Kodak HC-110 Developer

An Unofficial Resource Page

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See also my Kodak Xtol Developer Resource Page

Deutsche Übersetzung dieser Seite

Many thanks to Stefan Heymann for the translation!

NOTE ADDED JAN. 19, 2012: Now that Kodak is in bankruptcy protection, the future of all their film products is unclear. Should HC-110 become unavailable, I recommend Ilford Ilfotec HC as an alternative. It is not identical and is not syrupy, but it can be handled with a syringe the same way as HC-110 and probably has similar keeping properties. Being a Phenidone-hydroquinone developer, it probably gives slightly higher true emulsion speed (toe speed) than HC-110.

I have made a few minor updates to this page, shown in blue type.

This year, 2012, is the 50th anniversary of HC-110.

NOTE ADDED 2009: I do not have any information about HC-110 other than what is posted here. To develop film, please follow the recommendations from the manufacturer of the film and the developer. I cannot take responsibility for the performance of products whose manufacturers may change them at any time.

NOTE ADDED 2006: I am no longer doing much film photography and am no longer actively updating this page. I will make corrections as needed to keep its contents accurate, but I am no longer soliciting further information about this developer. Thank you for your interest!

I want to thank Stefan Heymann for redesigning the tables on this page.

About HC-110

Kodak HC-110 is a liquid-concentrate film developer introduced in 1962 and widely used ever since, particularly in photojournalism and fine-art photography.

It is recommended by Ansel Adams in his book, The Negative, and is a favorite of Zone System enthusiasts.

The official Kodak data sheet contains recommended developing times for practically all Kodak black-and-white films. A more comprehensive table of developing times, comprising films from other manufacturers, is available at www.digitaltruth.com. See also Greg Mironchuk's HC-110 tips and Stefan Heymann's German HC-110 page.

HC-110 is unusually environmentally friendly for the simple reason that it uses a small amount of chemicals. Less than 6 mL of HC-110 syrup - which itself is not highly toxic - will develop a roll of film. Compare that to the quantity of chemicals needed in typical powdered developers.

Obscure Beginnings

The introduction of HC-110 in 1962 apparently went almost unheralded. Scanning photography magazines from that period, I have not found any reviews, news items, or even advertisements for it. *The New York Times* reported on August 26, 1962 (p. 114): "Kodak HC-110 Developer, highly concentrated and rapid developer for black-and-white films, and Kodak HC-110 Replenisher, will be available next month. Characteristics include moderately fine grain, full shadow detail, long density scale, development latitude, and no loss of film speed, according to Kodak. The new product will be offered in bottles to make two gallons and three and one half gallons of working solution; the replenisher, in bottles to make one gallon." That is the only news of its debut that I have been able to find. I would like to hear from people who can point me to early reviews of HC-110.

The name "HC-110" is also curious. No other Kodak products have names beginning with "HC-" although one can guess that it might stand for "highly concentrated." Normally, Kodak developers have distinctive names such as Polydol, Dektol, etc., or numbered designations that begin with DK if the developer uses sodium metaborate ("Kodalk balanced alkali") and D if it doesn't (thus DK-50, D-76, and so forth). SB denotes stop baths, F denotes fixers, and there are a few other abbreviations for other types of chemicals.

Developer Characteristics

HC-110's selling points are ease of use, versatility, and reliability. The concentrate keeps for years; it's easy to mix up enough developer for one roll at a time; all types of black-and-white film can be developed with HC-110; and results are consistent.

Until recently, Kodak literature said little about the differences between general-purpose film developers. However, the 2001 *Kodak Professional Photographic Catalog* contains a comparison chart.

Compared to D-76, this chart indicates that HC-110 (dilution B) produces:

- Slightly less shadow detail or true film speed;
- Slightly finer grain;
- Slightly lower acutance.

Apparently, HC-110 has somewhat more solvent action than D-76, but less than Xtol.

Opinions differ about the effect of HC-110 on grain. Some photographers report coarser grain than with D-76; others report finer grain. This is probably a function of dilution and agitation.

Opinions also differ regarding acutance, since many photographers report that HC-110 produces high acutance, especially at high dilutions. This is a function of solvent action, which is reduced by diluting the developer.

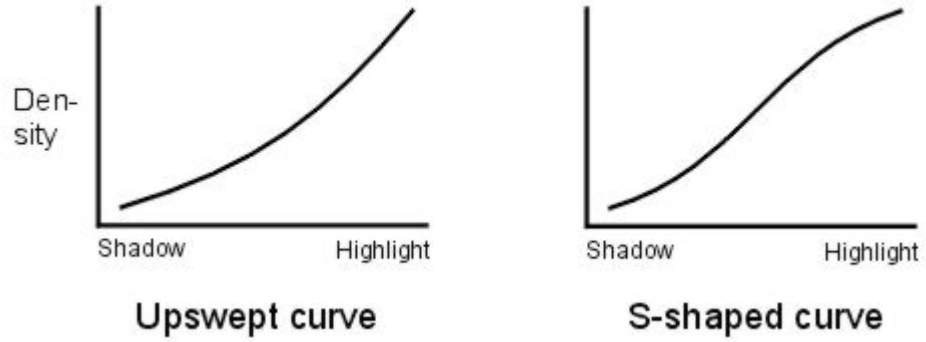
Where HC-110 really shines is in scientific work or push-processing, where film is deliberately overdeveloped to increase contrast and speed. HC-110 gives surprisingly little fog even with very prolonged development. In this respect it resembles D-19, Kodak's high-contrast scientific developer. I normally use HC-110 (A) for 10 minutes to develop gas-hypersensitized Kodak Technical Pan Film, which fogs severely in other developers.

Like Rodinal, HC-110 keeps very well and gives very reproducible results. It is a good choice when failure would be costly.

Curve Shape

Although I have not made detailed tests, it appears that HC-110 tends to produce an "upswept" characteristic curve with relatively high contrast in highlights (dark areas of the negative, light areas of the picture).

With T-Max 100 film in particular, HC-110 produces an upswept curve, with more contrast in the highlights than in the shadows, while Xtol produces a more S-shaped curve (reminiscent of Tri-X Pan), with the most contrast in the midtones.



This is confirmed by John P. Schaefer in *The Ansel Adams Guide: Basic Techniques of Photography*, Book 2. Schaefer's measurements indicate that diluting HC-110 does not change this effect appreciably; he got the same curve shape with Dilution B, 4.5 minutes, and Dilution F, 10 minutes. For an S-shaped curve he recommends Edwal TG7 developer.

When developing T-Max films in HC-110, be sure not to overdevelop. My own working time for HC-110 (B) is about 85% of Kodak's published time.

Date Code

Late-1990s bottles of HC-110 apparently have a manufacturing date code. Apparently this is the usual industry code where 9916, for instance, denotes the 16th week of 1999. That's when it left the factory; it may reach the consumer a year later, or more. I opened a bottle with this code just recently (June 2001) and decanted it into smaller bottles. It will probably take me 2 years to use it up, and if past experience is any guide, there won't be any noticeable deterioration the whole time.

Note: As of 2006, bottles of HC-110 are labeled with an expiration date. But if you transfer the syrup from the plastic bottle into *completely full* 4-ounce or 125-ml glass bottles, there is every reason to expect that it will still be good 4 or 5 years past the expiration date. At present I cannot distinguish between fresh HC-110 syrup and syrup that was stored that way since 2001.

Development Times

Need a longer development time?

Development times shorter than 5 minutes are hard to control accurately. But some newer films require very short development times in normal dilutions of HC-110.

The solution? Try the unofficial **dilution H** which is **half of dilution B**, and simply develop twice as long as for dilution B.

I am doing this successfully with Fuji Neopan 400.

Kodak films

From Kodak data sheets unless otherwise noted. Development in small tanks, agitating 5 seconds every 30 seconds.

If a development time with dilution B is less than 5 minutes, I recommend changing to dilution H and developing twice as long. Dilution H is a one-shot developer (not reusable).

Important note: In 2002, Kodak changed its manufacturing processes for a number of films. Although the photographic characteristics were not affected, development times have changed. The new films have new designations, such as 400TX instead of TX. That is why two versions of many films are listed below. For more information see Kodak's press release, Kodak's revised development times, and the general information available on www.kodak.com.

Film	Speed	Dilution	Time 68 F 20 C	Time 75 F 24 C	
OLD T-Max 100 (TMX)	100-200	B	7 min	5 min	
	400	B	9.5 min	6.5 min	
NEW T-Max 100 (100TMX)	100	B	6 min	4.5 min	
T-Max 400 (TMY and 400TMY)	320-800	B	6 min	4.5 min	
	1600	B	8.5 min	6 min	
OLD T-Max P3200 (TMZ)	400	B	7.5 min	5 min	
	800	B	8 min	5.5 min	
	1600	B	9 min	6 min	
	3200	B	11.5 min	7.5 min	
	6400	B	14 min	9.5 min	
NEW T-Max P3200 (TMZ)	400	B	7.5 min	5 min	
	800	B	8.5 min	6 min	
	1600	B	9.2 min	6 min	
	3200	B	10.5 min	7 min	
	6400	B	12 min	8.5 min	
Technical Pan	32	F	6 min	4.3 min	Gamma = 1.05
	64	F	10 min	7 min	Gamma = 1.20
	125	D	8 min	6 min	Gamma = 2.00
	250	B	12 min	9 min	Gamma = 2.70
	Max	A	10 min	7 min	Gamma > 2.9
	All of these are for high contrast. For normal contrast, use Xtol or Technidol Liquid.				
OLD Plus-X (PX, PXP), Verichrome Pan	125	B	5 min	3.5 min	
NEW Plus-X Pan (125PX)	125	B	3.5 min		See note below

	125	B	5 min	3.5 min	Unofficial
OLD Tri-X Pan (TX)	400	B	7.5 min	5 min	See note below
	1600	B	16 min	12 min	
OLD Tri-X Prof (TXP)	320	B	5.5 min	3.7 min	
NEW Tri-X Pan (400TX)	400	B	3.7 min		See note below
	400	E	6.5 min	5 min	My recommendation

Note about Kodak Tri-X Pan and Plus-X Pan: Kodak's published time for the new 400TX film in dilution B is 3 3/4 minutes at 68 F. That is too short to be practical, and I think they have made a serious mistake; it looks to me like the time for dilution A. I think they used the wrong dilution in their testing for both 400TX and 125PX.

Numerous photographers tell me that the correct time for 400TX is only a few percent shorter than for the old TX. Even Kodak told me the same thing – though they insist that they didn't mix up the dilutions.

However, it's generally agreed that Kodak's published time of 7.5 minutes for TX in dilution B was a bit long. Most photographers recommend about 6 to 7 minutes.

I want to thank Dick Dickerson and Silvia Zawadzki (retired from Kodak, part of the team that invented Xtol) for correspondence about this. They, too, think the wrong dilution was used in Kodak's tests. It will be interesting to see if the published time changes in future Kodak publications.

After further thought, I suspect that there really isn't much difference between 3.5 minutes and 5 minutes. The reason? This is almost entirely within the induction time (the time taken to start development). Results with development times this short are notoriously irreproducible and I recommend higher dilutions.

Ilford films

From Ilford data sheets unless otherwise noted. (The times for 75°F are my calculations.) Development in small tanks, "intermittent agitation" (probably comparable to the usual Ilford regimen of agitating 10 seconds every minute).

If a development time with dilution B is less than 5 minutes, I recommend changing to dilution D and developing about 25% longer.

Film	Speed	Dilution	Time 68 F 20 C	Time 75 F 24 C	
SFX 200	400	B	10 min	7 min	My estimate
100 Delta	50	B	5 min	3.5 min	
	100	B	6 min	4 min	
	200	B	8 min	5.3 min	
Delta 400 (new)	320	B	7.5 min	5 min	
	800	B	10 min	6.5 min	
	1600	B	13.5 min	9 min	
Delta 3200	400	B	6 min	4 min	
	800	B	7.5 min	5 min	
	1600	B	9 min	6 min	
	3200	A	8 min	5.5 min	
	6400	A	13 min	8.5 min	
HP5 Plus	400	B	5 min	3.5 min	
	800	B	7.5 min	5 min	

	1600	B	11 min	7 min
FP4 Plus	50	B	6 min	4 min
	125	B	9 min	6 min
	200	B	12 min	8 min
Pan F Plus	50	B	4 min	n.r.

Handling and Mixing

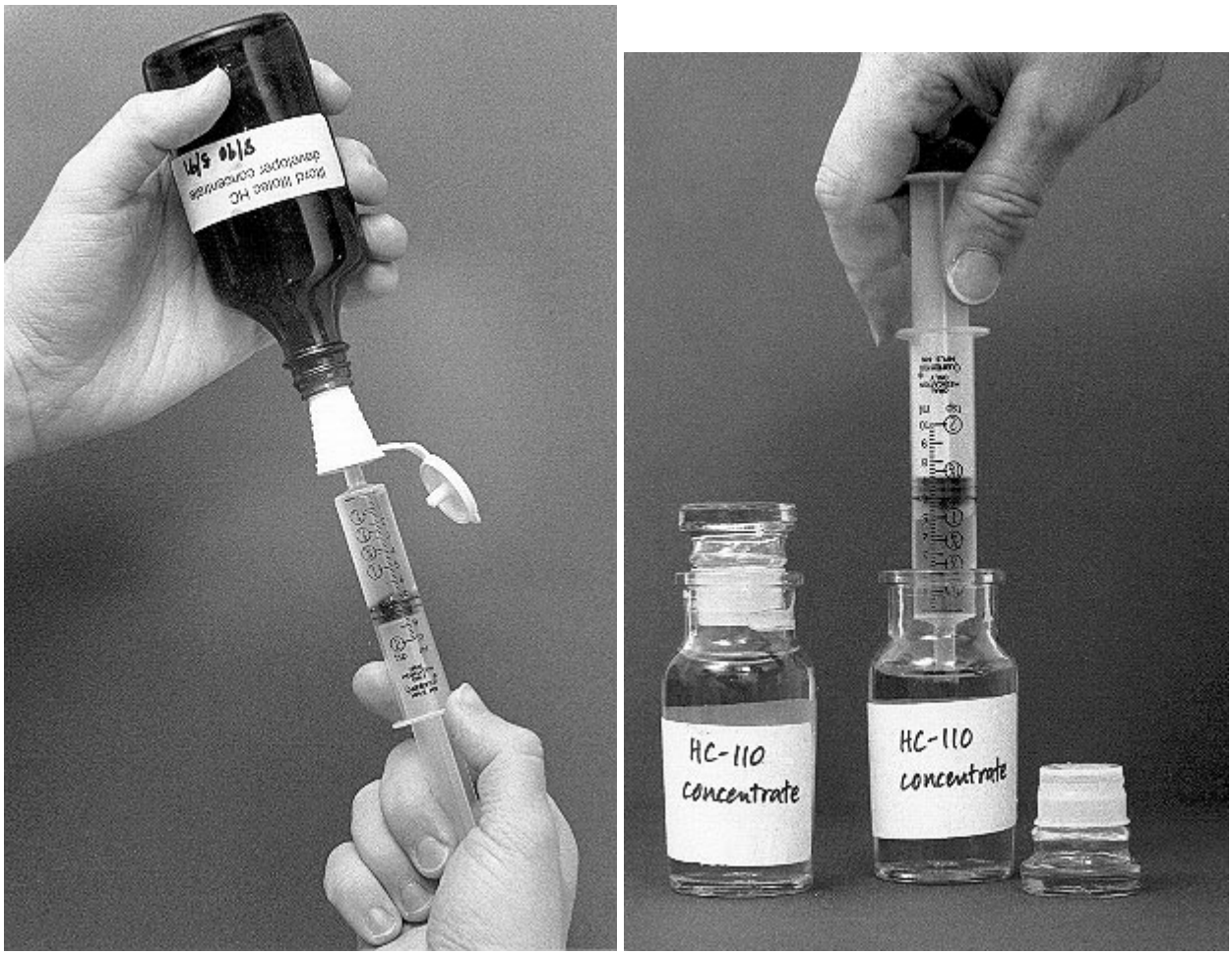
General Approach

HC-110 is so cheap that I always use it as a "one-shot" developer, with no attempt to reuse it. Kodak makes a replenisher which I have never used. The keeping properties of HC-110 concentrate are outstanding.

The developer is supplied as a syrupy concentrate which you are supposed to dilute 1:3 with water to make a stock solution and ultimately 1:31 to make dilution B. I do not make stock solution; instead, I work directly with the syrup, which will keep at least 4 years in tightly sealed, full bottles.

> *Note:* In Europe, HC-110 is also sold in 500-mL bottles as a **less concentrated syrup** which you dilute 1:9 to make dilution B. If you are using that product (Kodak CAT 500 1466), *follow the instructions for the European concentrate*, not those for the syrup. Although the European type of HC-110 is sold in England, there does not seem to be an English data sheet for it. **Full-strength syrup is also sold in Europe** so make sure you know which one you have.

On opening a 16-ounce or 500-mL bottle of HC-110, I decant the syrup into four amber glass medicine bottles, three of which are filled to the brim to exclude all air. I withdraw the syrup with an oral medicine syringe (designed for giving liquid medicines to babies; not used with needles and not restricted by law anywhere). Then I spray "Dust-Off" gas into the bottle to displace the air that was let in.



Two ways to measure HC-110 syrup. Photos by Cathy Covington from [Astrophotography for the Amateur](#).

Dilution Guidelines

The following table tells you how much SYRUP (original HC-110 concentrate) to use to make specific amounts of particular dilutions:

Dilution from SYRUP	240 mL (1 roll, steel tank)	300 mL (1 roll, plastic tank)	480 mL (2 rolls, steel tank)	600 mL (2 rolls, plastic tank)
A (1:15)	15 mL	18.8 mL	30 mL	37.5 mL
B (1:31)	7.5 mL	9.4 mL	15 mL	18.8 mL
C (1:19)	12 mL	15 mL	24 mL	30 mL
D (1:39)	6 mL	7.5 mL	12 mL	15 mL
E (1:47)	5 mL	6.3 mL	10 mL	12.5 mL
F (1:79)	3 mL*	3.8 mL*	6 mL	7.5 mL
G (1:119)	2 mL*	2.5 mL*	4 mL*	5 mL*
H (1:63)	3.8 mL*	4.7 mL*	7.5 mL	9.4 mL

*Be sure to use at least 6 mL of syrup per 135-36 or 120 roll of film, even if this requires you to put more than the usual amount of liquid in the tank.

The following table tells you how much EUROPEAN CONCENTRATE (from 500-mL bottles only, CAT 500 1466) to use to make specific amounts of particular dilutions:

Dilution from EUROPEAN CONCENTRATE (500 1466)	240 mL (1 roll, steel tank)	300 mL (1 roll, plastic tank)	480 mL (2 rolls, steel tank)	600 mL (2 rolls, plastic tank)
A (1:4)	48 mL	60 mL	96 mL	120 mL
B (1:9)	24 mL	30 mL	48 mL	60 mL
C (1:5.25)	38.5 mL	48 mL	77 mL	96 mL
D (1:11.5)	21 mL	26 mL	38.5 mL	52 mL
E (1:14)	16 mL	20 mL	32 mL	40 mL
F (1:24)	9.6 mL*	12 mL*	19 mL	24 mL
G (1:36.5)	6.4 mL*	8 mL*	12.8 mL*	16 mL*
H (1:19)	12 mL*	15 mL*	24 mL	30 mL

*Be sure to use at least 19.2 mL of European concentrate per 135-36 or 120 roll of film, even if this requires you to put more than the usual amount of liquid in the tank.

Dilutions G and H are unofficial — not described in any Kodak publications. See "Unusual Uses" below. I use Dilution H as a substitute for Dilution B to give twice the development time.

Dilutions C, D, and E seem to have been designed to match, respectively, the developing times of DK-50, DK-50 1:1, and DK-50 1:2 with sheet film (Carroll, *Photographic Lab Handbook*, 1979).

With this developer, development time is *roughly* proportional to dilution. Thus:

Dilution D **Develop 25% longer than with Dilution B**

Dilution E **Develop 50% longer than with Dilution B**

Dilution F **Develop 2.5 times as long as with Dilution B**

It takes about 6 mL of syrup to develop one 135-36, 120, or 8x10-inch film without exhausting the developer when complete development is required, perhaps less for compensating development. Thus, when experimenting with extreme dilutions, you may need more than the usual total amount of developer in the tank.

Adjusting Development Time for Different Temperatures

You can compensate for *small* changes in development temperature (over the range 66-75°F, 19-25°C) by changing the development time.

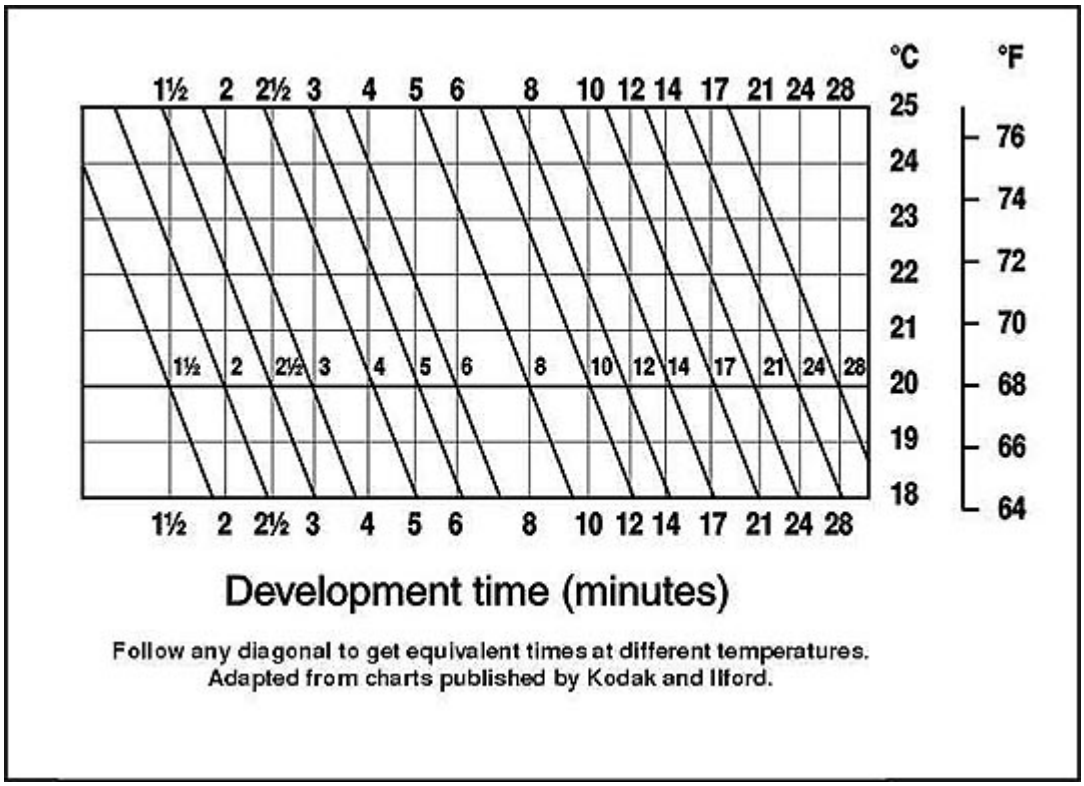
To adjust the development time for a temperature other than the one specified, use these formulae:

New time = Old time × exp(-0.081 × (New temp °C - Old temp °C))

New time = Old time × exp(-0.045 × (New temp °F - Old temp °F))

On some calculators *EXP x* is called e^x.

Though derived from published data about HC-110, these formulae are also approximately correct for most other developers. You can also use this chart:



How to Find Unknown Development Times

A *clip test* is a simple way to find out whether a particular developing time is roughly correct for a particular film. It's also a way to make sure your developer hasn't gone bad.

To do a clip test, you'll need a small piece of the film you're going to develop; a small piece clipped off the leader will do, since the test is performed in full room light. You'll also need a sample of the fully exposed (black) leader portion of a correctly developed roll of film. It need not be the same kind of film as long as it is of the same general type and was developed to the level of contrast that you're trying to achieve.

Using small dishes, develop, stop, and fix your sample of undeveloped film in full room light. Then wash it for about 5 minutes, hang it up to dry, and compare it carefully to a piece of the black portion of a correctly developed roll. Neither one should be pitch black; you should be able to see strong lights through them.

Compare them. If your experimental sample is too black, use less development time; if it's not as black, use more.

Unusual Uses for HC-110

Ansel Adams used HC-110 dilution G (syrup 1:119) as a compensating developer to increase shadow detail without blocking highlights. His developing time (presumably for Tri-X Pan Professional) was about 18 minutes at 68°F (20°C), with continuous agitation for the first minute and subsequent agitation for 15 seconds every 3 minutes. For preferential development of the shadows, it is important not to agitate too much.

For 35-mm film, this would require a minimum of 6 mL of syrup with water to make 720 mL, and one roll should be developed in a 2-roll tank with all 720 mL of liquid in it.

Michael Gudzinowicz (on rec.photo.darkroom) recommends dilution H (syrup 1:63) for higher acutance. Development times are to be found by experiment, but are likely to be 50% to 100% longer

than for HC-110 (B). I find that doubling the time for Dilution B is a good starting point.

It has been suggested that HC-110 might benefit from dilution with a sodium sulfite solution (perhaps 5%) as with Edwal FG7. Bear in mind however that HC-110 apparently already has considerable solvent action.

Joe Giacalone reports that astrophotographer Gerard Therin does planetary photography on gas-hypersensitized Kodak Technical Pan which he develops in two baths, first HC-110 (B) for 5 to 6 minutes and then D-19 for 2 minutes (presumably at 20 C = 68 F). My own thought is that a single bath in HC-110 (A) for 8 to 10 minutes will probably give very similar results.

You can develop photographic paper in HC-110 (A). Action is slightly slower than other print developers, and the capacity is less (about 10 or 15 8x10 sheets per 600 mL).

Scott Daniel Ullman (on rec.photo.darkroom) recommends adding HC-110 to paper developer in order to increase its working life and increase highlight detail (i.e., lower the threshold of developable exposure). He adds about 60 mL of HC-110 syrup to five liters of prepared Lauder Chemical Concentrated Paper Developer. Presumably, the organic accelerators in HC-110 are responsible for the beneficial effects.

Michael G. Slack (in *Darkroom Photography*, July/August 1979, p. 13) reports pushing Kodak Tri-X Pan to EI 4000 (with extreme contrast increase) by developing for 5 minutes at 75 F in HC-110 *replenisher* diluted 1:15 (like Dilution A, but starting with replenisher rather than syrup).

HC-110 Monobath

On Oct. 9, 2004, Donald Qualls posted, in rec.photo.darkroom, the following description of a **monobath** based on HC-110.

A monobath is a combined developer-fixer. You process the film in just one chemical - the monobath - and then wash it.

From Mr. Qualls' article:

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My specific HC-110 monobath was developed after taking a statement in
Anchell & Troop as a challenge; they said they weren't aware of anyone
developing a monobath that used rapid fixer instead of hypo, because
development would have to be exceedingly rapid.  Well, let's see —
HC-110 Dilution A at 75 F is pretty darned fast; how much do I need to
dilute the fixer to get the fixing time to six minutes?  That much?
Does it still have enough capacity for 135-36?  Cool!

I had to adjust the alkalinity and fixer proportion after the first
test, but the second was a complete success.

For 256 ml of HC-110 Dilution A, instead of pure water, use:

50 ml household clear ammonia
10 ml Ilford Rapid Fixer concentrate
Water to make up 256 ml including the HC-110 concentrate for Dilution A

At 75F, this mix develops and fixes 400TX in well under ten minutes,
likely as little as six (I haven't opened the tank that early, but
development should be completed in under three minutes and I lose some
shadows to fixing away the halide before the shadows develop; it might
work in four minutes total time).
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I have not tried this myself. It might be especially good for dealing with old or slightly fogged film because of the anti-fog action of the fixer.

Published Tests of HC-110

"Developing the Yellow Box"

In September 1972, *Modern Photography* published a test of the whole range of Kodak developers and found that, surprisingly, HC-110 gave the finest grain with Tri-X Pan. ("Developing the Yellow Box," by Jason Schneider, *Modern Photography*, vol. 36, pp. 88-89 and 107.)

Specifically, HC-110 (A) gave relatively fine grain and good acutance. (Unfortunately, the developing times are too short to be convenient for most films.) HC-110 (B) "produced virtually grainless Tri-X" but at the expense of acutance.

This is the article that first drew my attention to HC-110. Yes, I read it when it first came out; now you know how old I am! :)

Fred Picker, *Zone VI Workshop* (Amphoto, 1974)

This book praises HC-110 highly and also cites a review from *International Photo Technique* (1970) reporting that HC-110 produces finer grain and greater sharpness than Ilford Microphen. (No big surprise there; Microphen is a speed-increasing developer and HC-110 is not.)

Picker and other fine-art photographers feel that mastery of one particular developer is more important than changing formulas and that HC-110 and Tri-X Pan Professional are a very good combination.

The Judge-Holm Test

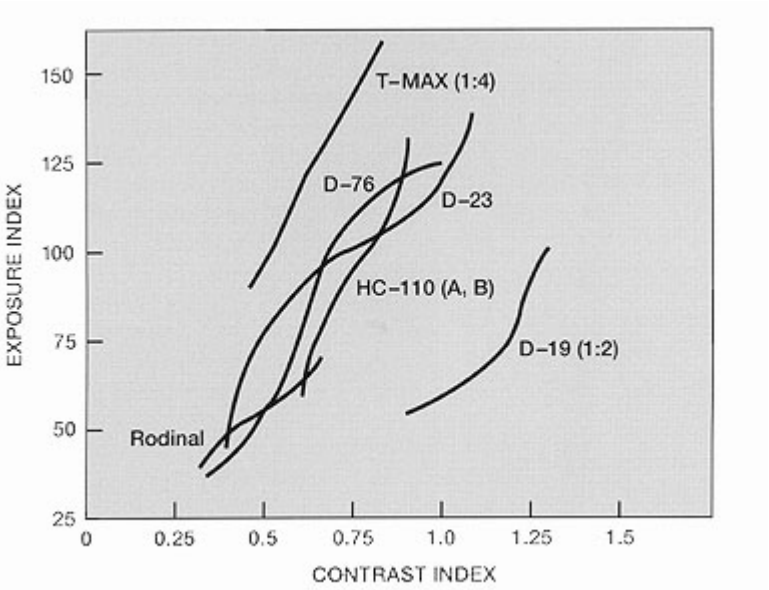
A very interesting test of numerous developers with Kodak T-Max 100 and Technical Pan Films is reported in these two articles:

- Judge, Nancianne, and Holm, Jack, "Sensitometric Evaluation of Kodak Technical Pan Film and Kodak T-Max 100 Professional Film Using a Wide Range of Developments," *Kodak Tech Bits* 1990, Issue No. 2, pp. 5-9. (Kodak Publication No. P-3-90-2.)
- Covington, Michael A., "Choosing a Developer Scientifically: An Interpretation of the Judge-Holm Test Data," *Kodak Tech Bits* 1991, Issue No. 2, pp. 14-16. (Kodak Publication No. P-3-91-2.)

Developers were evaluated for contrast and true toe speed (not push-processing speed, which is higher because it's based on midtones). As the following graph (from my article) shows, with T-Max 100:

- Kodak T-Max Developer gave the highest true speed at any given contrast index. (Normal contrast is 0.6 or 0.7.)
- D-76, D-23, HC-110, and Agfa Rodinal were the same to within experimental error. Rodinal looks as if it might have given somewhat lower speed than the others if the curves were extended, but this is not certain. Likewise HC-110 may be running a little lower than D-76.
- D-19, often used for scientific work, gave much less speed than HC-110 at comparable contrast indices.

The full text of the articles is presumably still available from Kodak.



Toe speed of Kodak T-Max 100 vs. contrast index in various developers. My plot of Judge and Holm's data, previously published in Kodak Tech Bits 1991.

The Secret Formula

The formula of HC-110 is a closely guarded trade secret - which, of course, does not prevent numerous photographers, including myself, from trying to figure it out.

The material safety data sheet (MSDS) for HC-110 mentions only:

Water, diethylene glycol, and ethylene glycol (solvents);
Diethanolamine-sulfur dioxide complex (sulfite in liquid form);
Hydroquinone (developing agent);
2-aminoethanol and *diethanolamine* (accelerators); and
Pentetic acid (chelating agent to remove water impurities).

However, I have it on good authority that HC-110 also contains another developing agent, a Phenidone derivative, probably Dimezone (4,4-dimethyl-1-phenyl-3-pyrazolidone, invented by Kodak, a derivative of Ilford's Phenidone).

This information comes from Bill Troop (co-author of The Film Developing Cookbook), who cites a personal communication from Dick Henn, who formulated HC-110 for Kodak.

A formula that resembles HC-110 was published in U. S. Patent 3,552,969 (1971), and many HC-110-like formulae are in British Patent 958,678 (1964, probably the original patent for HC-110). Practically all of them contain Phenidone or Dimezone.

Ilford's nearest equivalent to HC-110, Ilfotec HC, definitely contains Phenidone.

HC-110 does not act like most Phenidone or Dimezone developers. It does not produce fog or increase shadow speed. I attribute this to the use of a rather strong restrainer.

There are surely also other ingredients in HC-110, and the formula is known to have changed somewhat over the years. The syrup is lighter-colored than it used to be; for a while, in the 1980s, it was quite yellow.

The formula from Patent 3,552,969 is published in The Film Developing Cookbook, by Stephen G. Anchell and Bill Troop, p. 58. However, the patent number is given incorrectly there, and the words "Water to make 1 liter" should be deleted. This is an excellent book about developer formulations and I highly recommend it.

Another complication is the fact that the U.S. MSDS for Kodak HC-110 Developer Replenisher (but not HC-110 Developer) also lists pyrocatechol, a developing agent now rarely used. It is not entirely clear whether the information is current or pertains to an earlier formulation, since the label on the replenisher bottle does not mention pyrocatechol. Moreover, the British MSDS for the replenisher does not list that ingredient. Anchell and Troop report that HC-110 itself contained pyrocatechol at one time.

The formula of HC-110 and a few other single agent developers was discussed extensively in the newsgroup **rec.photo.darkroom** in February 2003 in a thread titled "Single agent developers." You can view that thread by clicking here. Several experts participated and contributed detailed information about how they think HC-110 works. In particular, the organic amines in it make it very different from other developers.

Top

Last revision 2012 January 19, the day of Kodak's bankruptcy filing