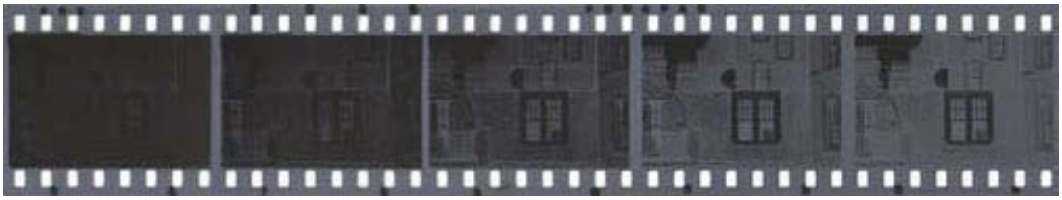
ROLLEI IR400 TEST FOR USE AS STANDARD 400 ISO/ASA FILM

Rollei Infrared IR400, no filter

Kodak Tri-X 400



Foma Fomapan 400

Technical notes:
All film exposed identically with correct exposure set for ISO 400, f.8 @1/250th second. Filmstrip images show correct exposure in center, with +1 and +2 stops to the left, -1 and -2 stops to the right.

Analysis:
This test shows the efficacy of using Rollei Infrared film for non-infrared results. Without an infrared filter, Rollei IR400 demonstrates a wide latitude producing printable negatives across 5 stops. Tri-X 400 performs equally well; however, the overall density of the overexposed negatives is higher than Rollei IR400. Fomapan 400 shows the least latitude, with thin shadows in the -2 exposure, and too much density in both overexposed negatives.

Rollei Infrared IR400, no filter

2900dpi enlargement

Kodak Tri-X 400

2900dpi enlargement

Foma Fomapan 400

2900dpi enlargement

Technical notes:
Film was developed in Agfa Rodinal 1+50 for the recommended time.

Analysis:

Rollei IR400 grain is less apparent than both Tri-X 400 and Fomapan 400. Highlights are bright and retain exceptional levels of detail, shadows are full and show excellent separation. Mid-tones are slightly compressed compared to Tri-X. In the enlargement, the window frame shows the best detail in the moulding and has a true three-dimensional quality. The two black streaks running down the brickwork show the clearest shadow separation.

Kodak Tri-X 400 has better mid-tone contrast than the Rollei film, as can be seen in the brickwork. However, the highlights are more blocked up than the Rollei film, and the the window frame is more gray. Separation of the black ironwork from the mid-tone bricks is slightly weaker than Rollei IR400, although the overall contrast balance is good.

Foma Fomapan 400 is higher in contrast than the other two films, and there is notable loss of detail in both the shadows and highlights. The left section of the window frame has lost all separation and the moulding is not even evident. As the photograph was taken under cloudy bright conditions, the loss of highlight detail makes this film unsuitable for regular use in higher contrast situations. Mid-tone separation is acceptable, but the shadows block up easily as seen in the brickwork shown in the enlargement.

INFRARED FILM

	ROLLEI INFRARED IR400	EFKE IR820
Grain	Very Fine	Moderate
Contrast	Excellent	Soft
Sharpness	Excellent	Average
IR Sensitivity	Good	Strong
Daylight Loading	Yes	No
Resolution	160 l/mm	110 l/mm
ISO/ASA for IR	25	25
Compare to	SFX 200, Konica Infrared	Kodak HIE
Pro +	• Far superior in terms of fine grain, contrast and sharpness • Clear polyester base best for archiving and scanning • Excellent 400 ISO film without filter, ideal for shooting normal and IR images on the same roll! • Milder IR effect can produce more effective images • Withstands machine processing at high temperatures (40°C) • Unrivalled quality control and batch consistency • Easy daylight loading. No black bag needed.	• Easier to obtain IR effects with standard red filter • Graininess and low contrast create textural dreamlike quality
Con -	• Requires Deep Red or Opaque filter for IR effects • IR effect limited when IR levels are very low • Polyester base can be hard to load if reels are damp	• Requires absolute darkness when loading camera (35mm) • Base fog and grain make for difficult scanning • Grainy and lacking contrast • Emulsion not suitable for machine processing above 25°C • Highlights can blow out easily

Rollei Infrared IR400, ½ sec, f.16 [+]

Efke Infrared IR820, ½ sec, f.16 [+]

Evaluation and comparison
by Daryl Duckworth

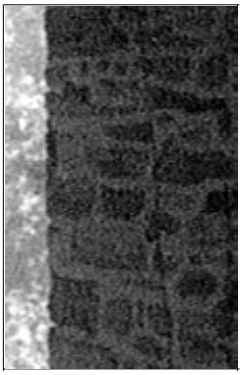
Efke IR820 and Rollei Infrared IR400

A series of exposures were taken with a 135mm Symmar-S at f/16 using a Hoya R72 filter.

All films were all developed in ACU-1 (1+5) for 12 minutes.

1200 dpi scan detail shows the Rollei Infrared IR400 to be far superior to the Efke IR820 with regards to grain and tonality


Rollei @1200dpi


Efke @1200dpi

Note: All results have been provided by independent testers. Scans and images have NOT been manipulated.

INFRARED FILM COMPARISON

Independent report and analysis by Gary A. Reese, College of Southern Nevada, Department of Media Technologies, North Las Vegas, Nevada USA

General notes:

Each film was developed in Kodak Xtol for the time indicated in the notes below. Agitation was for 5 sec. each 30 seconds for times under 10 min. Alternately, it was 10 sec. each min for times over 10 minutes. For the 1:2 dilution, I used a tank twice as large as necessary to hold the reels.

EI is the exposure index (film speed). I used an incident light meter held at camera position with the dome facing the camera.

Filters include None, a red R25 and an infrared R72.

Analog Gain is the control on Nikon film scanner which allow the user to control the exposure. Adjustments were often needed to compromise on how the scanner handled excessive contrast in the negative. I used the control to balance the shadow and highlight detail rendered A perfectly exposed negative for scanning purposes would have contrast at a low enough level to not require the use of analog gain. The higher the setting, the more a film/developer combination would benefit from tweaking the development time to reduce contrast in a high contrast early morning light scene like I shot. This could be achieved through a) higher dilutions, b) less developing time or c) the choice of a lower contrast developer.

Film loading was as per manufacturer's recommendations or better.

Rollei IR400 No filter, EI 400

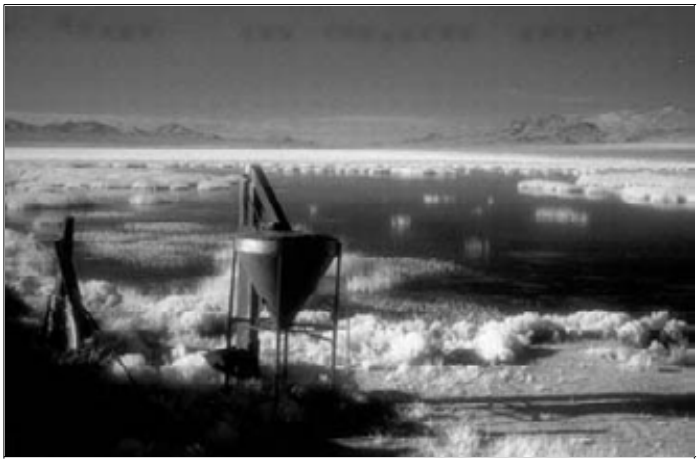
Rollei IR400 R25 filter, EI 25-50

Rollei IR400 R25 filter, EI 50 **REFERENCE**

Rollei IR400 R72 filter, EI 4

Rollei IR400 R72 filter, EI 4-8

Efke IR820 R25 filter, EI 5



Efke IR820 R72 filter, EI 1.5

Ilford SFX200 No filter, EI 200

Ilford SFX200 No filter, EI 400

Ilford SFX200 R25 filter, EI 25

Ilford SFX200 R25 filter, EI 50

Ilford SFX200 R72 filter, EI 12

Kodak HIE R25 filter, EI 100

Kodak HIE R72 filter, EI 50

Konica IR750 R25 filter, EI 10

Konica IR750 R72 filter, EI 8

Notes for specific film / filter combinations:

Rollei IR400 No filter EI 400 Analog gain -0.1, Xtol 1+1 @7.5 mins
Lacks the drama I like from infrared (see Rollei IR R25 EI 50 Reference note).

Rollei IR400 R25 EI 25~50 Analog Gain -0.4, Xtol 1+1 @7.5 mins
An alternate choice to my "reference" shot below.

Rollei IR400 R25 EI 50 – REFERENCE, Xtol 1+1 @7.5 mins
The best scene representation as I visualized it in infrared. I like the subtle infrared effects of lightening up the dark greens of vegetation, bringing out clouds with a darker sky and getting some lightening of shadows (i.e., adding some drama). Trying to force (with Photoshop controls) a negative which doesn't reproduce tones correctly often results in a print which reveals its flaws to a discerning viewer. This negative wouldn't require any forcing, thus representing the saying: "The best negative is one which prints easy." On the other hand, the grain is too mushy for my taste, despite using a developer with a high acutance effect. As with Agfa B&W films, the grain might sharpen up some in Rodinal - the traditional best choice for Agfa films. With medium format shots, the grain issue is a moot point with me. I like the film.

Rollei IR400 R72 EI 4, Xtol 1+1 @7.5 mins
Blows out highlights at EI 4. Has potential, but development needs to be cut even below the 20% cut I did versus manufacturer's recommendation. Unfortunately, this means that R72 shots need to all be on one roll - or - mix filters on one roll but accept underdevelopment for R25 and no filter shots.

Rollei IR400 R72 EI 4~8, Xtol 1+1 @7.5 mins
Loses shadow detail at EI 4~8 (this means a half stop between EI 4 and EI 8). Best compromise exposure would have been EI 5 (not shot).

Efke IR820 R25 EI 5, Xtol 1+2 @16 mins
The anti-halation backing is effective in keeping highlights from bleeding (like is evident on the edges of frames), but it still passes near IR wavelengths which bounce back through the layer. Thin emulsion needs gentle agitation to avoid sprocket hole streaking. Kodak HIE like grain and average sharpness versus the other IR films.

Efke IR820 R72 EI 1.5, Xtol 1+2 @16 mins
Negative greatly flawed by dimple pattern which is caused by film pressure plate in camera. See comments about anti-halation layer above. Much lower film speed than I expected. EI 0.75 (not shot) would probably have been a better exposure). Strange UFO pattern of fuzzy rectangles across sky caused by light leaks through sprocket holes - but how? I handled this film in total darkness. Very good infrared effects, but at a great cost in film speed over its competition. Kodak HIE like grain and low sharpness with a R72 filter.

Ilford SFX200 No filter EI 200 Analog Gain -1.1, Xtol 1+1 @7 mins
Could benefit from a reduction in manufacturer's recommended development time. The flare is a light leak which reached Frame 1. Thus the film needs to be started at about Frame 3 to avoid leaks through the felt trap. Wider than expected exposure latitude. This frame, at the manufacturer's recommended EI, is the overexposure limit. Finer grain and similar sharpness versus Rollei IR.

Ilford SFX200 No filter EI 400 Analog Gain -0.58, Xtol 1+1 @7 mins

Could benefit from a reduction in manufacturer's recommended development time. Wider than expected exposure latitude. This frame, at twice the manufacturer's recommended EI, is the underexposure limit. Finer grain and similar sharpness versus Rollei IR.

Ilford SFX200 R25 EI 25 Analog Gain -0.5, Xtol 1+1 @7 mins
Could benefit from a reduction in manufacturer's recommended development time. While an obvious overexposure, it is still a usable shot. Thus, this film/developer/filter combination shows a wider than normal exposure latitude for an infrared film. Finer grain and similar sharpness versus Rollei IR.

Ilford SFX200 R25 EI 50 Analog Gain -0.5, Xtol 1+1 @7 mins
Could benefit from a reduction in manufacturer's recommended development time. Had I shot an EI 40, it might have been my "reference" shot (see Rollei EI R25 EI 50 Reference below). Finer grain and similar sharpness versus Rollei IR.

Ilford SFX200 R72 EI 12 Analog Gain -0.35, Xtol 1+1 @7 mins
A surprisingly nice combination, with film speed way better than reports on the Internet would suggest. Results in a very full tonality scan for any R72/film combination, thus allowing for a wide variety of printing interpretations. Fantastic shadow detail without burning out highlights for this developer/dilution and time. Finer grain and similar sharpness versus Rollei IR.

Kodak HIE R72 EI 50, Xtol @6 mins
Still too contrasty with development to a Contrast Index of 0.58. Simultaneous loss of highlight and shadow tonality at an EI of 50. Negative flawed by dimple pattern which is caused by film pressure plate in camera. The most grainy film, although Xtol keeps it better than I've seen my students get with D76 developer. Poor sharpness and grain.

Kodak HIE R25 EI 100, Xtol @6 mins
Development for a Contrast Index of 0.58 (as per this test) yields a perfect negative for scanning. But that C.I. isn't one listed on the box... Negative flawed by dimple pattern which is caused by film pressure plate in camera. Classic infrared effects with a R25 filter - at a very usable film speed. The most grainy film, although Xtol and perfect exposures keep it better than I've seen my students get with D76 developer. Poor sharpness and grain.

Konica IR750 R25 EI 10 Analog Gain -1.13, Xtol 1+1 @7 mins
Nice infrared rendition as photographers have come to know it - and from a R25 filter, no less! Using an Orange filter, a common practice for landscape photographers, would have been less pronounced (see my comments under Rollei EI R25 EI 50 Reference below). Poorer sharpness, same grain versus Rollei IR.

Konica IR750 R72 WI 8 Analog Gain - 1.3 (approx), Xtol 1+1 @7 mins
Surprisingly way too much contrast in negative for a film/developer combination I have standardized on in the past. A good example of why one would have to scan for the highlight detail and the let the shadows render as a detailess "lunar effect."

INFRARED FILM COMPARISON, Part 2

Independent report and analysis by Gary A. Reese, College of Southern Nevada, Department of Media Technologies, North Las Vegas, Nevada USA

General notes:

Each film was developed in Kodak Xtol for the time indicated in the notes below. Agitation was for 5 sec. each 30 seconds for times under 10 min. Alternately, it was 10 sec. each min for times over 10 minutes. For the 1:2 dilution, I used a tank twice as large as necessary to hold the reels.

EI is the exposure index (film speed). I used an incident light meter held at camera position with the dome facing the camera.

Filters include None, a red R25 and an infrared R72.

Analog Gain is the control on Nikon film scanner which allow the user to control the exposure. Adjustments were often needed to compromise on how the scanner handled excessive contrast in the negative. I used the control to balance the shadow and highlight detail rendered A perfectly exposed negative for scanning purposes would have contrast at a low enough level to not require the use of analog gain. The higher the setting, the more a film/developer combination would benefit from tweaking the development time to reduce contrast in a high contrast early morning light scene like I shot. This could be achieved through a) higher dilutions, b) less developing time or c) the choice of a lower contrast developer.

Film loading was as per manufacturer's recommendations or better.

Efke IR820 R25 filter, EI 5


Efke IR820 R72 filter, EI 1.5


Ilford SFX200 R25 filter, EI 50


Ilford SFX200 R25 filter, EI 50a

Ilford SFX200 R25 filter, EI 100

Ilford SFX200 R72 filter, EI 3-6

Kodak HIE R25 filter, EI 100

Kodak HIE R72 filter, EI 50

Konica IR750 R25 filter, EI 10

Konica IR750 R25 filter

Konica IR750 R72 filter, EI 4-8

Rollei IR400 No filter, EI 200

Rollei IR400 R25 filter, EI 50-100

Rollei IR400 R72 filter, EI 4-8.jpg

Rollei IR400 R72 filter, EI 4

Notes for specific film / filter combinations:

Kodak HIE R25 EI 100, Xtol 6 min
Best EI probably 80 (not shot). Excessive contrast requiring analog gain of 1.75 to retain detail in highlights (gravel), but with no shadow details. No analog gain (as shown) retained shadow detail but burned out highlights. Surprisingly controlled grain (although the second most grainy) and excellent sharpness in Kodak Xtol developer.

Kodak HIE R72 EI 50, Xtol 6 min
Moderately high contrast requiring analog gain of 0.43 to retain detail in highlights (gravel), but with no shadow details. No analog gain (as shown) retained shadow detail but burned out highlights. Lower contrast with stronger IR filter is opposite of other IR films. Surprisingly controlled grain (although the second most grainy) and excellent sharpness in Kodak Xtol developer.

Rollei IR400 R25 EI 50~100 Analog Gain -1.25, Xtol 1+1 @7.5 min
Analog gain of -1.25 necessary to balance shadows and highlights. Wide useable tonal range in negative. Mushy APX type grain, but as sharp as Ilford SFX.

Rollei IR400 No filter EI 200~400 Analog Gain -0.71, Xtol 1+1 @7.5 min
Analog gain of -0.71 necessary to balance shadows and highlights. Wide useable tonal range in negative. Mushy APX type grain, but as sharp as Ilford SFX.

Rollei IR400 7.5 min R72 EI 4 Analog Gain -0.1, Xtol 1+1
Analog gain of -0.47 necessary to balance shadows and highlights. Mushy APX type grain, but as sharp as Ilford SFX.

Konica IR750 R25 EI 10~20 Analog Gain -1.2, Xtol 1+1 @7 min
Analog gain of -1.25 necessary to balance shadows and highlights. Wide useable tonal range in negative. Finest grain of the group.

Konica IR750 R25 EI 10 Analog Gain -1.05, Xtol 1+1 @7 min
Analog gain of -1.05 necessary to balance shadows and highlights. Wide useable tonal range in negative. Finest grain of the group.

Konica IR750 R72 EI 4~8 Analog Gain -1.3, Xtol 1+1 @7 min
Analog gain of -1.3 necessary to balance shadows and highlights. Wide useable tonal range in negative. Finest grain of the group.

Ilford SFX200 Xtol No filter EI 50~100 Analog Gain -0.7, 1+1 @7 min
Analog gain of -0.7 necessary to balance shadows and highlights. Wide useable tonal range in negative. Fine grain and high sharpness.

Ilford SFX200 Xtol No filter EI 50 Analog Gain -0.8, 1+1 @7 min
Analog gain of -0.8 necessary to balance shadows and highlights. Wide useable tonal range in negative. Fine grain and high sharpness.

Ilford SFX200 Xtol R25 EI 100 Analog Gain -0.9 Reference, 1+1 @7 min
Analog gain of -0.9 necessary to balance shadows and highlights. Wide useable tonal range in negative. Fine grain and high sharpness. The best scene representation as I visualized it in infrared. I like the subtle infrared effects of lightening up the dark greens of vegetation, bringing out clouds with a darker sky and getting some lightening of shadows (i.e., adding some drama). Trying to force (with Photoshop controls) a negative which doesn't reproduce tones correctly often results in a print which reveals its flaws to a discerning viewer.

Ilford SFX200 R72 EI 3~6 Analog Gain -0.8, Xtol 1+1 @7 min
Analog gain of -0.8 necessary to balance shadows and highlights. Wide useable tonal range in negative. Fine grain and high sharpness.

Efke IR820 R25 EI 5, Xtol 1+2 @16 min
No analog gain needed - good film/filter/developer combination for this scene. Largest grain of group.

Efke IR820 R76 EI 1.5, Xtol 1+2 @16 min
Underexposured at least one stop. Least sharpness of group with largest grain.

INFRARED FILM


Efke IR820


Kodak HIE


Ilford SFX200


Rollei IR400

Photo credit: © Gary A. Reese, College of Southern Nevada, Department of Media Technologies, North Las Vegas, NV, USA

The images above are details of larger negatives and are shown here as examples of each film's characteristics and spectral response. All photographs were taken using an R72 Infrared filter, and developed in Xtol for the recommended time.

Efke IR820
The closest in infrared sensitivity to Kodak HIE, Efke IR820 has similar characteristics to the Kodak film. Foliage appears white and glowing, overall contrast is slightly soft and the grain is textural. Efke IR820 will produce good results with a standard red #25 filter, and stronger effects with an R72 filter.

Kodak HIE
Kodak's High Speed Infrared film is renowned for the grainy dreamlike images which it is capable of producing. HIE has the highest infrared sensitivity of all the IR films, and will produce strong IR effects with minimal filtration.

Ilford SFX200
Technically, this film is an extended red rather than a true infrared film; however, it offers very fine grain and nice IR effects. Foliage is lightened, but not to the extent of the other IR films. R72 Infrared filter required for IR effects.

Rollei IR400
Much finer grained than the Kodak or Efke film, Rollei IR400 shows more of a split Wood effect, with some areas of foliage glowing white, while other areas are darker. More contrast than Efke IR820. A #25 filter can be used, but an R72 Infrared filter is recommended.

The example images provide a good idea of the different qualities each film offers, but should be seen as an introductory guide only. Each film is capable of rendering greater or less contrast depending on the filtration, exposure and development.

Note: All results have been provided by independent testers. Scans and images have NOT been manipulated.

ROLLEI INFRARED FILM: TEST REPORT
Independent report and analysis by Willie Jan Bons, www.foto-art.nl


Roll 1, #1


Roll 1, #2


Roll 1, #3


Roll 1, #4


Roll 2, #1


Roll 2, #2


Roll 2, #3


Roll 2, #4


Roll 2, #5


Roll 2, #6


Roll 2, #7

[click any image to enlarge]

Equipment used:
Hasselblad 500 CM
Planar 80 CF T* 2.8
150 CF T* 4.0
Hoya Filter IR720

Scans:
Epson 3200 with Silverfast software
Adobe Photoshop CS2

Roll 1 Development:
The first roll was developed at 14.5 minutes
Developer Pyrocat HD 1:1:100, 20°C
Agitation first minute continuously
After that 1 inversion each minute.

The first roll was shot at 400 asa. I took 4 stops for the filter, so shot the film at 25 asa with filter and 400 without. The shots where taken in the wood at 2 o'clock in the afternoon. There was a little sun behind light clouds. Temperature around 23°C.

Result Roll 1
After development I saw that the shots with the filter where to light. Some shots I bracketed also at 12 asa and this was the best compared to the shot at 25. So this filter uses up 5 stops and not 4 as I pretended.

Photo	Description
Roll 1 #1	Shot without filter. Tone is good. No grain visible.

Roll 1 #2	Is the same shot as Roll 1, #1 but now with IR720 filter.The wood effect is good visible. The tree was actual in the shadow, no direct sunlight.
Roll 1 #3	Same circumstance as Roll 1, #1
Roll 1 #4	Higher contrast. The sun was shining (no clouds).

Roll 2 Development:
The 2nd roll was developed at 14 minutes
Developer Pyrocat HD 1:1:100, 20°C
Agitation first minute continuously
After that 1 inversion each minute.

The roll was shot at 400 asa. I took 5 stops for the filter, so shot the film at 12 asa with filter and 400 without. The shots where taken at 8-10 o'clock in the morning. There was sun. Temperature around 20°C.

Result Roll 2
The overall structure of the negatives look fine. Not to dark and not to light.

Photo	Description
Roll 2 #1	Inside our house at 7 o'clock.
Roll 2 #2	High contrast scene where fog was moving at the back of the house.
Roll 2 #3	High contrast scene. About 7 stops. I think I get more out in the darkroom.
Roll 2 #4	No direct sunlight onto the grass. No visible wood effect. The grass had not yet been lightened by the sun at all.
Roll 2 #5	At 9.30 the light became to hard. The highlights get burned out...
Roll 2 #6	Shot at 12 o'clock in our garden pond. The light was hard (direct sunlight). The lilly is almost not visible. The leaves have the same colour.
Roll 2 #7	Normal shot taken with a b&w closeup filter. The leave was taken from a plant in the garden just before the shot was taken. The leave was in the sun shot around 11 o'clock.

Conclusion

- The filter Hoya IR720 takes away about 5 stops.
- Development 14 minutes at 20°C. In Pyrocat HD 1:1:100.
- Agitation first minute, after that 1 inversion each minute.
- When putting the film into the development reel (Jobo), with other films the tape attached to the film is cut when I remove the film. But now the complete tape got off the paper and got stuck onto the film.
- After drying the film, it does not lay completely flat. Maybe after some weeks in the sheet holder.
- The grain is not visible on my 6x6 negatives. It looks very nice. The Pyrocat HD developer also helps to reduce grain.
- It scans very good on the basic settings.
- Probably when shooting in the spring or autumn the light is not that hard, or shoot when the sun is behind light clouds. I was sometimes over the edge but would like to see the wood effect.

I like the structure of the film. It does not look like a 400 asa film to me. The highlights in the negative are soft, so probably when making prints in the darkroom the quality will be even better than scanning.

Willie Jan Bons, Foto-Art 2007

Note: All results have been provided by independent testers. Scans and images have NOT been manipulated.