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GSMP:
General Specifications Change Notification (GCSN)

GSCN #	GSCN Name	Effective Date
16-424	Corrections to DPM Table	20-Dec-2016

Associated Work Request (WR) Number:

WR 16-424

Background:

- The information in the Table for Direct Part Marking is incorrect and need to be changed. The rationale for the changes include:
 - The minimum quality for DPM symbols, listed on two separate lines (for "A" and "B" types) do not specify the grade in accordance with ISO/IEC TR 29158 and thereby leads to great confusion among users who are trying to faithfully implement and abide by the GS1 system Gen Spec.
 - The specific aperture size in the DPM quality grade is impossible to implement because the DPM grading method picks the aperture size, rather than the operator specifying the aperture size as they do with non-DPM grading methods.

GS1 General Specification Change:

5.5.2.7.7 Symbol specification table 7 - Direct part marking

Figure Error! No text of specified style in document.-1. GS1 system symbol specification table 7

Symbol(s) specified	X-dimension mm (inches) Note 1 Note 2			Minimum symbol height for given X mm (inches) For minimum, Target and Maximum X-dimension	Quiet Zone	Minimum quality specification	
	Minimum	Target	Maximum				
GS1 DataMatrix	0.254 (0.0100")	0.300 (0.0118")	0.615 (0.0242")	Height is determined by X-dimension and data that is encoded	1X on all four sides	1.5/06/660 Note 3	For direct marking of items other than medical devices
GS1 QR Code	0.254 (0.0100")	0.300 (0.0118")	0.615 (0.0242")	Height is determined by X-dimension and data that is encoded	4X on all four sides	1.5/06/660 Note 3	For direct marking of items other than medical devices
GS1 DataMatrix Ink Based direct part marking	0.254 (0.0100")	0.300 (0.0118")	0.615 (0.0242")	Height is determined by X-dimension and data that is encoded	1X on all four sides	1.5/08/660 Note 35	For direct marking of medical devices such as small medical / surgical instruments
GS1 DataMatrix direct part marking - A Note 2	0.100 (0.0039")	0.200 (0.0079")	0.300 (0.0118")	Height is determined by X-dimension and data that is encoded	1X on all four sides	DPM1.5/04-12/650/(45Q I30QI30TI30 S)90)1-5/03 Note 3 Note 4 Note 5	For direct marking of medical devices such as small medical / surgical instruments
GS1 DataMatrix direct part marking - B Note 2	0.200 (0.0079")	0.300 (0.0118")	0.495 (0.0195")	Height is determined by X-dimension and data that is encoded	1X on all four sides	DPM1.5/08-20/650/(45Q I30QI30TI30 S)90) 1-5/06/ Note 3 Note 4 Note 5	For direct marking of small medical / surgical instruments

Commented [AH1]: WR14-424 various on Table 7

✓ **Note:** The largest X-dimension in a given range that will allow a symbol with the needed data content to fit within the available marking area should be used to maximise marking and reading performance (depth of field, tolerance to curvature, etc.).

The angle is an additional parameter defining the angle of incidence (relative to the plane of the symbol) of the illumination for direct part marking verification. It SHALL be included in the overall symbol grade when the angle of incidence is other than 45 degrees. Its absence indicates that the angle of incidence is 45 degrees. See ISO/IEC 15415 and ISO/IEC TR 29158 (AIM DPM).

In small instrument marking, mixed marking technologies used within the same scanning environment should be avoided to ensure highest reading performance. Laser etching is recommended for small instrument marking.

✓ **Note 1:** Optical effects in the image capture process require that label based GS1 DataMatrix and GS1 QR Code symbols be printed at approximately 1.5 times the equivalent X-dimension allowed for linear symbols in the same application.

✓ **Note 2:** There are two basic types of non ink based direct part marks, those with "connected modules" in the "L" shaped finder pattern (GS1 DataMatrix direct part marking – A) created by DPM marking technologies such as laser or chemical etching and those with "non connected modules" in the "L" shaped finder pattern (GS1 DataMatrix direct part marking – B) created by DPM marking technologies such as dot peen. Due to the marking technologies and characteristics of reading they each have varied ranges of X-dimensions and different quality criteria recommended and may require different reading equipment.
GS1 DataMatrix – A is suggested for marking of medical devices such as small medical / surgical instruments. The Minimum X-dimension of 0.100mm is based upon the specific need for permanence in direct marking of small medical instruments which have limited marking area available on the instrument with a target useable area of 2.5mm x 2.5mm and a data content of GTIN (AI 01) plus serial number (AI 21).

Note 3: The wavelength for direct part marked GS1 DataMatrix and GS1 QR Code is based upon the practical scanning environment and thus must in the grade be matched to the scanner / imagers being used. See ISO/IEC 15415 and ISO/IEC TR 29158.

✓ **Note 4:** The angle is an additional parameter defining the angle of incidence (relative to the plane of the symbol) of the illumination for direct part marking verification. It SHALL be included in the overall symbol grade when the angle of incidence is other than 45 degrees. Its absence indicates that the angle of incidence is 45 degrees. See ISO/IEC 15415 and ISO/IEC TR 29158. ✓

Note 35: The effective aperture for GS1 DataMatrix and GS1 QR Code quality measurements SHOULD be taken at 80 percent of the minimum X-dimension allowed for the application. For direct part marking - A this would equate to an aperture of 3; for direct part marking - B this would equate to an aperture of 6 and for general healthcare label printing, an aperture of 8. See ISO/IEC 15415 and ISO/IEC TR 29158.

✓ **Note 6:** The largest X-dimension in a given range that will allow a symbol with the needed data content to fit within the available marking area should be used to maximise marking and reading performance (depth of field, tolerance to curvature, etc.).

✓ **Note 47:** In practical application, where very small symbol sizes are needed, it may be necessary to work with GS1 DataMatrix module X-dimensions smaller than those suggested. Where dimensional restrictions prohibit the application of a full size code, reduced X-dimension AIDC marking is encouraged to facilitate information capture. It should be noted that these practices may limit the symbol effectiveness, including but not limited to:

- the effect of smaller X-dimensions on reading performance,
- the need for, and limited availability of, special scanners/imagers for reading,
- special processes for marking,
- the overall cost considerations.

These smaller X-dimensions should therefore only be used internally or by mutual agreement between trading partners



Note 5: Any "Type A" mark that meets the grade requirements under the quality techniques specified in ISO/IEC 15415 is considered acceptable. If the letters "DPM" precede the grade it indicates that the grade was obtained by following ISO/IEC TR 29158 (AIM DPM) and not ISO/IEC 15415 whether "Type A" or "Type B". **Note:** In small instrument marking, mixed marking technologies used within the same scanning environment should be avoided to ensure highest reading performance. Laser etching is recommended for small instrument marking.