APPENDIX A-R

BACKGROUND AND TECHNICAL DETAILS FOR 2-DIMENSIONAL (2D) SYMBOLOGY ON THE PERSONAL PROPERTY MILITARY SHIPPING LABEL (MSL)

A. TRANSPORTATION PROCESSING

1. Advance Transportation Control and Movement Document (ATCMD) Available. The MSL 2D symbol improves the accuracy of transportation in-check when ATCMD data is available in the Automated Information System (AIS) being used to process the cargo.

   a. When the ATCMD data is available in the AIS, three Transportation Control and Movement Document (TCMD) bar code data points are used from the MSL 2D symbol of each shipment unit (SU) to complete the in-check: the Transportation Control Number (TCN) of the SU, the piece number, and the consignee agents' Department of Defense Activity Address Code (DODAAC).

   b. To meet this requirement, the MSL 2D symbol label must contain the International Standards Organization (ISO)/International Engineering Consortium (IEC) 15418 (American National Standards Institute [ANSI] Materials Handling [MH] 10.8.2) Data Identifiers (DI), Department of Defense Data Element Identifiers (DEI), and related data that are mapped to the source document header TCMD prime data.

2. ATCMD Not Available. When ATCMD data are not available, the 2D symbol is also intended to improve the speed and accuracy of transportation in-check by the processing activity. The MSL 2D symbol is intended to provide selected MSL and TCMD data to resolve a "no-hit" situation that occurs during shipment in-check when header ATCMD prime and/or trailer data are not available.

3. Reprint MSL. The 2D symbol can also serve as a data file to assist in reprinting a label that has been damaged or for printing a new label when information changes. The MSL 2D symbol will contain information that is human readable on the MSL. The 2D symbol may contain TCMD coded information that will have to be converted to in-the-clear text for printing on the MSL (e.g., deletion of leading zeros from pieces, weight, cube; conversion of date/times codes to in-the-clear text; or conversion of mode code to text).

B. EXPLANATION OF MSL 2D PORTABLE DATA FILE 417 (PDF417) SYMBOL STRUCTURE FOR CODING MSL TEXT AND TCMDS

1. Each SU must be marked with a 2D symbol shipping label and the 2D symbol will contain the data elements from Table A-R-2, which provides the content of the data streams for personal property MSLs. The data elements include MSL information and prime TCMD header data (T_1) with the respective trailer data (T_5, T_8, T_9) for an export shipment. See this Regulation, Part II, Appendix X, for detailed descriptions of DI/DEIs.

2. All SU data in the MSL 2D symbol replicate data from the Transportation Operational Personal Property Standard System or from shipment information entered in-the-clear on the MSL.

3. When an MSL 2D symbol is generated in accordance with Table A-R-2, it does not need to include data elements that are blank.

4. Explanation of Table A-R-2.

   a. Compliance Indicator (Column 1) shows the special formatting characters associated with the ISO/IEC 15434 (MHIA MH10.8.3) data format. The Compliance Indicator will be the first

three characters in the Message Header. The Compliance Indicator will be [)> (left bracket, right parenthesis, and greater than).

b. Element Separators (Column 2), shows the separator or terminal code that is for that particular part of the data stream. The Format Trailer Character (RS) will be used at the end of the Message Header (before a format series) and at the end of each format series of data (before the next series of data). The Data Element Separator (GS) separates data elements within each format series of the data table. The Message Trailer (EOT) identifies the end of the message within the data stream (see Table A-R-1).

c. Format Header (Column 3) is a two-digit numeric identifier "06" or "07" which identifies the rules governing the message format. It is followed by Format 06/07 data qualifiers (DIs or DEIs in Columns 4 and 5, respectively), which define data content within the message.

d. Data Field (Column 6) contains the description of the data field.

e. Data Format Type/Length (Column 7) contains indicators of whether the data is alpha and/or numeric and the length of the actual data represented by this field (e.g., an5). A convention of "an..25" means a variable length data string of up to 25 alphanumeric characters, where "an25" means a fixed length of precisely 25 alphanumeric characters. A convention of "an13..15" means a minimum of 13 characters and a maximum of 15 characters. The plus symbol (+) is used to show concatenated data fields within a DI/DEI string and it may or may not be part of the data sub-string. When specifically identified by a note in the Data Format column, the plus symbol (+) becomes part of the data sub-string to separate different types of data that are encoded within a single field (e.g., DIs 2L, 3L, and 5L). Variable length fields are not zero-filled unless the information is extracted from an external data source that requires leading zeros.

f. Sample Data (Column 8) contains sample data for the field indicated.

5. Data entries for listed DIs/DEIs are mandatory if:

a. The text is shown on the MSL for a respective DI/DEI.

b. The data is available from the shipment unit TCMD.

C. PDF417 SYMBOL FORMAT COMPLIANCE REQUIREMENTS AS REFERENCED IN MHIA MH10.8.1 AND ISO/IEC 15434 (MHIA MH10.8.3)

1. The narrow element dimension ("X" dimension) range will be from 0.010 to 0.017 inches (10 to 17 mils).

2. The minimum bar height of an element will be three times the "X" dimension width.

3. The symbol will not exceed 2.4 inches to include the quiet zone as described in MHIA MH10.8.1.

4. The symbol will be printed with no more than 12 data columns in width. A PDF417 symbol includes a start pattern, a left row indicator column, one or more data columns, a right row indicator column, and a stop pattern. The start and stop patterns appear to be wide and narrow vertical lines on each end. The indicator and data columns appear to be checkered patterns separated by single vertical lines.

5. The symbol will have a minimum quiet zone of 0.04 inches above, below, to the left, and to the right.

6. An error correction level of five will be used.

7. ISO/IEC 15438 Automatic Identification and Data Capture Techniques – Bar Code Symbology Specification – PDF417 and ISO/IEC 15416 Automatic Identification and Data Capture

Techniques – Bar Code Print Quality Test Specification – Linear Symbols will be used to determine a minimum symbol print grade of 2.5/10/660, where:

a. Print quality grade ≥ 2.5 (B) at point of printing

b. Measurement aperture = 0.010 inches

a. Light source wavelength = 660 nanometers (nm) ± 10 nm.

Table A-R-1. Excerpt from Subset of ASCII/ISO 646
(Table of Hexadecimal and Decimal Values)

ASCII/ISO 646	HEX	DEC
R_S	1E	30
G_S	1D	29
E_{OT}	04	04

Table A-R-2. Personal Property Shipping Label 2D Symbol Format

Compliance Indicator	Element Separators	Format Header	Format 06 DI	Format 07 DEI	Data Field	Data Format Type/Length	Sample Data without DI/DEI
[)>					**Message Header Compliance Indicator**		**[)>**
	RS	**06**			**Data Identifier Format Header**		**06**
	GS		JKUSM		TCN	an17	F1096305469621JXX
	GS		3D		Ship Date	an4	1090
	GS		2K		Bill of Lading	an..12	M1234567
	GS		9K		TAC	an4	FZZZ
	GS		12K		Personal Property SCAC	an4	XYZW
	GS		2L		Ship To Address	an..35+an..35+an..35+an..35+an..35 See Note 1	1st address line+2nd address line+3rd address line+4th address line+5th address line
	GS		3L		From Address	an..35+an..35+an..35 See Note 1	1st address line+2nd address line+3rd address line
	GS		5L		Consignee Address	an..35+an..35+an..35+an..35+an..35 See Note 1	1st address line+2nd address line+3rd address line+4th address line+5th address line
	GS		2Q		Weight (shipment piece)	an..5+../an2 See Note 2	350
	GS		11Q		Tare Weight	an..5+../an2	40

Compliance Indicator	Element Separators	Format Header	Format 06 DI	Format 07 DEI	Data Field	Data Format Type/Length	Sample Data without DI/DEI
	GS		13Q		Piece Number/Total Pieces	an..4/an..4	1/4
	GS		17V		CAGE Code – Consignor	an5	6R517
	RS	**07**			**Free Text Format Header**		**07**
	GS			12	Cube (shipment piece)	an..4+../an2 See Note 2	36
	GS			15	Water Commodity/ Special Handling Codes	an5	390Z9
	GS			23	Air Dimension Code	an1	A
	GS			25	POE Code	an3	DOV
	GS			26	POD Code	an3	RMS
	GS			27	Consignee DODAAC	an6	FB5612
	GS			28	Transportation Priority	n1	2
	GS			29	Consignor DODAAC	an6	FB4407
	GS			30	Method Code	an1	P
	GS			32	RDD	an..3	118
	GS			34	TCMD/Manifest Doc ID Code (header DIC only)	an3	TF1
	GS			35	Free Text Comment	an..60	Free text up to 60 characters
	GS			45	Owner's Last Name	an..13	Smith
	GS			46	Owner's First and Middle Initials	an..2	JB
	GS			47	Owner's Grade	an2	O5
	GS			48	Type Service	an..10	TGBL UB
	GS			49	Air Commodity/ Special Handling Codes	an2	JZ
	GS			50	Type Pack Code	an2	MW
	GS			69	Personal Property Code	an1	B
	GS			70	Net Weight	an..5+../an2	310
	GS			71	POV Model Year	n2	05
	GS			72	POV Make	a4	MERC
	GS			73	POV State of Registration	a2	VA

Compliance Indicator	Element Separators	Format Header	Format 06 DI	Format 07 DEI	Data Field	Data Format Type/Length	Sample Data without DI/DEI
	GS			74	POV License Number	an..8	PAE8393X
	GS			75	POV Vehicle Color	a3	BLK
	RS EOT						

NOTE 1. The plus symbol (+) is used as a delimiter between the data elements and is part of the data sub-string.

NOTE 2. To accommodate current automated information systems, U.S. default values are assumed as shown. Metric data values may be used in the 2D symbol for generic cargo shipment descriptions, but the data values must be marked with the metric units of measure from the ANSI X12.3 code list 355. The ANSI X12.3 codes selected for use are: KG = kilograms, CM = centimeter, CC = cubic centimeter, MR = meter, CR = cubic meter. Decimal values are allowed in the 2D symbol. Human-readable values printed on the DoD MSL will be in U.S. standard unit of measure format and will be rounded to the next higher whole number with leading zeros suppressed.

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