A Paper on
Least Material Condition
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The use of the Least Material Condition, abbreviated LMC and symbolized $L$, concept is a valuable aid in the design of gages and tooling. Its use is as necessary in gage and tool design as the Maximum Material Condition concept is in product design.

Figure 1 is an illustration of a product to be fabricated and inspected.

Figure 2 illustrates an example of a hole location gage. As the locating diameter of the gage (4.3000/4.3002 dia.) and the gaging diameter of the pin (.2448/.2446 dia.) deviate from their Least Material Condition, the location tolerance of the gaging pin may be increased by the total of the differences between the actual size and the Least Material Condition. This will never permit the acceptance of an out of tolerance product.

Figure 3 illustrates an example of a drill fixture to fabricate the same product. As the locating diameter of the drill fixture deviates from the Least Material Condition, the location tolerance of the I.D. of the liner may be increased by this difference. The reason this is acceptable to the design is, as the locating diameter increases in size, the location tolerance may increase because there is less
clearance between the product I.D. and the fixture locating diameter.

Following the same concept, as the I.D. of the liner deviates from Least Material Condition, the location tolerance may increase because there is less clearance between the bushing and liner.

In general, the above concepts are acceptable in all cases where Maximum Material Condition (M) is specified in the product callout.

In conclusion, the use of Least Material Condition is a useful aid in the designing of gages and tooling. As the use of geometric dimensioning and tolerancing increases, more and more gage and tool designs will incorporate the system and the use of the LMC concept and symbol (L) should be a part of ANSI Y14.5 Standard.
.2500 DIA - PRODUCT
-.0060 LOCATION TOL - PRODUCT
.2440
+.0006 LOCATION TOL - GAGE
.2446 GAGE PIN SIZE

\[ \phi 2.448 \]
\[ \phi 2.446 \]

\[ +0.0006 \]

\[ A B L 0.0006 L \]

\[ 4.300Z \]
\[ 4.3000 \]

FUNCTIONAL GAGE

Figure 2