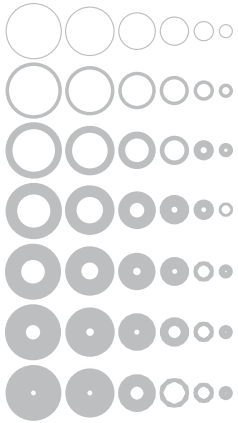


STANDARDIZE TUBING TERMINOLOGY Data Memorandum No. 52



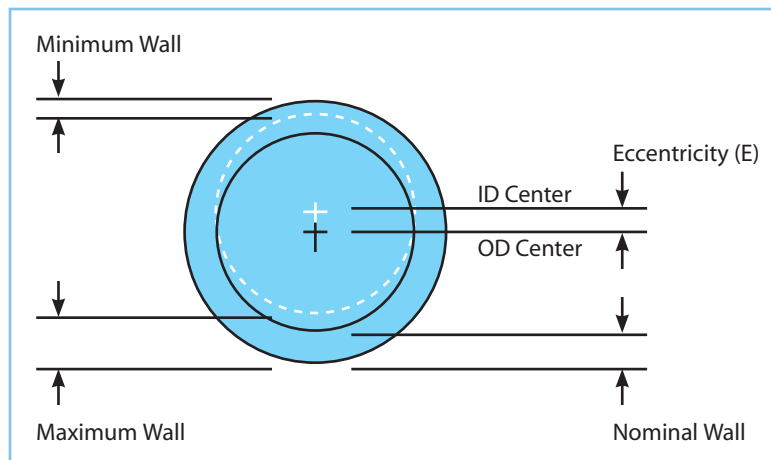
“Wall Run-out” Replaces Eccentricity, Concentricity, TIR, and DIR

For decades, terminology peculiar to the tubing industry—concentricity, eccentricity, TIR, and DIR—have been confused in their relation to tubing and each other. To engineers and other technically qualified personnel, these terms are clear. To personnel involved with tubing, but not directly responsible for design, they can pose a problem.

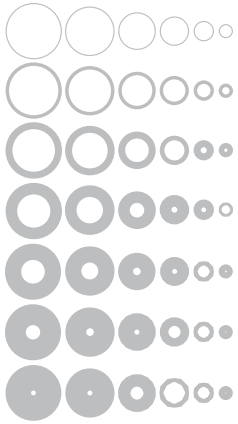
In the past, Superior Tube has received orders stating tubing requirements in various ways, e.g., drawings with the concentricity symbol; eccentricity percentages; TIR (total indicator runout); DIR (dial indicator reading); and written statements such as “OD and ID must be concentric within...” It’s been the job of Superior Tube personnel to decipher these various ordering approaches and assign the proper designation to the mill order instructions. The operation of translating orders has become cumbersome, time-consuming, and inefficient, especially considering the difficulty involved with measuring eccentricity and other tubing characteristics. A uniform system for ordering, used by all personnel involved, would increase our efficiency and provide better service to our customers.

Just Say “Wall Run-out”

Superior Tube is now using the standard tubing term, “wall run-out,” to be used when placing your orders. This will be profitable for all involved because of the ease of measuring wall run-out compared to measuring other tubing characteristics. To make things even simpler, you can convert your orders to wall run-out based on terminology that has been part of the tubing industry for years.



This diagram illustrates the determination of wall run-out and its relation to eccentricity. Using wall run-out terminology instead of eccentricity, concentricity, TIR, and DIR will improve communications between tubing suppliers and users.



First, There's Eccentricity

An eccentric tube is one which has the center of the circle formed by the OD at a different point from the center of the circle formed by the ID. Eccentricity can be checked by determining the wall thickness around the tube at any cross section to establish maximum and minimum wall dimensions. The tube's eccentricity at that cross section would be one-half the difference between the minimum wall thickness and maximum wall thickness at the same cross section:

$$\text{Eccentricity} = \frac{\text{Maximum Wall Thickness} - \text{Minimum Wall Thickness}}{2}$$

Wall run-out is derived from eccentricity. It is that variation in wall thickness compared to the specified nominal wall. It is defined as follows:

$$\text{Wall Run-out} = \text{Maximum Wall Thickness} - \text{Minimum Wall Thickness}$$

It can be related to eccentricity:

$$\text{Wall Run-out} = 2 \times \text{Eccentricity}$$

Once eccentricity and/or the minimum and maximum wall thicknesses are known, specifications may easily be converted to wall run-out.

It is particularly easy to convert from TIR to wall run-out—they're the same:

$$\text{Wall Run-out} = \text{TIR}$$

Typical orders

- **When a customer specifies 0.001 in (0.025 mm) maximum eccentricity, the order should read "0.002 in (0.050 mm) wall run-out."**

$$\begin{aligned}\text{Wall Run-out} &= 2 \times \text{Eccentricity} \\ &= 2 \times 0.001 \text{ in (0.025 mm)} \\ &= 0.002 \text{ in (0.050 mm)}\end{aligned}$$

- **When a customer specifies 0.002 in (0.050 mm) TIR, the order should read "0.002 in (0.050 mm) wall run-out."**

$$\begin{aligned}\text{Wall Run-out} &= \text{TIR} \\ &= 0.002 \text{ in (0.050 mm)}\end{aligned}$$

- **When a customer specifies 10% maximum TIR, the order should read "wall run-out 10% of nominal wall."**

$$\begin{aligned}\text{Wall Run-out} &= \text{TIR} \\ &= 10\%\end{aligned}$$

The relationships for converting tubing specifications to wall run-out are simple. Their regular and consistent use will improve communications between Superior Tube and its distributors and customers. Superior Tube continually strives for product excellence, technological improvements, and complete customer satisfaction.

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