

UID Verification: Do I Really Need to Verify Every Item? Why?

MIL-STD-130N - UID Verification
John O'Brien
UID Business Manager
Siemens Energy & Automation, Inc.

YES!

The MIL-STD-130 provides clear guidance that the supplier is responsible for conformance with the Marking Quality requirements in 5.2.7.

Note that it also states that deviations from the stated criteria require acquiring activity approval. A sampling plan *may be* acceptable if it is based upon the ISO/IEC 2859-1. Finally, it states that Marking quality conformance shall include validation and verification of mark content and quality.

Section 5.2.7.2 provides the acceptable quality standards to measure the Data Matrix symbol for conformance with the MIL STD.

(Paragraphs from the Standard are presented below).

WHY?

When the Department of Defense selected the ECC200 format of Data Matrix, they understood that one major benefit of the technology is the inherent error correction built into the symbol. Between 20% and 30% of the symbol can be damaged and the entire message can still be recovered, *with no apparent effort to the user*. A capable handheld reader uses the error correction software algorithms and, in a few milliseconds, reconstructs the message from the damaged symbol and outputs the correct UID as it was encoded. ***The user never realizes that there was significant damage because the correction is so efficient.***

The handheld reader never tells the user that the message required 100% of the built-in error correction to reconstruct this message, or that additional damage to any single one of the cells will make the message totally unreadable. It doesn't tell the user that the mark is of very poor quality, and may not be read by other brands or models of readers. The user only knows that it was read successfully and ***may incorrectly assume that it is a "good" mark!***

Policy makers at the Department of Defense understood this process and know that the full value of UID will only be captured if the symbol continues to be readable *throughout the lifetime* of the item. The MIL-STD-130 is written to ensure the Data Matrix symbol is of very high quality at the time it is made – marked onto whatever substrate (label, data plate, or directly on the part) it needs to be placed upon. The ONLY way to ensure a high quality mark is through the verification process, and that process is clearly specified in the MIL STD.

Excerpted sections regarding verification: MIL STD 130N

3.60 Validation. Confirmation by examination and provisions of objective evidence that the particular requirements for a specific intended use have been fulfilled; that all requirements have been implemented correctly and completely and are traceable to system requirements.

3.62 Verification. Confirmation by examination, and provisions of objective evidence, that the item identification marking requirements specified in this standard and the associated contract have been fulfilled.

5.2.7 MRI marking quality. The following describes MRI marking quality criteria for both linear bar codes and Data Matrix symbols. Any deviations from these criteria require acquiring activity approval. Marking quality conformance may be based on a sampling plan (e.g. ISO/IEC 2859-1 [i.e.: *Sampling procedures for inspection by attributes, title added –J.S.O'B.J.*]). Marking quality conformance shall include validation and verification of mark content and quality.

5.2.7.2. Data Matrix symbol quality. The following provide acceptance criteria for all marking procedures that can be used at the Supplier's choice:

a. ISO/IEC 15415: The symbol shall have a minimum quality grade of 3.0/05/650 measured with an aperture size of 0.005 inch (0.127 mm) with a light source wavelength of 650 nm \pm 20 nm. As an exception, the ISO/IEC 15415 parameters Modulation (MOD), Symbol Contrast (SC), or both, may measure as low as 2.0, providing the overall ISO/IEC 15415 grade would be 3.0 if the MOD and SC grades are 3.0 or higher. (This allows for lower contrast substrates, high density images, printing, over-laminates and other such limiting factors to the parameters MOD, SC, or both on otherwise well produced images.) Quality (symbol validation and verification) reports shall clearly show that the MOD, SC, or both, are the only parameters measured as low as 2.0, and clearly show that the overall grade would be at least 3.0 if MOD and SC were at least 3.0. Quality reports shall also document the synthetic aperture size used. The methodology for measuring the print quality shall be as specified in ISO/IEC 15415, where the overall grade is based on a single scan (not five scans).

b. AIM DPM-1-2006: The symbol shall have a minimum quality grade of DPM2.0/7.5-25/650/(45Q|30Q|90|30T|30S|D) where:

i. Minimum quality grade = 2.0.

ii. X dimension range of the application = 7.5-25 mils.

iii. Inspection wavelength = 650 nanometers \pm 20 nanometers.

iv. Lighting conditions = Medium Angle Four Direction (45Q) or Low Angle Four Direction (30Q) or Diffuse Perpendicular (90) or Low Angle Two Direction (30T) or Low Angle One Direction (30S) or Diffuse Off-axis (D).

c. SAE AS9132: The symbol shall fulfill the visual inspection criteria of "Pass" as defined in AS9132.

d. Due to the absence of a nationally traceable standard to calibrate verification.