

## Quality Considerations for Unique Item Identifiers (June 30, 2005)

Data matrix quality checks are required for data content and accuracy and code profile or appearance. The data content can only be verified by de-coding the mark using a reader capable of this operation. The profile or appearance of the code can be inspected under magnification or by vision verification. When selecting to use vision verification, the manufacturer must be satisfied on the operational requirements of the verifier and the integrity of the checks that it is performing.

The quality standard for acceptance of machine-readable code marked directly on parts with Data Matrix symbology is normally specified by the product definition data. There may also be additional quality requirements in the contract provisions. In the case of Item Unique Identification (IUID), the DFARS Clause 252.211-7003 requires that the data elements of the Unique Item Identifier (UII) be placed on the item based on the criteria provided in the version of MIL-STD-130 cited in the contract schedule. The current version is MIL-STD-130, Change 1, Marking Practices for U.S. Military Property, dated 20 December 2004. The applicable requirements of MIL-STD-130, Change 1, which related quality conformance criteria for the Data Matrix symbology, are as follows:

**4.4.2 Data Matrix Symbol.** The symbol shall be ECC 200 from ISO/IEC 16022.

Minimum cell sizes and quality levels shall be:

**4.4.2.1 Dot peen, laser and electro-chemical etching markings.** See appropriate tables in SAE AS9132 for quality requirements.

**4.4.2.2 Ink Jet, printing on label material and all other marking methods.** Minimum cell size will be within a range of 0.0075 inch (0.19 mm) to 0.015 inch (0.38 mm). For acceptance the symbol shall have a minimum print quality of grade "B" 3.0 /05/660, where the minimum grade is B (3.0), measured with an aperture size of 0.005 inch (0.127 mm) with a light source wave length of 660 nm + 10 nm. The methodology for measuring the print quality shall be as specified in ISO/IEC 15415.

With regard to dot peen, laser and electro-chemical etch markings (direct part markings) enterprises should have demonstrated process capabilities in place to produce direct part marks (DPM) of acceptable quality for the target applications. In general, DPM applications should strive for the maximum contrast, use the largest practical element size possible, select ECC 200, avoid quiet zone violations, and strive for the best mark consistency possible. To assure the best possible mark consistency, effective process controls should be in place to control print growth, axial non-uniformity, cell fill, angle of distortion, dot quality and dot center offset.

There has been some confusion lately about verification requirements. MIL STD 130, Change 1 addresses the quality characteristics of the mark, and does not imply that there must be a quality inspection of 100% of the UIIs on marked items. The QA requirement will be defined contractually. For more information, please visit

<http://www.acq.osd.mil/dpap/Docs/uid/MIL-STD-130 Change1.pdf>

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