

Internal Focus (IF) vs. Standard Focus (SF)

The attributes of the Internal Focus Zoom (IFZ) lens are widely known and admired. You know, the polarizer doesn't rotate when focusing, it focuses faster when using auto focus. They usually focus much closer than Standard Focus Zoom (SFZ) lenses.

The information that may not be widely distributed regards subject capture size.

An Internal Focus Zoom (IFZ) lens and a Standard Focus Zoom (SFZ) lens will only capture images the same size, when both are focused at infinity. As you reduce the distance to the subject, the capture of the IFZ will get relatively smaller. The term relatively smaller is because the relation must be compared to the image size captured using a Standard Focus Zoom (SFZ) zoom lens or a prime lens at the same focal length.

If you focus a SFZ lens at a focal length of 200mm with the subject nine (9) feet away, (which may very well be its close focus point), the capture will look something like image 1.

If you focus an IFZ lens at a focal length of 200mm, at that same distance of nine (9) feet, the capture will appear something like image 2. Keep in mind the focal length of the lens is the same, both were set to 200mm. The subject distance is the same; the only thing changed was the lens. The image size here may be equivalent to 135mm focal length.



If you move the camera back to 30 feet or very near infinity, the IFZ lens still shows a slightly smaller capture size as in Image 3. It is only at infinity that the capture size comes close to being the same as the SFZ lens.



Image 3

This phenomenon is true at any focal length, however may appear more pronounced at the longer focal lengths, see Image 4A and 4B.



Image 4



Image 5

Even at the closest focus distance of the IFZ lens at 100mm it will not render an image capture as great as the prime 100mm macro lens at the same distance. See image 5.



Image 6

All this is highly complex mathematically, however visually obvious as above. It is all a matter of whether or not the lens moves its front element in or out when focusing. If the front element of the lens moves in or out (SFZ) when focusing closer than infinity, all focal lengths will be correct over all subject distances. If the lens does not move its front element in or out (IFZ) the focal length at all focal lengths will get shorter when focusing at distances closer than infinity.

If you wish to use an IFZ lens as your primary lens, keep in mind that the focal length of the lens, at any focal length is only correct at infinity. If this is an issue you might want to consider using a SFZ lens or prime lenses and when you want to work up close, get a macro lens.