



**6 Tips to Help Choose
the Best Lens for your
Vision Application**

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To realise the full performance of your machine vision camera or sensor it needs to be matched with the most appropriate lens. As a supplier of specialist lenses to machine vision suppliers and systems integrators for over 20 years, Resolve Optics has assembled below some basic hints and tips on lens selection.

1

Format / sensor size

Care should be taken with specifying the camera format or sensor size. Many camera manufacturers will class the format of the camera as a standard format such as 1/3" or 2/3" but in reality the active area of the sensor can be larger or smaller. The best way to avoid confusion is to supply a data sheet for the camera or sensor.

2

Focal length / Field Of Vision (FOV)

You can specify the focal length in millimetres if known but again it is better if you state the object size and distance. The focal length can then be determined by the design to suit the sensor format.

3

Aperture

How much light do you have? Typically, we are asked for the lens to be as fast as possible, by fast we mean large aperture. However, what should be considered really is what image quality is required. Dropping the aperture stop by even one stop can simplify the design and improve the image quality by reducing the level of aberrations that have to be corrected by the design. Reducing the aperture also allows for the diameter of the lens to be reduced.

4

Distortion

Distortion is similar to the aperture in that specifying a lens with very low distortion will result in a more complex design and increased cost. It is not uncommon for distortion to be specified as the same as stated by the manufacturer of an off-the-shelf lens that you may have already tried. The problem with this approach is that quite often the level of distortion in the off-the-shelf lens is actually a lot higher than specified. This will lead you to specify a more expensive custom lens.

5

Resolution

Typically the resolution of the lens will match the resolution of the sensor it is to be used on. However, take care not to over-specify your lens resolution as you will end up paying for unused resolution.

6

Mechanical constraints / Space envelope

If your application is space prohibited then make sure you specify the space available for the lens. Depending on the space available the optical designer will use a design approach to suit.

Should you wish to discuss any of the points above in detail do not hesitate to contact us on +44-1494-777100 or email sales@resolveoptics.com