GS1 DIY Self-Learning Materials

GS1 Barcode Symbol Specifications

GS1 Malaysia Berhad

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What to expect from this DIY Self-Learning Material

1. Understand what a barcode is and its place in a supply chain
2. Find out about the different types of GS1 Barcode symbols
3. The specifications for each type of barcode symbol
4. Guidelines on how to label your products, trade items and logistic units.

What is a Barcode?

What is a Barcode? (Also known as a Data Carrier)

A series of dark bars/dots and light spaces on a light background.

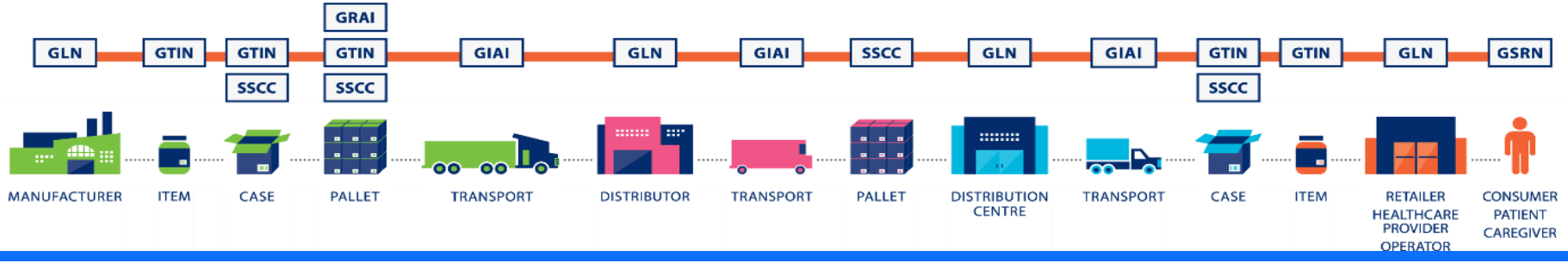
Each dark bar/dot and light space arrangement represents a number or character !

Why Use a Barcode?

Fast and accurate capture of information into a computerised system, with little to no human error.

IDENTIFY: GS1 Standards for Identification

GLN Global Location Number **GTIN** Global Trade Item Number **SSCC** Serial Shipping Container Code **GRAI** Global Returnable Asset Identifier **GIAI** Global Individual Asset Identifier **GSRN** Global Service Relation Number



CAPTURE: GS1 Standards for Barcodes & EPC/RFID

GS1 BARCODES

EAN/UPC

GS1-128

ITF-14

GS1 DataBar

GS1 DataMatrix

GS1 QR Code

GS1 Composite Barcode

GS1 EPC/RFID

EPC HF Gen 2

EPC UHF Gen 2

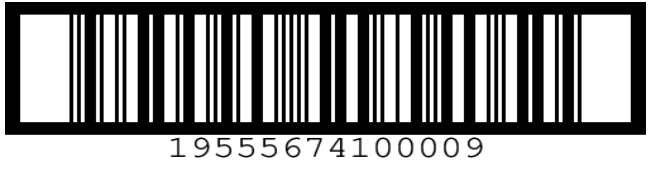
SHARE: GS1 Standards for Data Exchange

MASTER DATA Global Data Synchronisation Network (GDSN) **TRANSACTIONAL DATA** eCom (EDI) **Event Data** EPC Information Services (EPCIS)

Different Types of GS1 Barcode Symbols

EAN-13

EAN-8



ITF-14

GS1-128

GS1 QR Code

GS1 2D DataMatrix

Reading GS1 Barcodes

Bar Code Scanner / Reader

Infrared laser scanner

Camera-based scanner

Data carrier

Linear barcode

2-D barcode

Barcode Symbol Size

The size of the bar code is known as magnification.

Magnification can vary within certain limits. If a bar code is not within these limits, it may not scan. Any reduction in magnification below the nominal size (100%) may reduce reliability. Reliability of scanning is always enhanced by selecting a magnification higher than the theoretical minimum.

Manufacturers should also consult their printer before deciding how large a bar code they will have on their pack. Until printability tests have been run the pack material concerned, it is not possible to say how large the bar code should be.

EAN-13

The nominal size of a 100% EAN-13 digit bar code symbol including the right and left light margin area is 37.29mm wide and 25.93mm high. The bar code symbol must be in the range of 80% to 200%.

85% 90% 95% 100%

Barcode Symbol Size

EAN-8

EAN-8 digit bar code symbol is another option if the design of the pack or label genuinely and reasonably precludes the printing of a standard EAN-13 digit bar code symbol. The general rule is that the printable area should not be more than 8,000mm² or the product is cylindrical with a diameter less than 30mm. The nominal size of a 100% EAN-8 digit bar code symbol including the right and left right margin area is 26.73mm wide and 21.31mm high. The bar code symbol can be printed as small as 80%.

Due to the limited number of GTIN-8 digit available, it is only allocated if deemed absolutely necessary. When applying for a GTIN-8 digit, a sample label or a copy of the actual size of the artwork should be provided.

85% 90% 95% 100%

Overall Dimensions of EAN-13 and EAN-8 Barcodes

Dimensions of GS1 Bar Codes (mm)						
Mag. Factor	EAN-13			EAN-8		
	Width not including LM	Width including LM	Height including Interp.	Width not including LM	Width including LM	Height including Interp.
0.80	25.08	29.83	20.74	17.69	21.38	17.05
0.85	26.65	31.70	22.04	18.79	22.72	18.11
0.90	28.22	33.56	23.34	19.90	24.06	19.18
0.95	29.78	35.43	24.63	21.00	25.39	20.24
1.00	**31.35**	**37.29**	**25.93**	**22.11**	**26.73**	**21.31**
1.05	32.92	39.15	27.23	23.22	28.07	22.38
1.10	34.49	41.02	28.52	24.32	29.40	23.44
1.15	36.05	42.88	29.82	25.43	30.74	24.51
1.20	37.62	44.75	31.12	26.53	32.08	25.57
1.25	39.19	46.61	32.41	27.64	33.41	26.64
1.30	40.76	48.48	33.71	28.74	34.75	27.70
1.35	42.32	50.34	35.01	29.85	36.09	28.77

Overall Dimensions of EAN-13 and EAN-8 Barcodes

1.40	43.89	52.21	36.30	30.95	37.42	29.83
1.45	45.46	54.07	37.60	32.06	38.76	30.90
1.50	47.03	55.94	38.90	33.17	40.10	31.97
1.55	48.59	57.80	40.19	34.27	41.43	33.03
1.60	50.16	59.66	41.49	35.38	42.77	34.10
1.65	51.73	61.53	42.78	36.48	44.10	35.16
1.70	53.30	63.39	44.08	37.59	45.44	36.23
1.75	54.86	65.26	45.38	38.69	46.78	37.29
1.80	56.43	67.12	46.67	39.80	48.11	38.36
1.85	58.00	68.99	47.97	40.90	49.45	39.42
1.90	59.57	70.85	49.27	42.01	50.79	40.49
1.95	61.13	72.72	50.56	43.11	52.12	41.55
2.00	62.70	74.58	51.86	44.22	53.46	42.62

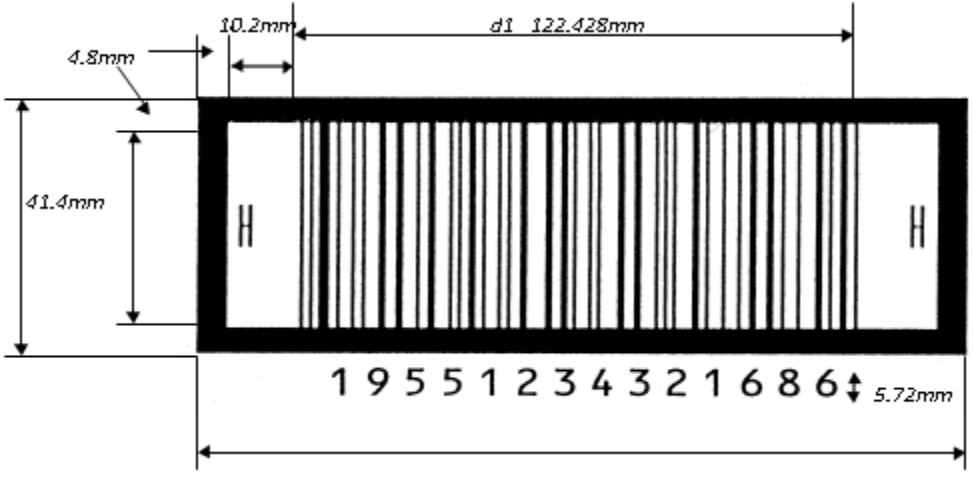
Note:

Mag. = Magnification (Size)

LM = Light Margins (Empty area before and after the bar code symbol)

Interp. = Human Readable Interpretation (The bar coded numbers below the bar code lines)

ITF-14 Barcode



- The ITF-14 bar code can be printed with a magnification factor ranging from **25%** to **100%**.
- To ensure efficient reading in any environment, including conveyor belt scanning, a minimum magnification factor of **50%** should be used.
- ITF-14 bar codes with a magnification less than **62.5%** should not be printed directly on corrugated material.

ITF-14 Barcode

Mag. factor	X-dimension Narrow element (mm)	Wide element (mm)	Width of Light Margins (10x) (mm)	Min. height of bars (mm)	Excluding bearer bar		Including bearer bar & LM		
					Width not incl LM (mm)	Width incl LM (mm)	Width not incl. H gauges (mm)	Width incl. H gauges (mm)	Height (mm)
0.5	0.508	1.270	5.1	32	61.214	71.41	81.01	87.01	41.6
0.625	0.635	1.588	6.4	32	76.518	89.32	98.92	104.92	41.6
0.7	0.711	1.778	7.1	32	85.700	99.90	109.50	115.50	41.6
0.8	0.813	2.032	8.1	32	97.942	114.14	123.94	129.94	41.6
0.9	0.914	2.286	9.2	32	110.185	128.59	138.14	144.14	41.6
1.0	1.016	2.540	10.2	32	122.428	142.83	152.43	158.43	41.6

Notes : In the heading of this table: Mag. = magnification, LM = Light Margins

GS1-128 Barcode

- For general distribution, the height for a GS1-128 is **32mm**.
- Where space constraints do not allow the barcode to be printed at the minimum recommended height, it should not be lower than **13mm** in height.

GS1-128 Barcode

Number of characters including AI	Dimensions (mm) including light margin areas				
	MF 0.25	MF 0.4	MF 0.6	MF 0.8	MF 1.0
4	22.0	35.2	52.8	70.4	88.0
6	24.8	39.6	59.4	79.2	99.0
8	27.5	44.0	66.0	88.0	110.0
10	30.3	48.4	72.6	96.8	121.0
12	33.0	52.8	79.2	105.6	132.0
16	38.5	61.6	92.4	123.2	154.0
20	44.0	70.4	105.6	140.8	—
30	57.8	92.4	138.6	—	—

Note 1: One code A or code B character is included in these calculations. If you use more than one code A, B, C, or shift characters, the bar code width will be larger.
Note 2: Calculate widths for other encoded numbers using the formula 11N + 66.

GS1 2D Datamatrix

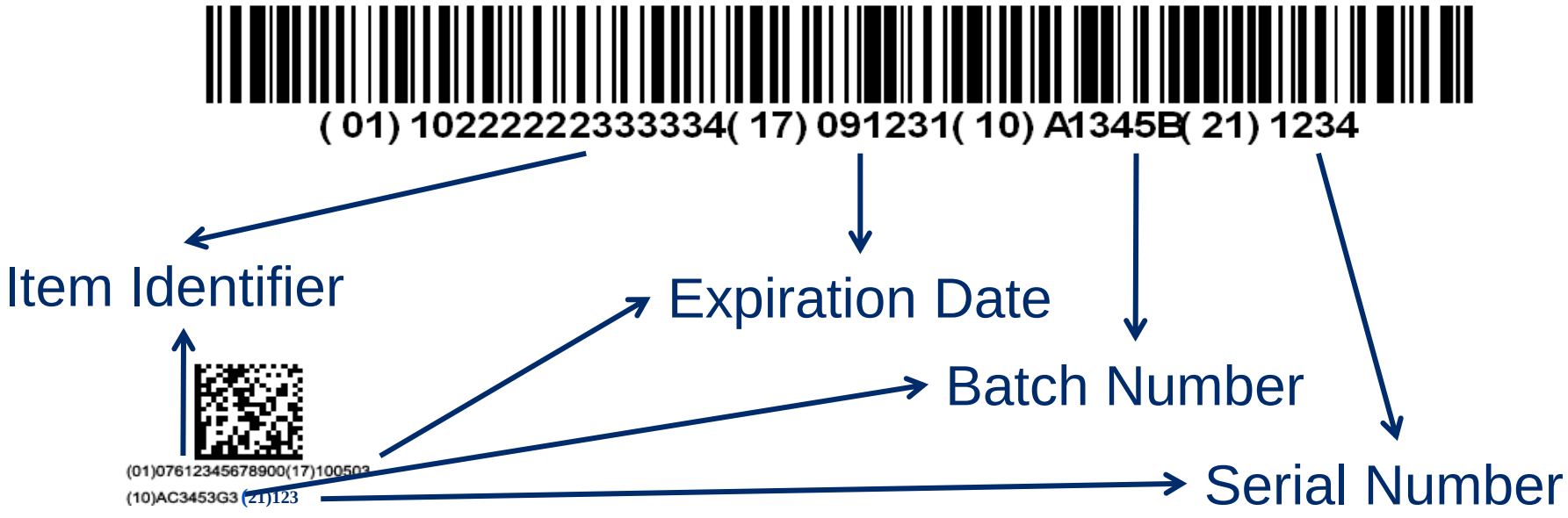
What is a 2D Datamatrix?

- The GS1 2D DataMatrix is a 2D (two-dimensional) barcode symbol.
- The GS1 2D DataMatrix holds large amounts of data in a relatively small space as compared to traditional linear barcodes. Example information – expiry date, batch number & serial number
- Can be used on Retail & Non-Retail Product Units.

(17) 050101 (10) ABC123

(01) 04012345678901

GS1-128 & GS1 Data Matrix Comparison

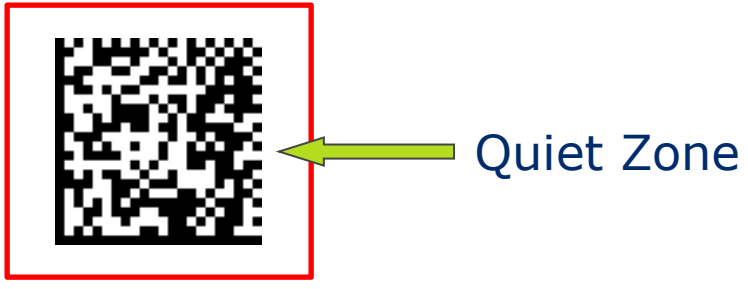


The Colour Red & Barcodes

Humans can see red..

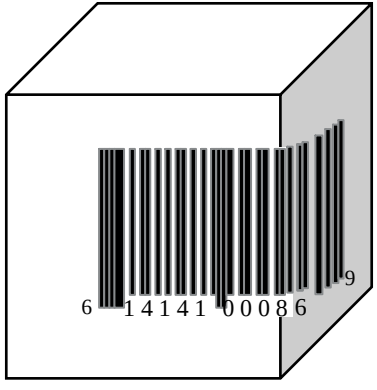
Scanners can’t!!!

Light Margin Area (LMA) & Quiet Zone

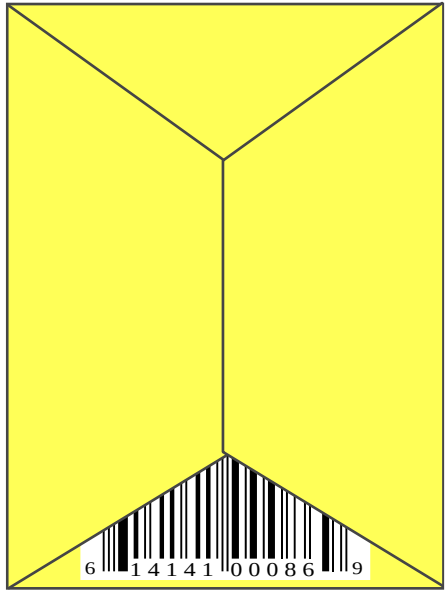


- Determines whether a barcode symbol can be properly scanned.
- All barcodes must have a clear and blank space in front, behind or around it to ensure no design or colour choices will affect the scanning.

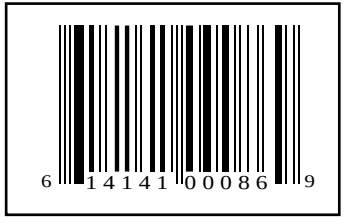
Symbol Locations & Orientation



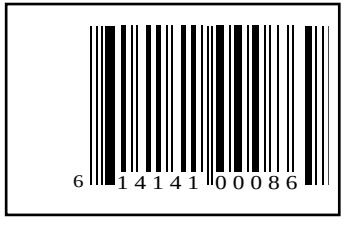
Avoid Corner Wraps



Avoid Package Flaps



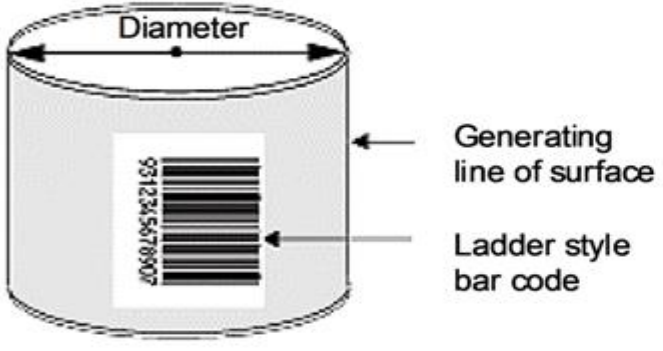
Centered On Label

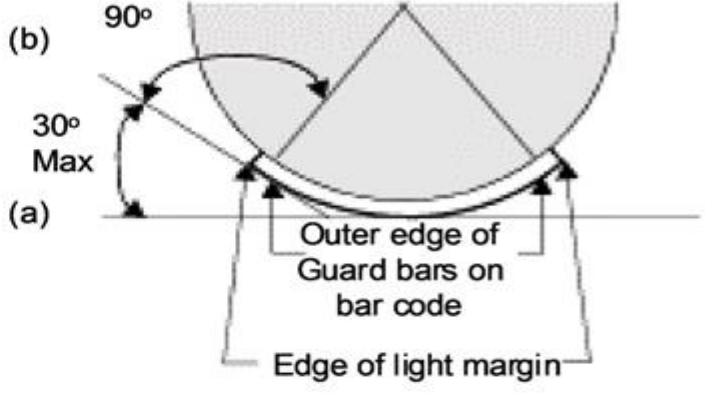


Not Centered - Information Lost

Symbol Locations & Orientation

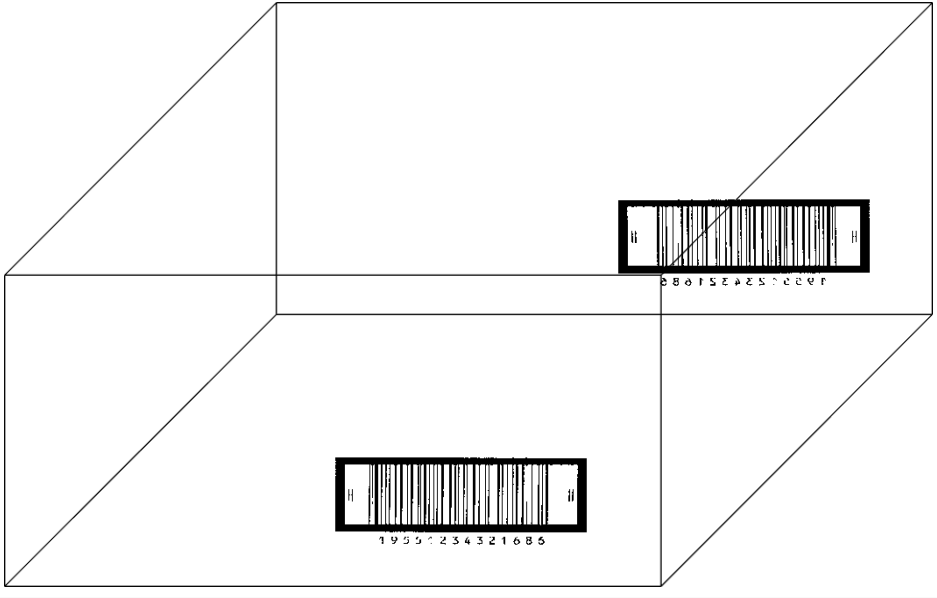
- When placing barcodes on rounded or curved surfaces, always place them in the "**ladder**" style instead of the standard "**fence**" style.
- Typical barcode scanners utilise an infrared laser that can only scan flat and smooth images.





Barcodes on Outer Case Carton / Trade Unit

- Two barcode labels on adjacent sides (a short side and the long side on the right) is recommended.
- At least one label on any side (except on the base)



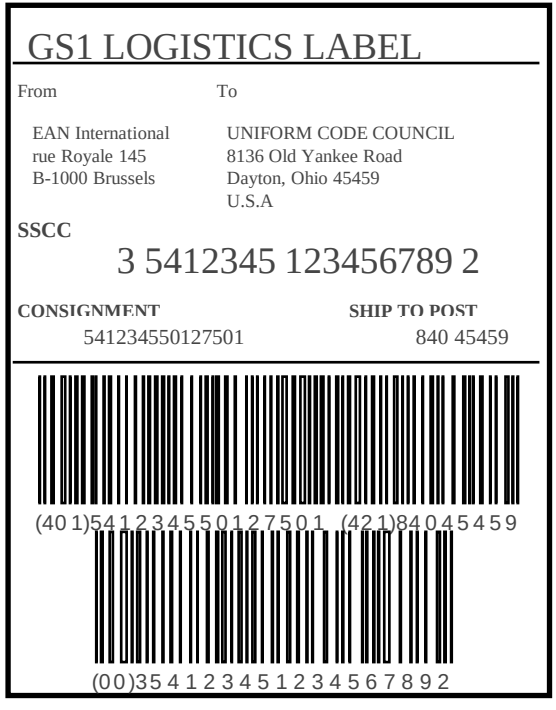
Structure of the GS1 Logistics Label

GS1 logistics labels can be divided into three sections:

The **top section** of the label contains free format information

The **middle section** contains text information and human readable interpretations of the bar codes

The **lowest section** includes the bar codes and their associated interpretation. SSCC must be the lowest



Barcode Symbol Specifications - Recap

- When barcodes fail to scan the first time, every time; delays and errors are introduced into the supply chain. Avoid time and monetary losses when having to re-design, re-print or recall products due to ineffective or unworkable barcodes
- Key considerations:
  - **Size**

Min X-dimension * 0.264 mm (0.0104”)

Target X-dimension 0.330 mm (0.0130”)

Max X-dimension 0.660 mm (0.0260”)

Scan here!

***X-dimension** = The specified width of the narrowest element of a barcode

  - **Colour**
    - Bars must appear black under red light.
    - Bars may be black, blue, green – cold colours.
    - Background may be white, red, yellow, orange.
    - Colours used must be pure colours
    - Reversed colour images (white bars against a coloured background cannot be scanned.)

Want to learn more?

Attend GS1 Malaysia's
Capacity Building & Implementation Program
to find out more!

Effective Implementation of GS1 Standards and Keys – FREE to attend!

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Effective Implementation of GS1 Standards & Keys

Date	Time	Highlights
Monday to Friday **Subject to change*	**3.00 PM - 4.00 PM**	• ***Learn how to assign GS1 barcode numbers.*** • ***Upload your product information to our online repository for visibility & authenticity.*** • ***Why an active GS1 Membership is important for your Business.***

JOIN US NOW ON ZOOM!

Migration to “Data-Rich 2D” Initiative (FOC)

Migration to “Data-Rich 2D” Zoom Link: https://us06web.zoom.us/j/82513900764

Verified by GS1 – Product Databank Support & Services

Verified by GS1 – Product Databank Support & Services

Date	Time	Highlights
Every Thursday of the Month **Subject to change*	**11.00 AM - 11.30 AM**	• ***WHAT is VbG-PDSS?*** • ***WHY is VbG-PDSS so Important?*** • ***The Services & Platforms Managed by VbG-PDSS***

JOIN US NOW ON ZOOM!

VbG-PDSS Zoom Link: https://us06web.zoom.us/j/89770665451

GS1 Industry Focus Forums

GS1 Malaysia Industry Focus Forums

TOPIC 1	TOPIC 2	TOPIC 3
Supply Chain Optimisation and Regulatory Fulfilment using Global Location Number (GLN) and GS1 Services	**Comply with Global Unique Device Identification (UDI) Regulation & Directive of Healthcare using GS1 Standards**	**The Importance of GS1 Global Location Number (GLN)**
Key Learnings: • *Comply with **Retail Merchandising Requirements*** • *Fulfill **Global Regulatory Compliance*** • ***Track & Trace** using the **GS1 2D Datamatrix***	**Key Learnings:** • *Achieve compliance with international directives and country-specific regulations on **medical devices** and **pharmaceutical products*** • *Fulfilling regulatory compliance required by **US FDA GUDID, EU EUDAMED, China NMPA, UAE BrandSync**, and many more.*	**Key Learnings:** • *Comply with international directives and country-specific regulations on location and entity identification such as the **Russian certificate of conformity** for all products originating outside of EAEU and the use of GLN by **NPRA-MOH** for **COVID-19 vaccine** track and trace.*

Write to databank@gs1my.org to book your session!

***Chargeable:**
1-5 people – RM 500
6-10 people – RM 1000

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Need a special tailor-made **In-House Business Consultation** session? GS1 Malaysia can provide advisory support for you to meet your specific needs.

Each session can be **half-day** or **full day**.

Scan here for the Fee Structure:

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+6016-2455 228
(Strictly for Payment Only)

+6012-2722 646
(Strictly for Payment Only)

Official GS1 Malaysia Emails

gs1malaysia@gs1my.org

membership@gs1my.org

payment@gs1my.org

gs1mymembership@googlegroups.com

Official GS1 Malaysia Land Line & Fax Line

Land: +603-6286 7200

Fax: +603-6276 1042

Official GS1 Malaysia Website

www.gs1my.org