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A Guide to 35mm Films

The Editors, January, 2003



Film is still alive and well, thank you very much

While digital imaging is becoming ever more popular with both snapshotters and pro photographers, there are still more than 100 35mm films available in handy cassettes. Wonder why?

Well, because film is still a very popular genre for still photography. And different photographers have different tastes. And—while most of today's films perform well in a wide variety of photographic situations—some films offer decided advantages for specific types of photography.

Types of Films

There are three basic types of films in wide use today: color-negative (also known as color-print) films, color-reversal (also known as color-slide) films, and black-and-white negative films. There's also a black-and-white slide film (Agfa Scala 200X), and a few regular black-and-white negative films can be processed into black-and-white transparencies using special reversal developing kits. And there are some special-purpose films.



General-purpose consumer films do well with people subjects. Here, Kodak Gold 200 produced natural colors in overcast daylight. *Photo by Lynne Eodice*

Color-negative films produce color negatives, from which color prints are made. When the color negatives are printed on color papers (which contain a photosensitive emulsion similar to the one on the films), you get color prints that look like the original scenes you photographed. Print films offer the advantages of wide exposure latitude and the ability to fine-tune things when the negatives are printed.

Color-reversal films produce transparent positive images that look like the original scenes you photographed. When these are cut into

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You don't need pro film to do professional-looking studio portraits. This one was made on Konica Centuria Super 100 consumer print film, lit by two studio flash heads in bounce umbrellas. *Photo by Lynne Eodice*



Fujicolor Reala was the first film to feature a 4th color layer to reproduce colors "as the human eye sees them." It's another consumer print film that works very well for portraits, of pets as well as of people. *Photo by Lynne Eodice*



Photo by Lynne Eodice

individual frames and mounted, you get color slides for projection. Slide films offer the advantages of what-you-saw-is-what-you-get (there's no printing step that can alter the colors), and a greater range of tones (transparencies are viewed by transmitted light, and thus can show a greater range than paper prints, viewed by reflected light, can).

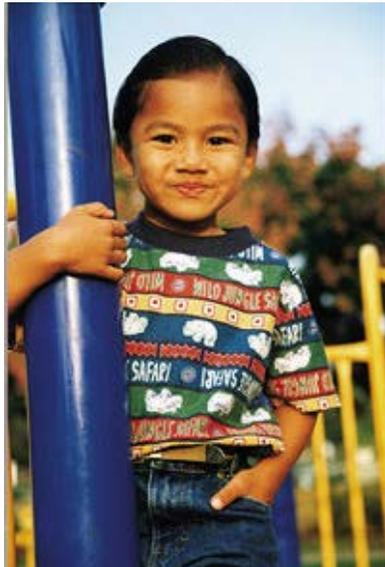
Black-and-white negative films produce black-and-white negatives, from which black-and-white prints are made. B&W films offer the advantages of wide contrast control through development time, and longer-lasting images (their silver-based images are more stable than color films' dye-based images). There are also chromogenic black-and-white films (discussed in a sidebar later in this article), which produce dye-based black-and-white negatives.

Films for General Photography

Today's films by and large do a good job with a wide variety of subject matter and shooting conditions. You can get good results with just about any subject using just about any film. The general rule for best image quality is to use the slowest film that will let you get your shot (i.e., that will let you use the desired shutter speed to render subject motion as you want it, and the desired aperture to control depth of field), because slower films generally are finer grained and sharper, with richer color rendition.

If in doubt, use color-print film, because it has wide exposure latitude, and corrections can be made when the negatives are printed.

The consumer films (the ones that don't have the word "professional" in their names) are generally lower-priced than the pro films, and better "generalists." Many pro films are designed for specific applications, and thus less suitable for other applications. For example, a portrait



Late-afternoon sun lends a warmth to outdoor portraits. Fast film (here, Konica Centuria 400) compensates for the dimmer lighting, allowing for hand-holdable shutter speeds and adequate depth of field. *Photo by Lynne Eodice*



Fujicolor Superia 100 is another consumer film that's great for portraits—here, by natural light with on-camera flash-fill. *Photo by Lynne Eodice*

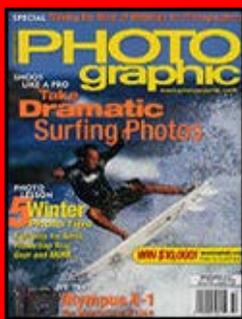
film, with its softer palette, might not be the best choice to record a street festival's bright colors. As a general rule, consumer films do a pretty good job with a wide variety of subject matter, while pro films are best used for the subjects for which they were designed.

Consumer films aren't necessarily inferior to pro films. In fact, in many cases a pro film has its consumer-film equivalent. For example, Fujichrome Sensia 100 is the consumer equivalent of Fujichrome Astia 100 Professional, with similar image characteristics and color rendition. Likewise, Kodak's highly saturated Elite Chrome ExtraColor 100 is quite like Ektachrome E100VS Professional. So, in these instances, you can save some money by using the consumer version of the film. In other cases, though, there are consumer films with no pro counterpart. For example, Kodak's Gold and MAX consumer print-film series has richer colors than its pro color-print films, but is grainier for a given film speed.

So what's the difference between consumer and pro films? Why do pros pay more for pro films? Consistency. As a film ages, it changes. Its color balance shifts, and its ISO speed decreases. Pros need to know exactly what to expect from roll to roll, and generally buy large quantities of film and use it right away. So pro films are shipped when they're at their optimum age, and kept frozen to prolong that state of affairs. A snapshotter might take six months to expose that roll of film in his or her camera, so consumer films are released sooner after manufacture, so they age into ripeness on a more leisurely schedule. Consumers use color-print films almost exclusively, so wide exposure latitude and corrections during printing cover the difference.

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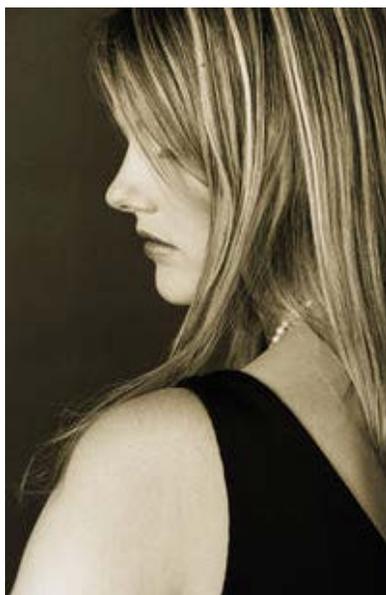
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From the Archives



Old, conventional black-and-white films are still viable portrait choices, if you want black-and-white portraits. Here, Kodak Plus-X was used. *Photo by Lynne Eodice*



An easy way to get sepia-tone portraits is to shoot on black-and-white film (here, Ilford FP4 Plus), and have the lab print it on color paper with appropriate filtration. *Photo by Lynne Eodice*

Films for People

Lots of things are more important in portraiture than the film you use: the lighting, the pose and the camera position, for starters. Using a pro portrait film is not going to improve a poorly lit portrait of an awkward pose, shot from too close. But the pro portrait films are optimized for skin tones and portrait lighting situations, and can turn a well-lit, well-posed portrait shot from the right distance into a real winner.

A talented portraitist can shoot nice portraits on most of today's color films (a notable exception being Fujichrome Velvia, a superb landscape and general-purpose slide film whose intense "punch" is a bit much for most people applications). But the portrait pros tend to prefer the pro portrait films, optimized to yield excellent skin tones while still producing neutral gray tones (not an easy task for film designers), and generally having softer contrast than the general-purpose films. After evaluating our descriptions here, try some that seem promising, and see which best suit your tastes.

Most portrait films are color-print films, because this is what professional portrait and wedding photographers prefer, but Fujichrome Astia 100 slide film was also designed specifically for portraits. Astia uses Fuji's ICG (Interlayer-effect Controlling Grains) technology to produce both good skin-tone gradation and neutral grays, and is our favorite portrait slide film. Grain is extremely fine—the only finer-grained slide films are Fujifilm's fine-grain-champ Fujichrome Provia 100F, and the ISO 50 Fujichrome Velvia—and sharpness is excellent. Astia provides a natural rendering of delicate hues without compromising bright, saturated colors, and you can push it to EI 200 with excellent results if you need more speed.

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Fujichrome Velvia is a long-time favorite of scenic photographers, for its rich, accurate colors, snappy contrast and incredible sharpness and fine grain. *Photo by Lynne Eodice*



Pushed to EI 200, Provia 100F still has extremely fine grain, but color saturation and contrast increase—handy for distant scenics and aerial photography, when shooting through lots of atmosphere reduces saturation and contrast. *Photo by Mike Stensvold*



Fujichrome Provia 100F is a stop faster than Velvia, yet even finer-grained. Colors and contrast are natural rather than Velvia's "super" natural look. *Photo by Mike Stensvold*

The pro color-print films designed for portraits include Agfacolor Portrait 160; Fujicolor Portrait NPC 160, NPS 160, NPH 400 and NPZ 800; and Kodak Portra 160NC, 160VC, 400NC, 400VC, 800 and 100T.

Agfacolor Portrait 160 Professional was the first of these to reach the market, introduced more than a decade ago as part of a triad of films for every need: Portrait 160 with restrained colors and contrast, for beautiful portraits; Ultra 50, with enhanced color and contrast for maximum "punch"; and Optima 125, with normal colors and contrast, for general photography. Ultra 50 has since been discontinued, and the Optima now comes in ISO 100, 200 and 400 versions, but Portrait 160 remains the finest-grained and sharpest of the lot.

Fujifilm offers two ISO 160 portrait films: Fujicolor Portrait NPC 160 Professional and Fujicolor Portrait NPS 160 Professional. Both incorporate Fujifilm's 4th Color Layer Technology (in which a cyan-sensitive layer is added to the conventional red-, blue- and green-sensitive color-film layers to give response similar to that of the human eye—and excellent performance under mixed and fluorescent lighting), and offer similar excellent grain and sharpness. The difference? NPS has softer contrast, good for maintaining detail in white wedding dresses, while NPC has more contrast, better for fashion and commercial applications.

Fujifilm also offers two faster portrait films: Fujicolor Portrait NPH 400 Professional and Fujicolor Portrait NPZ Professional. The ISO 800 NPZ is a step grainier than the ISO 400 NPH (both are amazingly fine-grained for their speeds), and both incorporate Fujifilm's 4th Color Layer Technology (it was just added to the new version of NPH). Both films perform well in existing light and with electronic flash, and produce beautiful skin tones. NPZ is our favorite ISO 800 color-print film



Kodak Ektachrome E100VS has vivid saturation to begin with (that's what the VS stands for). Push it a stop to EI 200, and it gets even better. *Photo by Mike Stensvold*



Ektachrome E100VS pushed to EI 200 is great for hand-holding long lenses for wildlife shots—a 400mm lens caught this Great Blue heron on its early-morning stroll. *Photo by Mike Stensvold*

for general photography when such a high film speed is needed, as well.

Kodak Professional Portra 160NC is an ISO 160 portrait film with a natural color balance, while Portra 160VC (for Vivid Color) offers more "punch." Both films are slightly grainier than Kodak Professional Supra 100, but finer grained than Kodak Gold 100—and the Portra films are 2/3-stop faster, and very-fine grained.

Kodak Professional Portra 400NC is the ISO 400 counterpart to Portra 160NC, while Portra 400VC is the faster "brother" of Portra 160VC. Graininess falls between that of Professional Supra 400 and Kodak MAX Versatility 400 consumer film, and is very fine. We really like Portra 400VC as a windowlight portrait film, for its speed, image quality and skin tones.

The newest member of the Portra family is Professional Portra 400UC (for ultra color). If your portrait includes a colorful wardrobe or props, this film will make them "pop." And, unlike Kodak's other max-saturation color films, this one is actually finer grained than its less-saturated counterparts—Portra 400UC has the same granularity rating as Portra 160NC!

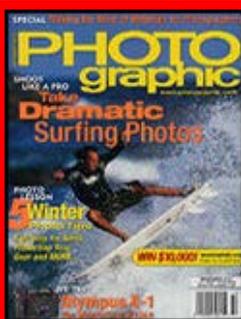
Kodak Professional Portra 800 matches Kodak Professional Supra 800 in fine grain (both are noticeably finer-grained than Kodak MAX Versatility Plus 800 consumer film), and Portra 400NC in color rendition and contrast. This is a fine available-light portrait and wedding film, and also excellent for action shots in contrasty conditions, with its softer-than-Supra contrast.

Professional Portra 100T is an ISO 100 film balanced for 3200 K tungsten lighting, so you don't have to use light-absorbing filtration with these dimmer-than-sunlight studio sources. Color rendition is similar to that of Portra 160NC, while image structure is similar to that of Portra 160VC.

Kodak also offers a black-and-white Professional Portra, 400BW. This chromogenic film allows professional portrait and wedding photographers to shoot black-and-white, and have that processed and printed along with their color-print films, as it uses the same process and—unlike Kodak's other

chromogenic black-and-white films—is designed to be printed on professional color papers (on which it yields monochrome images).

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General-purpose consumer print films are great for scenic work, too. Here, Fujicolor Superia 100 nicely recorded a sunrise from roadside. *Photo by Mike Stensvold*

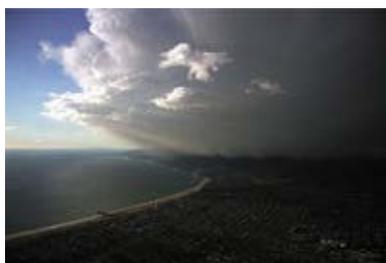


Photo by Mike Stensvold



Fujicolor Superia 200 is an excellent all-around film, and turns out beautiful scenic images. These were taken from an airplane. *Photo by Mike Stensvold*



In dimmer light, you can switch to Ektachrome E200 and push it to EI 400 or 800. Here, EI 400 provided a fast enough shutter speed to get this sunset scene sharp from a moving airplane. *Photo by Mike Stensvold*

Films for Nature & Wildlife

As is the case with people photography, nature photography can be done successfully with just about any film. But serious nature photographers have their favorite films, films they prefer because they reproduce nature's nuances the way they see them. And, as in all photography, beauty is in the eye of the beholder—what one photographer deems ideal, another may deem less so. So read the descriptions, then try some that sound promising to you.

While pro people photographers tend to prefer color-print films, pro nature photographers tend to prefer slide films. That's partly because magazine publishers traditionally have preferred transparencies to prints for reproduction (nowadays, they can handle both very well), partly because slide films of a given speed traditionally were sharper than print films of the same speed (that also has changed), and partly because they want what they shoot—with slides, what you shoot is what you get, with no printing step to adversely alter anything.

Professional wildlife photographers use very fast supertelephoto lenses (the 600mm f/4 is one of the most popular) and very slow films. Those supertele lenses are very expensive, so many nonpro photographers make do with slower lenses and faster films.

Fujichrome Velvia Professional (RVP) is the sharpest color-slide film around, and until the introduction of Fujichrome Provia 100F, it was also the finest-grained. So, assuming you keep the camera steady (preferably by means of a sturdy tripod), it yields incredibly sharp and fine-grained images that can be published or printed really big. But that's not Velvia's best characteristic. Velvia produces beautiful, rich colors, rich blacks and neutral grays, and—to

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While it's got the word Portrait in its name, Fujicolor Portrait NPZ 800 Professional works well in the natural world, too. Its high speed combined with excellent image quality provides sharp, accurate images in dimmer light, as in this overcast-afternoon aerial shot. *Photo by Mike Stensvold*



Kodachrome 200 is grainy, but renders nature's colors beautifully, with less tendency to produce a bluish cast in aerial photography than other films. *Photo by Mike Stensvold*



Fujichrome Provia 400F is another good film for nature photos when the light level drops. It's the finest-grained ISO 400 slide film by far, and color reproduction is excellent. *Photo by Lynne Eodice*

a great many serious nature photographers—delivers the most natural-appearing images of natural subjects. Many rate it at EI 40 or even 32 instead of ISO 50, and Velvia is a bit too saturated and contrasty for most portrait work, but it's the favorite nature film of many—including us.

Fujichrome Provia 100F Professional (RDP111) offers the finest grain of any color-slide film, along with tremendous sharpness and a beautiful (albeit slightly less "punchy") combination of color reproduction and contrast. We often push it to EI 200 when conditions require more speed (e.g., in early-morning light, or when hand-holding a 300mm or 400mm lens), and find the image quality still excellent.

Fujichrome Provia 400F Professional (RHP111) is by far the finest-grained ISO 400 color-slide film (it's only one step grainier on the RMS scale than the finest-grained ISO 200 slide film), it's very sharp, and it produces beautiful colors in landscape and wildlife shots. You can push it to EI 800 and even 1600, or pull it to EI 200, and still get great results. We love it for wildlife action shots, and low-light landscapes. For the budget-minded, the consumer version of this film, Fujichrome Sensia 400, produces similar results at a lower price.

Kodak Ektachrome E100VS Professional is a step grainier than its less-saturated E100S and E100SW brothers, but still very fine-grained at RMS 11. The VS stands for Vivid Saturation, and it really delivers. Sunrises and sunsets, colorful birds, or even relatively drab natural scenes that can use some extra punch, are all good candidates for E100VS. We push it to EI 200 for aerial photography, the added snap and rich colors delivering especially dynamic images. Those on a tight budget might want to consider Kodak's consumer-film counterpart, Elite Chrome ExtraColor 100 (EBX), which produces similar results at a lower price.

Kodak Kodachrome 25 was the long-time standard of nature photographers. Velvia caused many to switch, and Kodachrome 25 has gone out of production, but Kodachrome 64 Professional (PKR) is still available as of this writing, and it's still a fine scenic/wildlife film. PKR is very sharp

and fine grained, and produces beautiful colors. Its biggest drawback is that few labs can process it (it requires special chemicals and processing machines, and can't be processed with the ubiquitous E-6 process). But because of this unique process, Kodachrome films have excellent image-keeping properties.

Kodak Kodachrome 200 (KL) is very grainy at RMS 19 (compare this with Fujichrome 400F at RMS 13, or Provia 100F at RMS 8!), but it's also very sharp, and most important, reproduces natural colors beautifully. Clouds of a clearing storm in late afternoon take on a variety of colors, and Kodachrome 200 captures them better than any other film we've used.

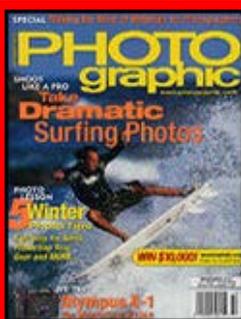
Kodak Ektachrome E200 Professional was designed to be pushed, and provides excellent results at speeds from ISO 200 to EI 800 or even 1000. It offers the look of a lower-speed film (rich colors, very fine grain, great sharpness and lower contrast) at ISO 200, and maintains amazing image quality at higher speeds.

Films for Action

Again, you can shoot action using any favorite film. As you'd expect, freezing fast motion is easier with faster films, but many action pros use slower films when they can, due the the finer-grained images they produce. Photographers for our sister publication Dirt Rider Magazine shoot motocross with ISO 50 Fujichrome Velvia. But they've got panning and focusing down pat, and use pro lenses—superfast superteles, and short zooms up close. But for general action photography, without press credentials and the close access they provide, our favorite action films are pretty much the same ones we prefer for nature photography: Fujichrome Provia 100F, Kodak Ektachrome E100S and VS (all frequently pushed to EI 200), Ektachrome E200 and Fuji Provia 400F. We also like the ISO 100 and 400 color-print films, and go to ISO 800 when light levels require it.

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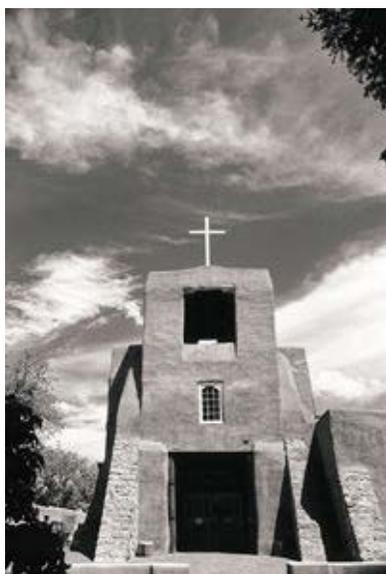
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Kodachrome 200 is grainy, but renders nature's colors beautifully, with less tendency to produce a bluish cast in aerial photography than other films. *Photo by Mike Stensvold*



Black-and-white is a "natural" for outdoor photography, and has been since the beginnings. The finest-grained (and thus, slowest) films provide the most detail. Here, Kodak T-Max 100 did the deed. *Photo by Lynne Eodice*

Films for Low-Light Photography

Naturally, fast films come to mind when the subject of low-light photography comes up. But you can use slower, finer-grained films if you're shooting nonmoving subjects and can mount the camera on a sturdy tripod. The main consideration then is possible reciprocity failure (or, more accurately, failure of the reciprocity law). There's a whole article about that elsewhere in this issue, but in brief, the reciprocity law of exposure ($E = It$, exposure is the product of the intensity [I] of the light and the amount of time [t] the light strikes the film) doesn't hold true at very long (or very short) exposure times. For example, shooting for 1/250 at f/5.6 produces the same exposure on the film as shooting for 1/125 at f/8, or 1/30 at f/16. But an exposure of one second at f/1.4 probably won't produce the same exposure as 8 seconds at f/4, and almost certainly won't produce the same exposure as 128 seconds at f/16, because film loses speed as exposure times increase much beyond one second (where the effect becomes noticeable depends on the specific film in question—each film has its own reciprocity characteristics). And, since color films have three emulsion layers, not all of which lose speed at the same rate, reciprocity failure causes a color shift as well as underexposure when you make extremely long exposures with color films. Film manufacturers provide reciprocity-compensation exposure and filtration data for their films, and Jack and Sue Drafahl's article elsewhere in this issue explains how to compensate after the fact.

You can avoid most reciprocity problems, and even shoot hand-held in pretty dim light, by using faster films (and using color-print films rather than slide films). Of course, faster films are grainier than slower ones, and not as sharp—and with color films, the colors aren't as rich. But today there are quite

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Kodachrome 200 is grainy, but renders nature's colors beautifully, with less tendency to produce a bluish cast in aerial photography than other films. *Photo by Mike Stensvold*



You can convert color images to black-and-white digitally, but lose a little in the process. If you want black-and-white, it's probably best to shoot black-and-white film. *Photo by Mike Stensvold*



The finest-grained black-and-white film is Kodak TP (for Technical Pan). Developed in Kodak Technidol developer, it yields full-range, virtually grainless prints, but has almost zero exposure latitude. Developed in Kodak D-19 developer, it produces extreme-contrast images like this one—handy for special effects, when you want only black tones and white tones, and no gray tones. *Photo by Mike Stensvold*

a few excellent fast films ready to serve the available-light shooter. Here are our favorites:

Fujifilm's trio of ISO 800 color-print films (Fujicolor Portrait NPZ 800 Professional, Fujicolor Press 800 Professional and its consumer counterpart Fujicolor Superia X-TRA 800), Kodak's Professional Supra 800 and Professional Portra 800, Agfacolor Vista 800 and Konica Centuria Super 800 all deliver excellent performance under a wide range of illumination, including mixed and fluorescent lighting, while retaining grain and sharpness not much worse than what most ISO 400 color-print films deliver. All have RMS 5 granularity ratings and similar resolving powers; which is "best" is pretty much a matter of personal taste. You really can't go wrong with any of these. Our staff member who does the most low-light shooting prefers NPZ 800; try that and a few of the others, and see which you like best.

The superfast color films (those above ISO 800), while amazing for their high speeds, produce noticeably worse image quality than the ISO 800 films, so we'd rather push an ISO 800 film to 1600 than use a superfast film if we need that much film speed.

If we have to shoot slide film in dim lighting, we prefer Fujichrome Provia 400F and Kodak Ektachrome E200, pushing both to EI 800 if necessary.

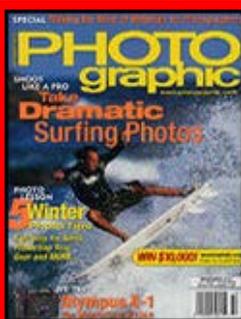
In black-and-white, the fastest films are Ilford Delta 3200 Professional and Kodak T-Max P3200. Despite their names, neither has a true ISO speed of 3200, but both can be exposed at EI 3200 with good results. Ilford states that Delta 3200 can be pushed to EI 12,500 when necessary; we've done simulated surveillance work with T-Max P3200 exposed at an incident-metered EI 25,000 and got identifiable images of the "suspect" (we even got one identifiable image at EI 50,000). (Of course, in real surveillance photography, you couldn't use an incident meter, but our "suspect" was a friend and thus were able to take an incident reading with the meter in front of the suspect. The incident reading ruled out errors due to a reflected in-camera meter reading being thrown off



In bright sunlight, any ISO 100 film will be fast enough for most action shooting. The gull above was photographed with a 28-105mm zoom lens at its 105mm setting, wide open ($f/5.6$) in aperture-priority AE, on Kodak Lumiere 100—a predecessor of today's Ektachrome E100 series. *Photo by Mike Stensvold*

by all the dark area—the incident reading assured that we really were exposing the film at the specified speed.) For pictorial work, EI 3200, or possibly 6400, are about the limits for these two films.

If ISO 400 is sufficient, there are lots of terrific black-and-white films, including Kodak T-Max 400 (excellent image quality, but requires precision in development), Tri-X (ancient and grainy, but lots of latitude and beautiful tonal range), Ilford HP5 Plus (similar to Tri-X but a little finer-grained), and the chromogenics (Ilford XP2 Super 400, Kodak Black & White 400, Professional Portra 400BW and Professional T400 CN, and Konica Monochrome VX400). If we were Zone-Systeming, we'd use Tri-X or HP5 Plus (or maybe T-Max 400), but for most black-and-white these days, we prefer the chromogenics (see sidebar), pushing them as far as EI 3200 if necessary. (Chromogenic films pushed to EI 3200 are sharper and finer grained than Delta 3200 and T-Max P3200 at that speed, but provide less shadow detail.)



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In bright sunlight, any ISO 100 film will be fast enough for most action shooting. The airshow performer was recorded on Agfachrome RSX 100 Professional slide film. *Photo by Mike Stensvold*



Ektachrome E200 at ISO 200 was fast enough to freeze this motorcyclist in mid-motion. This shot was made with a 90mm lens on a rangefinder 35mm camera. *Photo by Mike Stensvold*



At our sister publication Dirt Rider Magazine, some veteran action shooters use slow Fujichrome Velvia with great success. One secret: fast lenses. *Photo by Karel Kramer*

Film and Digital

Note that this head doesn't say "Film vs. Digital." You can do both concurrently. Many photographers today have "gone digital" while continuing to shoot film. That way, they get to use the cameras they already have and are familiar with (and, generally, cameras that have more and easier-to-use "serious" features and better performance than equivalent-cost digital cameras), they get to use the films with which they have long experience, they get slides or negatives as excellent originals, and they get all the benefits of the computer. How?

By scanning their slides and negatives. There are a variety of high-resolution film scanners on the market that let you turn your slides and negatives into 2700- to 4000-dpi digital scans that can be used like any digital images. Except they're of even higher resolution than any "affordable" digital camera currently makes. A 4000-dpi scan of a 35mm slide or negative results in an image measuring 3762x5646 pixels, or 21.2 megapixels. The newest pro digital SLRs introduced at the recent Photokina have just over half that resolution—and cost a bunch more than what a 4000-dpi scanner costs.

And today's films are designed with scanning in mind—the new ones all scan very well. The film scanners don't do a terrific job with older black-and-white films like Tri-X, but they do a great job with color-negative films, color-slide films, and chromogenic black-and-white films (see the "Chromogenic B&W Films" sidebar).

Push- and Pull-Processing

Sometimes, the film you have isn't fast enough to let you shoot in the existing conditions (i.e., it doesn't permit using the right shutter speed and aperture combination to get the picture you

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Ektachrome E100VS pushed to EI 200 is our standard "bird" film, allowing us to get sharp in-flight shots with a hand-held 400mm f/5.6 lens. (And it really enhanced the early-morning light!) *Photo by Mike Stensvold*



Fujichrome Provia 400's speed is sufficient to freeze a hummingbird in mid-flap (the exposure was 1/6400 at f/4 with a 300mm lens). Provia 400 has always been on the cutting edge; the current version, Provia 400F, is truly amazing. *Photo by Mike Stensvold*



Kodak Professional Portra 800 was designed for ambient-light portraits, but it works well for fast action, too. *Photo by Jack and Sue Drafa*

want). In such a situation, you can push the film speed: Set your meter's ISO index to a higher speed that permits you to use the desired shutter-speed/f-stop combination.

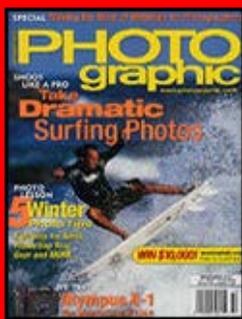
Of course, you can't just set the meter index to any number, expose the film accordingly, and expect to get good images. When you expose the film at a speed other than its ISO rating, you must compensate when processing the film. When you rate film at a figure higher than its ISO speed, you are underexposing it. If you develop it normally, your photos will be too dark, lacking shadow detail and having weak, gray highlights. By increasing the development time (or using a "speed-increasing" developer), you can partially compensate for the underexposure, and get better results. This procedure of underexposing and overdeveloping film is known as push-processing. It allows you to do some amazing things, but bear in mind that it always results in decreased shadow detail and sharpness, and increased graininess and contrast.

The opposite procedure—pull-processing—consists of intentionally overexposing the film to assure good detail in the dark areas of the scene, then reducing development (or using a special "extended-range" developer) to keep the highlights from becoming too dense on the negative to print with detail (or to burn out on a slide). Pull-processing is a good technique for night photography and daylit interiors with bright windows, to hold detail throughout the high-contrast scene.

Color-slide films generally can be push-processed a stop with good results, and two stops with OK results. With color-negative films, a one-stop push is generally about it without adverse effects on image quality. And a one-stop pull is about the limit for good results with color films. Black-and-white films can be pushed and pulled further. (We've pushed black-and-white Kodak T-Max P3200 to EI 50,000 for simulated surveillance photography, and got identifiable images of our "suspects.")

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The light level wasn't very high for this pre-sunrise scene, but a fast lens and ISO 100 slide film pushed to EI 200 allowed it to be photographed sharply hand-held. *Photo by Mike Stensvold*



Fujichrome 400 was our favorite hand-held low-light photography slide film until Fujichrome Provia 400 replaced it on our list. This Provia 400 sunrise image shows why. Now, there's Fujichrome Provia 400F, which is even better! *Photo by Mike Stensvold*



Hand-holding long lenses in low light requires fast film. Kodak Professional Supra 400 provided enough speed here (assisted by the image stabilizer in our Canon EF 300mm f/4 IS lens) to catch this sunrise-hour scene. *Photo by Mike Stensvold*

ISO vs. EI vs. ASA

You'll hear photographers use the terms ISO and EI interchangeably when referring to film speeds (and old-timers sometimes still use ASA): for example, ISO 400, EI 400, and ASA 400. For practical purposes, these terms can be used interchangeably, but there is a difference. ISO speeds are assigned by the film manufacturers based on specific international standards (ISO stands for International Standards Organization). You can't change a film's ISO speed. If you rate the film at a different speed—as when pushing or pulling it—you're rating it at an Exposure Index (EI). This is really just a terminology technicality: ISO and EI numbers are used the same way: set your exposure meter's film-speed index to the desired number. ASA is an old term for ISO speeds—ISO speeds replaced ASA speeds when ANSI (the American National Standards Institute) replaced the American Standards Association as the U.S. representative to the ISO back in the 1980s. Another technicality: while ASA speeds consisted of a single number (ASA 400, for example), ISO speeds combine the old ASA number and the European DIN number: ISO 400//27°, for example. Photographers using U.S.-market cameras (those with ISO calibrations) can ignore the second figure in the ISO rating.

Chromogenic B&W Films

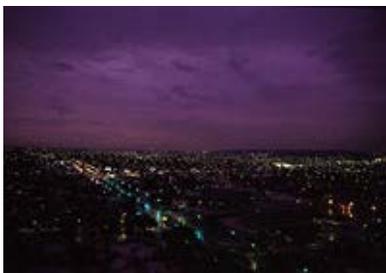
Chromogenic black-and-white films are wonderful things. They're ISO 400 black-and-white films that are processed in standard C-41 color-print-film chemicals, so they can be processed at any handy lab that does color-print films. The resulting negatives consist of dyes like color negatives, rather than of silver like conventional black-and-white film negatives, so they print equally well on condenser and diffusion enlargers (there's no Callier effect). Chromogenic

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"Available dark" is hand-holdable with a fast lens and Kodak Ektachrome E200 pushed to EI 800 for this shot. *Photo by Mike Stensvold*



Photo by Mike Stensvold

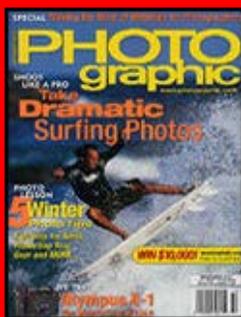


Slide films come in two varieties: daylight-balanced, and tungsten-balanced. Daylight films show things correctly in daylight, and produce a warm cast when exposed by tungsten light. Tungsten films reproduce things correctly when exposed by 3200 K tungsten light, and render things cooler when exposed in daylight. For night scenes, both types of film produce interesting results—use daylight film for a warmer rendition, and tungsten film for a cooler one. (Both shots above were made with a tripod-mounted camera on slow slide films.)
Photo by Mike Stensvold

films have lots of exposure latitude—images exposed from EI 50-800 will generally yield good prints. And while they have ISO 400 speed, they have the grain of an ISO 100 film.

What are the drawbacks? Well, you can't control their contrast through development, as you can with conventional black-and-white films—bad news for Zone System practitioners. And the dye images probably aren't as "archival" as the silver images of conventional black-and-white films.

Currently, three manufacturers market chromogenic black-and-white films: Ilford (who started it all with XP1 400 back in 1980) offers its third-generation version, XP2 Super 400. Kodak offers three: Black & White 400 (a consumer-oriented film), Professional T400CN (best printed on conventional silver-based black-and-white papers) and Professional Portra 400BW (designed to be printed on color papers). And Konica offers Monochrome VX400.



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Blurred-motion effects require slower films that permit using long exposure times. Mount the camera on a tripod so nonmoving portions of the scene remain sharp. *Photo by Mike Stensvold*



Pushing film speed increases grain and decreases sharpness and shadow detail—but boy, can you shoot in dim light! Here, we rated Kodak T-Max P3200 at EI 25,000, based on an incident-light reading, then photographed our "suspect" from across the street with a tripod-mounted 500mm mirror lens. It's not exactly Zone System, but the subject is readily identifiable. *Photo by Mike Stensvold*

For best results with any film . . .

- 1 Use it before its expiration date.
- 2 Have it processed soon after exposing it.
- 3 Load and unload the camera in subdued light—avoid direct sunlight.
- 4 Don't store film or a loaded camera in hot or humid conditions. Store film in a cool, dry, well-ventilated place.
- 5 If you refrigerate or freeze film, let it stand at room temperature for at least an hour before removing it from its packaging, to avoid condensation.

Especially for Portraits

- Agfacolor Portrait 160
- Fujicolor Portrait NPC 160 & NPS 160
- Fujicolor Portrait NPH 400
- Fujicolor Portrait NPZ 800
- Kodak Portra 160NC & VC
- Kodak Portra 400NC, VC & UC
- Kodak Portra 800
- Fujichrome Astia 100

Our Favorite Nature Films

- Fujichrome Velvia
- Kodak Ektachrome E100VS
- Fujichrome Provia 100F
- Kodachrome 64
- Kodachrome 200
- Fujichrome Provia 400F
- Agfacolor Optima Prestige 100

Our Favorite Action Films

- Fujichrome Provia 400F
- Fujicolor Superia X-TRA 400
- Fujicolor Superia X-TRA 800
- Kodak Supra 800
- Kodak Ektachrome E200 in bright sunlight:
- Fujichrome Provia 100F @ EI 200
- Kodak Ektachrome E100VS @ EI 200

Our Favorite Low-Light Films

- Fujicolor NPZ 800
- Kodak Supra 800
- Konica Centuria Super 800
- Konica Centuria Super 1600
- Fujicolor Superia 1600

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The opposite technique is pull-processing. When photographing a high-contrast scene in black-and-white, give extra exposure to record detail in the darkest areas, and reduce development to keep the bright areas printable. *Photo by Mike Stensvold*



Kodak's T-Max P3200 exposed at EI 3200 and processed accordingly produces a soft, pleasant effect, and the grain isn't too bad for the speed. This cropped shot of a window mannequin was made hand-held. *Photo by Mike Stensvold*



Photo by Jack and Sue Drafahl



With the demise of Konica SR-G 3200, the fastest color films today are Fujicolor Superia 1600 and its pro counterpart, Fujicolor Press 1600; and Konica Centuria Super 1600. These are best reserved for occasions that really require that much film speed, as they are noticeably grainier than the ISO 800 color-print films. These images were shot on Fujicolor Superia 1600 (below) and Konica Centuria Super 1600 (bottom).
Photo by Jack and Sue Drafa



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