

POSITION STATEMENT

MARKING OF DOT ALL-METAL, SEAMLESS COMPRESSED GAS CYLINDERS

Question

May I permanently mark all-metal DOT cylinders in any manner I choose?

Answer

No. The U.S. Department of Transportation (DOT) specifies permanent marking depending upon whether the marker is the original cylinder manufacturer, a requalification facility, or owner of the all-metal, seamless cylinder as follows:

- Original cylinder manufacturer—DOT specifies in Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) that the manufacturer of an all-metal, seamless cylinder shall stamp mark information on the cylinder [1]. This is performed by applying marks into the head of the cylinder, where the metal is usually thick, using steel or other hardened metal letters or symbols, which create a legible depression in the metal. DOT stipulates that only stamp marking is permitted at time of manufacture;
- Requalification facilities—DOT specifies in 49 CFR that the facility performing the periodic inspection and testing of DOT all-metal cylinders may apply the permanent marking in any manner [1]; and
- Cylinder owner—DOT allows permanent marking of cylinders by the owner provided that such marking is in specified places and does not interfere or enter into the area(s) set aside for DOT-required markings [1]. Stamp markings are prohibited in the cylinder sidewall.

The Compressed Gas Association (CGA) sees the following inconsistencies and potential safety concerns with current DOT requirements:

- The manufacturer and requalifying body do not have the same regulations for marking cylinders;
- The cylinder manufacturer, who is more knowledgeable about the product and its performance, is not given the opportunity to choose from a wide variety of permanent marking processes other than stamp marking that are accepted throughout the world and found in international standards; and
- The requalifying entity, who might not understand the effects of new permanent marking technology on all-metal cylinders, is not provided any industry guidance for the proper application of permanent markings.

Reason

Technology offers a wide variety of ways to make permanent marks on a metal surface, which can surpass the old stamp marking process in quality and safety. Such technology includes etching methods, cutting methods, and laser methods. Within these groupings there can be a variety of processes available to the manufacturer and requalification facility, all of which are not addressed in this position statement. However, whichever method and process is used to mark all-metal cylinders, it shall not adversely affect the integrity or performance of the cylinder or cause the cylinder to fall out of compliance with its design specification.

Stamping, etching, cutting, laser, etc., methods have the potential to disrupt and change properties of the metal on a micro scale of which the user of such equipment is unaware. Even within one method, such as laser marking, settings of the equipment determine whether marks are safe or damaging to the microstructure of the metal. Personnel using such technology could not know these changes have occurred. Even after careful study and investigation of proposed process effects on the metal, changes in the equipment, energy output, or application can create microstructure changes previously unidentified.

Effects of altering the metal properties of all-metal cylinders include the weakening of the metal, shortening the life of the product, and causing a failure (catastrophic or otherwise) of the cylinder. Cylinder failure can cause loss of life, injury, and loss of property.

CGA supports the use of new technologies to perform required markings. As permitted in international standards, marking should be allowed in a permanent manner, but such technology and processes must not adversely affect the product or create a potential for unsafe use.

Therefore, CGA recommends that all requalification entities duly authorized by DOT desiring to use permanent marking processes other than the traditional stamp marking, obtain approval to use the process from the cylinder manufacturer and provide sufficient evidence to the authority having jurisdiction that their proposed marking process does not affect the integrity of the cylinder. When that cylinder manufacturer cannot or is unable to offer approval, only the traditional stamp marking shall be used.

At all times, even with the traditional stamp marking process, manufacturers, requalification facilities, and owners applying such marks shall be sure that the process used does not reduce the integrity or performance of the cylinder and that the cylinder after marking still meets requirements of its design specification. Stamp marking shall not be so deep or sharp as to create stresses the metal cannot tolerate. If there is any doubt how to properly mark a cylinder, consult the cylinder manufacturer. If the cylinder manufacturer is unable to provide guidance, consult DOT or their appointed representative(s).

Reference

[1] *Code of Federal Regulations*, Title 49 (Transportation) Parts 100-180, U.S. Department of Transportation, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401. www.gpo.gov

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