

**EXCESS GAIN** Excess gain is a measurement of how much sensing power a photoelectric sensor has available beyond the power required to detect an object.

**Definition**

An excess gain of 1.00 at a given range means there is exactly enough power to detect an object **under perfect conditions at that range**. In other words, **the range at which the excess gain equals 1.00 is the maximum range of the sensor**.

Every model of sensor comes with an excess gain chart to help you determine the excess gain for an application's sensing distance.

However, we have to take into consideration the following real-world variables:

- Target size
- Target color
- Target surface texture
- Ability to block the beam
- Background
- Application environment

In the real world, there is contamination — dust, humidity and debris — that can settle on the lenses and reduce light transmission. Furthermore, each individual target may vary slightly from the next in color, reflectivity or distance from the sensor.

If you use a sensor with an excess gain of exactly 1.00, you stand an excellent chance of not sensing the target reliably. To cover yourself, **you need a sensor with the highest excess gain possible at the intended range**. This ensures the sensor will continue to operate reliably when you need it. As the level of contamination gets worse, more excess gain will be needed to get past the poor visibility.