SURFACE VEHICLE RECOMMENDED PRACTICE

J2370™ MAR2021

Issued 2001-05
Revised 2003-12
Reaffirmed 2009-03
Stabilized 2021-03

Superseding J2370 MAR2009

Geometric Dimensions and Tolerancing for Curved Hose

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “Stabilized” by the SAE Non-Hydraulic Hose Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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Foreword—The design engineer assigning tolerances for size, length and geometry must consider function, mating relationships, virtual condition, datums, and economy. Owing to the construction of rubber hoses (synthetic elastomeric material) and being a “non-rigid” product that can be deformed by shipping conditions, measurement forces, and in many cases it's own weight, care must be taken in applying GD&T procedures.

American Society of Mechanical Engineers, ASME, Dimensioning and Tolerancing Standard Y14.5M is in wide use today in a variety of industries to prevent ambiguous interpretation of design intent between designers, customers, suppliers,, manufacturers, and quality engineers. ASME Y14.5M Dimensioning and Tolerancing, standardizes definitions and methods for expressing a designer’s intent for a work piece in the form of an engineering drawing. It may be most cost effective for customer and supplier, to agree upon a frequency of gaging using this document, along with high volume cost effective gaging methods currently used in industry

Due to variation in hose wall thickness, material, shape, length, diameter, etc.; no tolerances for true position outer boundary (see Section 3) will be included with this document. The true position tolerance for the outer boundary shall be determined by customer and supplier and should be based on feasibility analysis conducted prior to final release of design record.

1. Scope—To provide the curved hose industry and their customers with a recommended practice for applying GD&T procedures to curved hoses and to provide generic curved hose drawings that represent the application of GD&T to typical curved hose parts. Dimensioning and Tolerancing will be in accordance with ASME Y14.5M.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of the publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J20—Coolant System Hoses

2.1.2 ASME PUBLICATION—Available from ASME, 345 East 47 Street, New York, NY 10017-2330.

ASME Y14.5M 1994—Dimensioning and Tolerancing

3. Definitions

3.1 Geometric Dimensioning and Tolerancing (GD&T) is:

a. The engineering product definition methods that geometrically describe design intent and provide the documentation base for the design of the quality control and production systems.
b. A technique of communication between customer engineers and supplier engineers that promotes a uniform interpretation of the acceptance requirements for a component in terms of its dimensions and tolerances.

GD&T provides the method for dimensioning and tolerancing in a language that helps to eliminate confusing and inconsistent notes. It replaces them with symbols that refer to a common code, ASME Y14.5M: which is the American National Standard. This code describes the dimensions and tolerances of the component with reference to the relationship of its features to each other and their functional interfaces with mating parts, assemblies, etc.

3.2 Reference to Standards Documents—When this document applies, there shall be a note on the drawing or in a document referenced on the drawing, which refers to ASME Y14.5M, SAE J20, and SAE J2370.

3.3 Reference to Gauging—This document and the ASME Y14.5M are not intended as gauging standards. Any reference to gauging is included for explanatory purposes only.

3.4 Figures—The figures in this document are illustrations intended only as an aid to the user in understanding the application of GD&T to curved hose. Any numerical values shown are for illustrative purposes only.

3.5 Theoretical Design Attitude—The theoretical design attitude is: The position of the hose when in the final installed attitude unless otherwise agreed upon by customer and supplier.

3.6 Boundary—The outside contour of the hose is controlled by a true position outer boundary tolerance zone. The tolerance zone follows the basic centerline of the hose, and its zone is equal to the hose outside diameters' MMC size plus the positional tolerance. The outside surface of the hose must reside within this boundary. To invoke this concept, the term BOUNDARY is placed beneath the feature control frame (see Figures 1 to 3).

4. Drawing Views

4.1 Projection—The drawing must specify either third (3rd) or first (1st) angle projection including the appropriate projection symbol.

4.2 Minimum Views—A minimum of two orthographic views is recommended on three dimensional hose shapes.

4.3 End View—A true end view of the hose, dimensioning any radially located features (orientation marks, stripes, etc.) to the next adjacent body length. This view is required for any radially located feature that is used as a tertiary datum.

4.4 Identification—Views are to be identified such as: Top or Plan, and Bottom or Front.

5. Dimensions

5.1 Dimensions, Angles—All dimensions are to be in metric. Angles are to be in decimal degrees.

5.2 Origin—Dimensions may originate from any hose end.