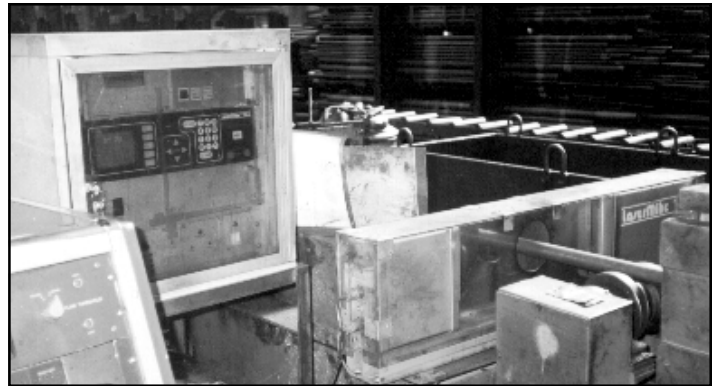


Application Note

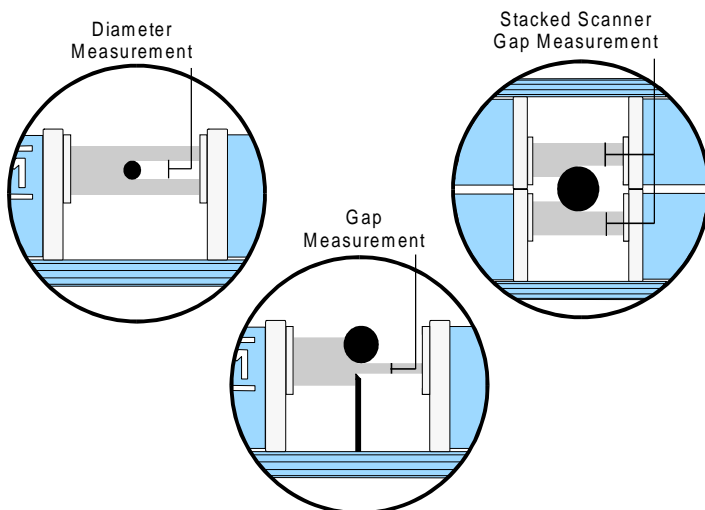
Measuring Large, Cold Metal Tubes

Since the selling price of large, cold metal tubes is strongly dependent upon close agreement to the defined product size, such tubes need an accurate measurement system. A tube which exceeds acceptable limits and will need rework must be identified and marked. With the Beta LaserMike 192-15 Processor (in operation in the photo to the right), tolerance limits are only one of the important features tailored to this application.

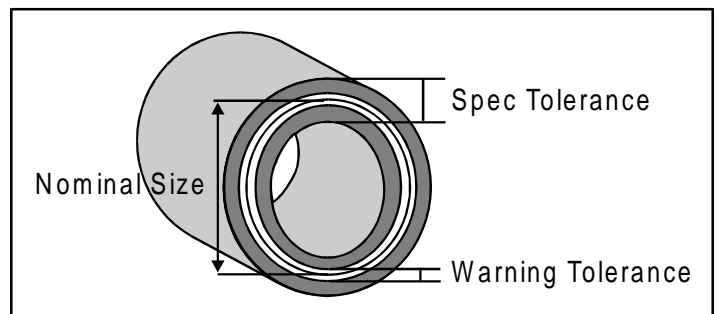


Measuring Cold Tubes

The 192-15 Processor offers three measurement types: Diameter, Gap, and Stacked Scanner Gap measurements (see drawing below). Generally, these three options are used to accommodate products of different sizes. Products which are too large to be measured using the simple Diameter measurement method are often measured using the Gap measurement method. Even larger parts may require two stacked scanners to provide the desired level of accuracy. The processor can measure products moving continuously across the laser scanning beam (Continuous Reading Mode), separate products (Part Reading Mode), or when a footswitch is triggered (Manual Reading Mode).



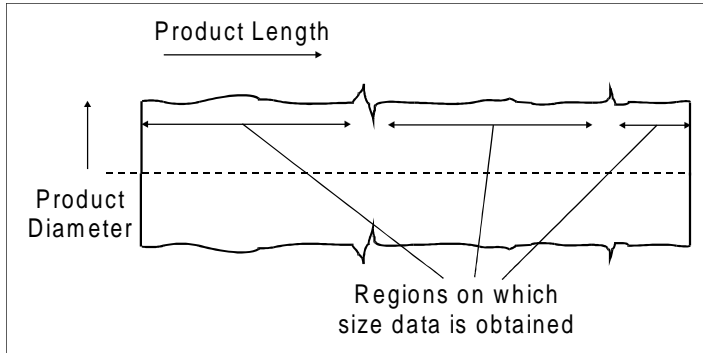
As shown in the drawing below, several parameters can be defined to indicate acceptable and unacceptable product. The desired product size, or Nominal value, is defined along with Upper and Lower Warning Tolerances. These limits are present to inform the operator that measured sizes are moving away from the desired size. Upper and Lower Specification Tolerances are used to define limits for unacceptable product.



After the scanning laser beam passes over the part and the light received by the scanner receiver has been measured, many options are present in the 192-15 processor to handle the scan data.

BETA LaserMike®

In many straightforward applications, all scans are averaged together to measure the size. In this application, however, it may be useful to remove small variations from the calculations before finding the product diameter. Through the **Scans Sorted** feature, the 192-15 Processor omits certain measurements from the reading, as shown in the drawing below. Further refinement in the measurement can be made by using the true size rather than the average.



But cold metal tubes often have irregularly-shaped ends, and measurements of these regions should not be included in the product size. The **Scans Ignored** parameter is specified as the number of scans which should be ignored before and after the beginning and end of the part are detected. By ignoring scans collected near the product ends, for example, the calculations for measured product size are more accurate and more correctly reflect the actual size of the product.

| BASIC Setup #1 of 2 | | RUN/ STOP |
|---------------------|--------|---------------|
| UPPER SPEC TOL | 0.0200 | MAS- TER |
| + CONTROL TOL | 0.0005 | |
| + WARNING TOL | 0.0050 | FULL SETUP |
| NOMINAL | 0.2500 | |
| - WARNING TOL | 0.0050 | EXIT |
| - CONTROL TOL | 0.0005 | |
| LOWER SPEC TOL | 0.0200 | |
| OFFSET | 0.0000 | |

| BASIC Setup #2 of 2 | | RUN/ STOP |
|---------------------|----------------|---------------|
| PART THRESHOLD | 0.0010 | MOD |
| HIGH FILTER | 0.2500 | |
| LOW FILTER | 0.1150 | |
| BATCH SIZE | 10 | FULL SETUP |
| TOLERANCE RPT | NO | |
| REPORT TYPE | ALL | EXIT |
| IGNORE REJECTS | YES | |
| INTERIM REPORTS | 2000.0 FEET | |
| SPC REPORTS | NONE | |

| CONTROL Setup #1 of 1 | | RUN/ STOP |
|-----------------------------|-------------------|--------------|
| GROUP SIZE | 10 | MOD |
| IGNORE REJECTS | NO | |
| COMPENSATION PULSE WIDTH | 0.5000 | EXIT |
| CONTROL DELAY | 0.5000 SECONDS | |
| ALARM DELAY | 5.0000 SECONDS | |
| PULSE WIDTH | 0.0500 | |
| ALARM OFF | OPEN | |

Sample processor display pages are shown above.

One of the major purposes of these useful features of the processor is to allow the marking of out-of-tolerance product. The 192-15 Processor can be connected to a paint sprayer and triggered. Since the sprayer can be installed at any downstream location, the processor has an Alarms Delay parameter. Alarms Delay can be specified in either units of time or length. With the length setting, a footage counter can be connected to keep track of product movement and seek the appropriate location for marking of the product.



Beta LaserMike
USA
8001 Technology
Blvd.

Beta LaserMike Europe
Halifax House, Halifax
Road
Cressex Business Park
High Wycombe, Buck
HP12 3SW

Beta LaserMike Far East
2nd Floor Hankook
Tire Building
344 Kwangjang-Dong,
Kwangjim-Ku
Seoul 143-210 Korea