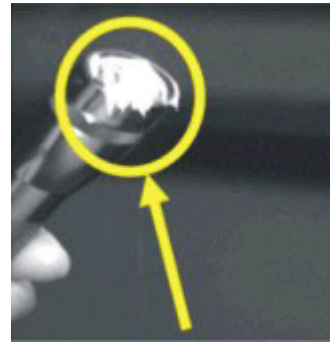


Anti Blooming

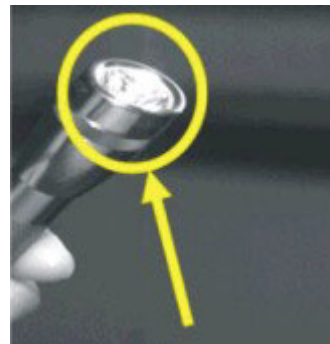
Some sensors contain circuitry called “antiblooming” electronics which allows a pixel to bleed off excess charge before it saturates and spills over into adjacent image data. Imagers that do not have antiblooming circuitry will show white streaking around the areas of the image where the full well capacity has been exceeded. The spilling or "blooming" of photo charge into adjacent pixels can be cosmetically unattractive and may result in unrecoverable image data in the regions where the blooming has occurred.

Two types of antiblooming structures are common. In the first, anti-blooming gates are incorporated into the CCD pixel to allow excessive charge to spill laterally into an adjacent overflow drain. These "lateral" antibloom structures can occupy as much as 30% of the pixel area resulting in a smaller fill factor and reduced optical sensitivity. For this reason, light starved applications typically utilize sensors without lateral antibloom structures. Another type of antibloom architecture is a vertical overflow drain which sinks excess photo charge vertically into the substrate of the sensor. These devices suffer no reduction in fill factor since the antibloom structure is created through a series of dopant implants beneath the pixel area. However, while vertical overflow generally offers higher fill factor, it does not necessarily give higher sensitivity. This is because long wavelength (red) photoelectrons generated deep in the silicon are sunk by the vertical overflow drain rather than being captured in the photosite like they would in a lateral overflow structure. For applications where red laser (or LED) illumination is used, this reduction in sensitivity can be dramatic. Thus, selection of the proper antiblooming structure is highly dependent on the imaging application.

The figure below shows the effects of imaging a bright spot with and without antibloom functionality. The image on the left shows streaking (blooming) around the bright areas of the flashlight, while the image on the right shows the same flashlight with antibloom functionality.



Without antiblooming, bright areas of the flashlight bloom into neighboring pixels.



On-chip antiblooming control suppresses this blooming effect.