CONTRAST

Contrast measures the ability of a photoelectric sensor to detect an object. The contrast of a sensor is a ratio of the excess gain under light conditions to the excess gain under dark conditions. A ratio of 10:1 is desired. **Contrast is important when a sensor has to detect semi-transparent objects or extremely small objects.**

Each mode handles contrast differently.

Thru-Beam and Reflex

These modes are affected by:

- Light transmissivity of an object or surface
- Size of an object in relation to the beam size

Diffuse

This mode is affected by:

- Distance of the object or surface from the sensor
- Color or material of the object or surface
- Size of the object or surface

The ideal application provides infinite contrast ratio of the detection event. This is the case when 100% of the beam is blocked in reflex or thru-beam modes. For diffuse sensing, this occurs when nothing is present. Understanding the contrast ratio is critical when this situation does not exist, such as when detecting semi-transparent objects. In some cases, it might be necessary to use a special low-contrast sensor designed for these applications.

IN THE WORKPLACE

A thru-beam pair is positioned ten inches apart to detect a semi-transparent plastic bottle moving through the sensing zone. But the sensor is not picking up the bottle.

Given that the excess gain at that range is 100, and the bottle blocks only 5% of the light energy, the contrast ratio is close to 1 (100/95). This does not meet the advised 10:1 ratio. The thru-beam pair is just too powerful.

Using a focused sensor positioned three to four inches from the bottle changes things. In this detection zone, the excess gain is between 20 and 100. (See graph on page 60.)

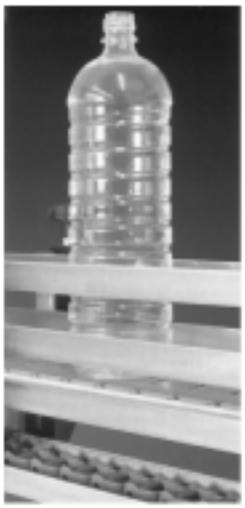

FIGURE 99: THE RIGHT SENSOR TYPE MAKES THE DIFFERENCE BETWEEN RELIABLE SENSING AND NO SENSING AT ALL