer

Diafine is usable over a wide temperature range with one developing time for all films. Fast, medium and slow films can now be developed simultaneously without adjustment in developing time. All films with exception of a few extremely slow emulsions are automatically developed to normal contrast. Time and temperature have no practical effect if the minimum recommendations are observed.

Diafine film developer is unsurpassed in its ability to produce greatest effective film speed, ultra-fine grain, maximum acutance and highest resolution. It is a characteristic of Diafine film developer to permit the widest latitude of exposure without the necessity of time-temperature compensation.

PREPARATION

Diafine is supplied in dry powder form to make two separate solutions (A & B). The two powders contained in a carton of Diafine are to be prepared and used separately.

Dissolve the contents of the smaller can (solution A) in water (75 to 85°F) to make the volume specified on the carton. Dissolve the contents of the larger can to make an equal amount of solution B. Label the storage containers clearly. For maximum consistency and stability, we recommend the use of distilled water. As with an photographic developer, all storage and processing equipment must be clean.

In use, the solutions will become discolored and a slight precipitate may form which in no way will affect the working properties of Diafine. The precipitate may be removed if desired by filtering.

TIME and TEMPERATURE

Diafine may be used within a temperature range of 70 to 85°F with a minimum time of 3 minutes in each solution. Increased developing times will have no practical effect on the results. It is recommended that you do not exceed 5 minutes in either solution.

DEVELOPING PROCEDURE

Do Not Pre-Soak Films
Any type of tank or tray may be used.

1. **Immerse film** in Solution A for at least 3 minutes, agitating very gently for the first 5 seconds and for 5 seconds at 1 minute intervals. Avoid excessive agitation as this may cause some loss of shadow detail.
2. **Drain, but do not rinse.**
3. Immerse film in Solution B for at least 3 minutes, agitating gently for the first 5 seconds and for 5 seconds at 1 minute intervals. Avoid excessive agitation.
4. Drain and rinse in plain water for about 30 seconds. (We do not recommend the use of an acid stop bath).
5. Fix, wash and dry in the usual manner.

Optimum results are obtained if all solutions, including the wash, are maintained at the same temperature. Care must be exercised to prevent any amount of Solution B from entering Solution A.

REPLENISHMENT

Diafine does not require replenishment. It is an extremely stable formula and has an unusually long work life, if normal precautions are taken against contamination.

When necessary, the level of the solutions can be maintained by the addition of fresh Diafine. Add *equal amounts* of fresh A and B to their respective working solutions. Since the introduction of dry film into Solution A decreases the volume of A more rapidly than that of B, some of the B will have to be discarded before adding the fresh B solution.

CONTRAST CONTROL

Because Diafine is a true two-bath developer, each film type is developed to a fixed degree of contrast, and changes in the developing times will have no practical effect on the final results. The chart listings will produce negatives of normal density and contrast (gamma 0.65 to 0.75) at the recommended exposure indexes.

Some control of high contrast subjects is possible by lowering the exposure index. Because Diafine has the property of limiting highlight development, increased exposures result in higher shadow densities without highlight “blocking”, thus effectively extending the tonal range. Diafine can accommodate as much as a two stop increase over the recommended indexes, without serious loss of quality. The increase in contrast in flat subject matter is not possible with Diafine.

Diafine

Film	ASA	35mm	Roll	Sheet	Temp °C	Temp °F
APX 100	200	3+3			20	68
APX 100	250		3+3		20	68
Ektapan	400			3+3	20	68
FP4+	200			3+3	20	68
FP4+	250	3+3	3+3		20	68
Fomapan 100	200			3+3	20	68
HP5+	640			3+3	20	68
HP5+	800	3+3	3+3		20	68
Neopan 100 Acros	200	5+5			22	71.6
Neopan 400	640	3+3			20	68
Neopan 1600	2400	3+3			20	68
Pan F+	80	3+3			20	68
Pan F+	100		3+3		20	68
Plus-X [PX]	400	3+3	3+3	3+3	20	68
TMax 100 [TMX]	80	4.5+4	4.5+4		22	71.6
TMax 100 [TMX]	160	3+3		3+3	20	68
TMax 100 [TMX]	200		3+3		20	68
TMax 400	500	3+3			20	68
TMax 400	640		3+3	3+3	20	68
TMax P3200 [TMZ]	1250	3+3			20	68
Tri-X Pan [TX]	1600	3+3	3+3		20	68
Tri-X Pan Pro [TXP/TXT]	1000		3+3		20	68
Tri-X Pan Pro [TXP/TXT]	1200			3+3	20	68

ACU-1 film developer

ACU-1 is a maximum acutance, ultrafine grain film developer, combining optimum quality, with great effective speed. ACU-1's higher speed ratings permit the use of slower films with superior resolving power and finer grain in situations that previously required high speed films. ACU-1 is a developer designed for those who prefer to work with a "one-time" use preparation with convenient dilution ratios.

Preparation: Prepare the concentrated "stock solution" by dissolving completely the full contents of the can in 1 quart of water (70 to 90°F). We recommend the use of distilled water wherever the mineral content or alkalinity of the tap water is high. ACU-1 concentrate, either dry or in solution, may assume a slight coloration which in no way will affect its chemical properties.

Storage: ACU-1 "stock solution" will retain its full strength for approximately one year if normal precautions are taken against contamination and oxidation. All storage and processing equipment must be clean. All equipment suspected of contamination should be soaked for eight hours in a solution of approximately one ounce of sodium sulfite per gallon of warm water, and then thoroughly rinsed. To minimize oxidation, ACU-1 should be stored in full, tightly capped amber glass or polyethylene bottles. For infrequent use, we recommend that the concentrate be stored in several small bottles to assure longer life.

Recommended Exposure Indices: The high speed ratings listed on the chart are the normal exposures indices for ACU-1. The recommended exposure/development values are calculated for optimum quality negatives, and are not the result of "pushing". Alteration of these values, variations of personal technique excepted, will result in negatives of less than ACU-1's best quality.

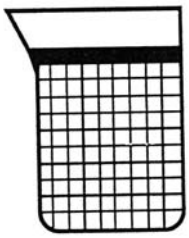
Developing Times: The listed times for development will produce negatives of ideal contrast for printing in modern condenser enlargers. For cold light and diffusion type enlargers, development may be increased by 25%. Contrast may be varied to suit individual requirements by varying the development times ±25% from normal.

Developing Procedure: Dilute the concentrate with water as specified on the chart. Two convenient dilutions of 1:10 and 1:5 are employed. Do not alter the dilutions. Use the diluted "working solution" within four hours after preparation and discard after use.

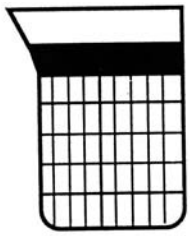
Agitation: The developing times listed on the chart are based on gentle agitation for the first 10 seconds after immersion, followed by gentle agitation for 5 seconds every 30 seconds thereafter.

The recommended procedure for gentle agitation with stainless steel tanks is to invert the tank twice during a 5 second interval. With the type of tank in which agitation is accomplished by rotating reels, turn the reels about a quarter of a turn backwards and forwards at the rate of 2 such cycles in a 5 second interval.

Excessive agitation is to be avoided since it results in greatly increased contrast, with little or no speed gain. Less than recommended agitation promotes the possibility of irregular development, low contrast, and loss of speed. constant agitation cannot be compensated for by decreasing development.



1:10
86cc or 3 oz. ACU-1 concentrate balance water to make 946cc (1 quart)



1:5
157cc or 5½ oz. ACU-1 concentrate balance water to make 946cc (1 quart)

ACU-1

Film	ASA	Dilute	35mm	Roll	Sheet	Temp °C	Temp °F
APX 100	200	1+10		8		21	69.8
APX 100	320	1+10	12		12	21	69.8
Delta 100 Pro	100	1+10	8	8	8	21	69.8
FP4+	100	1+10	9	9		21	69.8
FP4+	200	1+10			11	21	69.8
HP5+	400	1+5			10.5	21	69.8
HP5+	800	1+5		10.5		21	69.8
HP5+	800	1+10	10			21	69.8
Neopan 400	400	1+5	5.75	5.75		20	68
Neopan 400	800	1+10	12.75	12.75		21	69.8
Neopan 1600	1600	1+5	5.75			21	69.8
Neopan 1600	2400	1+10	14.5			21	69.8
Pan F+	50	1+10		7		21	69.8
Pan F+	64	1+10	6.5			21	69.8
Plus-X [125PX]	125	1+10		9		20	68
Plus-X [PX]	250	1+10	9	5.5	9	21	69.8
Recording Film	1600	1+10	22			24	75.2
Recording Film	3200	1+10	27			24	75.2
TMax 100 [TMX]	160	1+10	12	10.25	12	21	69.8
TMax 400	1000	1+10	12		12	21	69.8
TMax 400	1200	1+10		11.25		21	69.8
TMax P3200 [TMZ]	3200	1+10	18.75			21	69.8
TMax P3200 [TMZ]	6400	1+10	22.5			21	69.8
Tri-X Pan [TX]	1000	1+5	10	14		21	69.8
Tri-X Pan Pro [TXP/TXT]	6500	1+5		9	9	21	69.8