GS1 DataMatrix Intelligent Mail® Package Barcode (IMpb)

1 Background

The USPS® remains committed to improving package visibility by increasing the volume and quality of scan data that is collected within our processing environment. Extreme curvature, fold-overs, and creased shipping labels on soft packs and irregularly-shaped parcels often distort the current/traditional one-dimensional GS1-128 IMpb barcode to an extent that the barcode becomes unreadable resulting in no-reads. This reduces overall package visibility to the customer and may require that the piece to be re-run or manually sorted. In an effort to improve processing efficiency and improve package visibility USPS has begun adding two (2) supplemental GS1-DataMatrix IMpbs to shipping labels.

2 Purpose

This document provides technical specifications for generating GS1-DataMatrix IMpbs on the standard USPS shipping label. Please refer to the DMM for official guidance on mailing standards and for any specific service, endorsement, or program requirements:

- The Mailing Standards of the United States Postal Service Domestic Mail Manual (DMM®) available at https://pe.usps.com/text/dmm300/204.htm is the official source for all mailing standards (Section 2.0 Standards for Package and Extra Service Barcodes)
- The Parcel Labeling Guide available at https://postalpro.usps.com/parcellabelingguide is meant to clarify and enhance the information in the DMM, but again does not supersede it. While some flexibility exists in design of shipping labels, using these standards will make label certification easier and processing of parcels more efficient.

3 GS1 DataMatrix (2D) IMpb Guidelines

The two required GS1 DataMatrix IMpb barcodes shall be generated and positioned on the shipping label per the following guidelines.

	Label Element	Requirements
*	Barcode Content	The data payload of the GS1 DataMatrix IMpb shall match the traditional, GS1-128 Intelligent Mail Package Barcode (IMpb). This includes the usage of GS1 application identifiers (AIs).
1	Symbology	GS1 DataMatrix
2	Symbol Size	20x20 (Mapping matrix size:18x18). The square form of the GS1 DataMatrix symbol shall be used. **Note:** *The dimensions of the barcode itself is a function of the matrix and X-dimension.*
3	Finder Pattern Location	The symbol shall be oriented such that the "L finder pattern" is located in the lower, left-hand corner of the symbol when the shipping label is upright.

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4	X-dimension (mils/inches)	Target- 20 mil (0.020”); Min:19 mil (0.0190”); Max:22mil (0.0220”) X
5	Quiet (Clear) Zone	A quiet zone equal to 5 times the X-dimension (5X) of the symbol shall be observed around all four sides of the symbol. No print or marks shall in this area.
6	GS1 DataMatrix Placement	1. Left of the Delivery Address in the Address and Delivery Information Segment, and 2. in the lower right corner of the shipping label (in the “Additional Information and User Segment’ section) beneath the Identification Bars (aka Railroad tracks). Please see figure 1 below.
7	Symbol Reflectance & Contrast	**Minimum/Maximum Reflectance** The reflectance value of the darkest bar within the barcode symbol (R_{min}) shall be equal to or less than half the reflectance value of the lightest space (R_{max}), when measured in the red spectral range between 630 nanometers (nm) and 675 nm. $R_{min} \leq 0.5R_{max}$ **Symbol Contrast** Symbol contrast is the difference between the highest reflectance value (R_{max}) and the lowest reflectance value (R_{min}) within the barcode symbol, including the quiet zones. The symbol contrast shall be greater than 40 percent. $SC = R_{max} - R_{min}$ $SC \geq 40\%$
8	Barcode Quality	At least 70 percent of the barcodes in each mailing shall have an overall symbol grade of “B” or better when measured with the appropriate aperture size in the red spectral range between 630 nanometers (nm) and 675 nm. The remainder shall measure no less than a Symbol Grade of “C”. Specified symbol grades are based upon the ISO/IEC 15416 Barcode Print Quality Guideline (formerly INCITS 182) which recommends a method of measuring the quality parameters of printed barcode symbols. The different symbol grades indicate print quality. Only the use of the appropriate aperture for the specific X-dimension of the barcode symbol under consideration will guarantee that the grade obtained from measurement of this symbol is the correct grade according to the ISO/IEC 15416 specified methodology.

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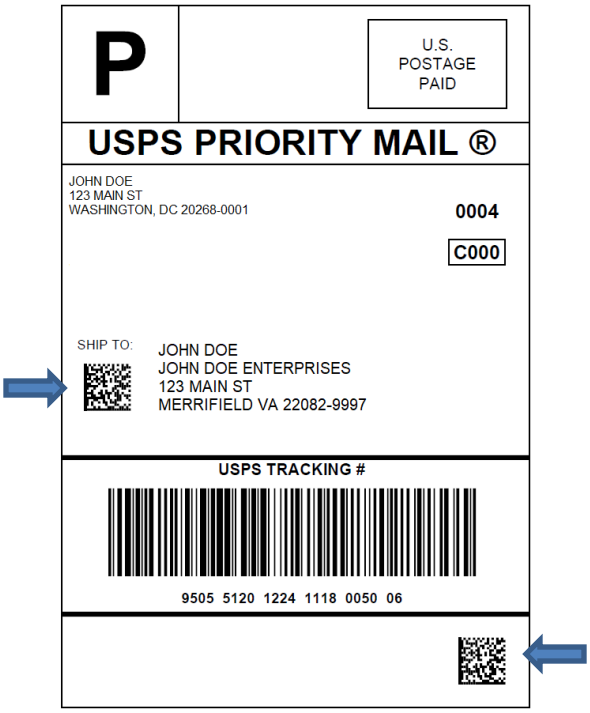
Figure 1: Sample Label



References:

- The IMpb Specifications (USPS2000508 - Barcode Package Intelligent Mail Specification, https://postalpro.usps.com/shipping/impb). This contains the USPS formal specifications on barcode creation of the traditional GS1-128 (1D) barcode.
- Technical and general specifications for IMpb use are provided in Publication 199 at: Publication 199 Intelligent Mail® Package Barcode (IMpb) Implementation Guide for: Confirmation Services and Electronic Verification System (eVS) Mailers | PostalPro (usps.com)
- GS1 General Specifications https://www.gs1.org/standards/barcodes-epcrfid-id-keys/gs1-general-specifications
- The GS1 Standard for GS1-DataMatrix https://www.gs1.org/docs/barcodes/GS1_DataMatrix_Guideline.pdf
- ISO/IEC 15415:2011(en) Information technology — Automatic identification and data capture techniques — Bar code symbol print quality test specification — Two-dimensional symbols, https://www.iso.org/obp/ui/#iso:std:iso-iec:15415:ed-2:v1:en