

summary

While capturing images of moving objects, the goal is to freeze the motion within the picture. If an object is moving too fast, an image will become blurry or smeared. The camera would detect one point on an object at multiple locations as it moves. If a camera can freeze the motion, the image quality will be clearer, with one point only appearing in one pixel. The best image quality will occur with a pixel blur less than or equal to 1.

equation

$$\text{Blur in Pixels} = (\text{Line Speed} * \text{Exposure Time}) * (\text{Image Size} / \text{FOV})$$

example

Solving for Exposure Time:

- Line speed = 100 mm/sec
- Blur of Pixel = 1
- Image size = 640 x 480 (use largest pixel size for calculation)
- FOV/Field of View = 150 mm
- X = Exposure Time/Image Capture Time

$$1 \text{ pixel of blur} = (100\text{mm} * X \text{ sec} * 640 \text{ pixels} / 150 \text{ mm})$$

→ **Exposure Time = .0023 seconds or 2.3 milliseconds**

reference

