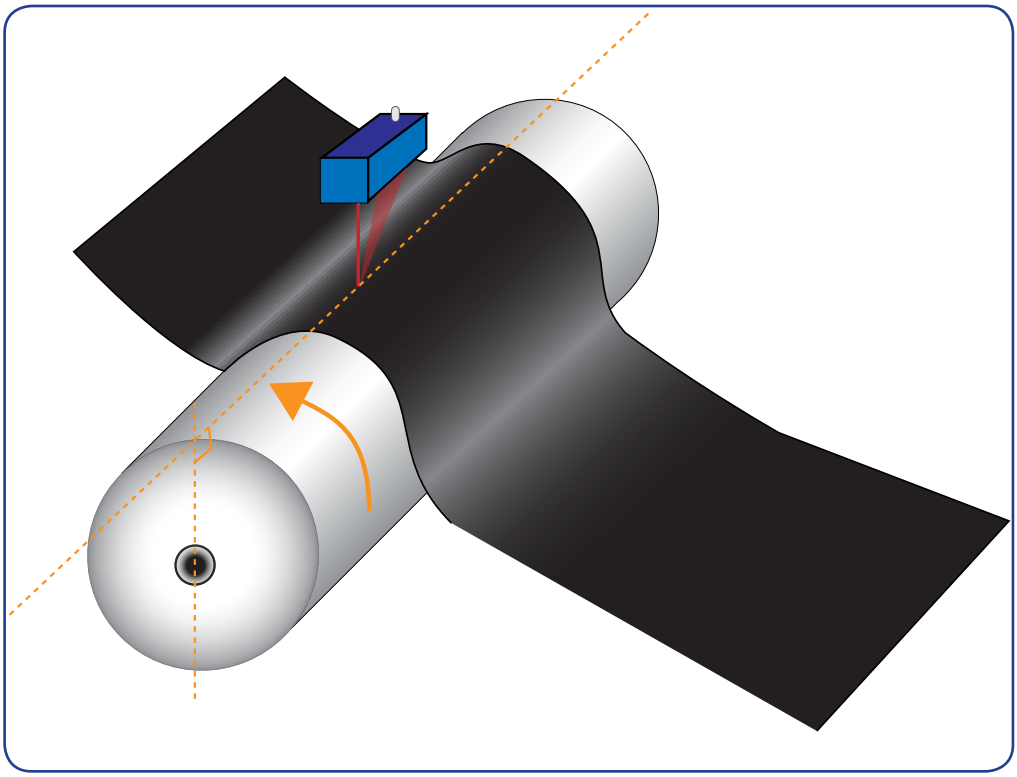
Acuity
Laser Measurement

Laser sensors are ideal for measuring the thickness of cast materials as they pass over polished rollers. Laser sensors use non-contact measurement principles to measure hot or molten materials that can not be measured with tactile probes. This document includes suggestions for optimizing thickness measurement applications.

Technical Note: Thickness Measurements on a drum

Principles of Operation

Thickness applications commonly employ the use of laser sensors because of their non-contact measurement principles, accuracies and fast sampling speeds. Object and material dimensions can be gauged using two opposing laser sensors or with one sensor and a reference surface. Soft and malleable materials like rubber and polymers that require multiple rolling steps are strong candidates for single-sensor thickness measurement techniques. A laser sensor is situated above a roll and material thickness is measured with reference to the roll



Suggestions for Implementation

Alignment - The laser sensor should be oriented parallel with the longitudinal axis of the roller and in line with a diameter of the cylinder created by the roll. The illustration above shows a triangulation laser's position relative to the centerline axis of the roll (orange dashed line). With this configuration, the emitted laser is perpendicular to the material's surface and allows the laser to measure a true thickness.

Reference surface - The surface of the roll is the "zero thickness" value when the user performs a tare function in his software or configures the sensor's span endpoints by configuring the appropriate parameters in the sensor's setup. It should NOT be assumed that a roll is perfectly round. Deformation in concentricity and vibration could alter the reference surface's expected position. It is therefore necessary to know the position of the roll's surface at each point a thickness measurement will be captured. If the laser sensor will continuously sample, it will be necessary to profile the entire, empty roll. Advanced systems may include an **encoder** to measure the angular position of the roll as it turns. By tracking the encoder's signal one can compensate for a roll's runout and the error it introduces in thickness measurements

Temperature considerations - Materials will contract and expand with changes in temperature. Take into consideration these physical properties if your material will see temperature change throughout the measuring process. Most laser sensors have operating temperature limits. Implement cooling or heating jackets to maintain a proper operating environment for the sensor.

Contact Acuity

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