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AE/MFT2.2		Harold Ebeling		26.04.2022

Specific MAT-Label for Processed Wafer delivered to Bosch

based on

Bosch-AE Instruction MAT-Label

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1 Prologue

1.1 Purpose

This instruction complements the specification Bosch-AE Instruction MAT-Label (2269921330) and specifies requirements for the MAT-Label for “Processed wafers delivered to Bosch”.

Version	Alteration Number	Alteration	Date
1.0	-	Implementation as own SAP-Document Based on: “MAT-Label for Processed Wafer Appendix to Bosch-AE Instruction” from 15.Oct.2019	26.04.2022

Acceptance

Department		
RtP1/LOI-SCO		
Date		
26.04.2022		
Signature		
Signed		

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2 Scope and Orientation

This instruction describes the contents of the MAT-Label for the product group “Processed Wafer”. It is valid for unmeasured and measured (Wafer Level Test) wafer.

The MAT-Label for these products

- is based on the general specifications of the MAT-Label (see www.bosch.com > Company > Supply chain > Information for business partners > [Logistics: Regulations and Standards](#) > Marking of supplied parts: MAT-Label)
 - o Standardized labeling of parts from suppliers with MAT-Label:
 - Requirements on Marking of Goods and Accompanying Information for Purchased Production Parts (MAT-Label)
 - o Specification of MAT-Label for Automotive Electronics (AE):
 - Bosch-AE Instruction MAT-Label (2269921330)
- includes additional Data Matrix Code (DMC) with wafer data

All specifics for Processed Wafer are listed in chapter “3.5 Differences to Bosch-AE Instruction MAT-Label”.

2.1 Motivation and Changes

The reasons for this new version are:

- Considering legal requirement “Country of Origin”
- alignment of fields 1. Batch and Shipping Note

All changes to the initial version are listed in chapter “3.6 Changes to initial version”.

3 MAT-Label for Processed Wafer

3.1 Definition of the MAT-Label content

The MAT-Label for Processed Wafer always consists of two DMCs:

- The MAT-Label DMC as required (see chapter 3.3)
- The Wafer Data DMC, which contains all Wafer-IDs and for measured wafer additionally good dies per wafer (see chapter 3.4)
 - o The Wafer Data DMC has to be printed at the bottom.

The placement of the DMCs has to consider the printed size in case of maximum data.

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3.2 Label samples with DMCs

3.2.1 MAT-Label for unmeasured Processed Wafer



	Part Name: ProWaf_2021	
	Part No.: 1223344556	1. Batch: SLOT2021
	Man. - Date: 20210708	2. Batch:
	Exp. - Date: 20991231	Quantity: 8
Man. Part. No.: PW2021556	Add. Info: ABC123#U	
Supplier ID: 777	CoO: DE	
Supplier Name: Sample_CO	Index: AA	
Man. Loc.: DEU-DRESDEN	MS-Level: 1	
Purchase: 55197828		
Shipping Note: 2153698754		
Package - ID: S20210708AXBA	RoHS	

Fig. 1: Example of MAT-Label for unmeasured wafer


Wafer Data DMC

3.2.1.1 MAT-Label DMC

For details see chapter “3.3 MAT-Label DMC”.

```

]>@06@12SP002@P1223344556@1PW2021556@31PDE@12V22446688
@10VDEU-DRESDEN@2PAA@20PABC123#U@6D20210708@14D20991231
@30PY@Z1@K55197828@16K2153698754@V777@3SS20210708AXBA@Q8NAR000
@20T1@1TSLOT2021@2T@1ZSupplier_Own_Data@@
    
```

]>@06 = prefix
 @ = separator
 nX = identifier
 @@ =suffix

3.2.1.2 Wafer Data DMC

For details see chapter “3.4 Wafer Data DMC”.

```
@V777@3SS20210708AXBA@31T%LSLOT2021%W01,02,03,04,05,06,07,08@@
```

@ = separator
 nX = identifier
 %L = sub identifier Lot-ID
%W = sub identifier Wafer String
@@ =suffix

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3.2.2 MAT-Label for measured Processed Wafer (with maximal data)



	Part Name: MD2021	1. Batch: MAX2021
	Part No.: 9887766554	2. Batch:
	Man. - Date: 20210708	Quantity: 30853425
	Exp. - Date: 20991231	
Man. Part. No.: BP12022021	Add. Info: ABC123#M	
Supplier ID: 777	CoO: DE	
Supplier Name: Sample_CO	Index: AA	
Man. Loc.: DEU-DRESDEN	MS-Level: 1	
Purchase: 55197828		
Shipping Note: 938458193		
Package - ID: SMAX202100001	RoHS	

Fig. 2: Example of MAT-Label for measured wafer


Wafer Data DMC

3.2.2.1 MAT-Label DMC

For details see chapter “3.3 MAT-Label DMC”.

```

j>@06@12SP002@P9887766554@1PBP12022021@31PDE@12V22446688
@10VDEU-DRESDEN@2FAA@20PABC123#M@6D20210708@14D20991231
@30PY@Z1@K55197828@16K938458193@V777@3SSMAX202100001
@Q30853425NAR000@20T1@1TMAX2021@2T@1ZSupplier_Own_Data@@
    
```

j>@06 = prefix @ = separator nX = identifier @@ =suffix

3.2.2.2 Wafer Data DMC

For details see chapter “3.4 Wafer Data DMC”.

```

@V777@3SS20210708AXBA@31T%LMAX2021%W01#1234017,02#1234027,03#1234037,
04#1234047,05#1234057,06#1234067,07#1234077,08#1234087,09#1234097,10#1234107,
11#1234117,12#1234127,13#1234137,14#1234147,15#1234157,16#1234167,17#1234177,
18#1234187,19#1234197,20#1234207,21#1234217,22#1234227,23#1234237,24#1234247,
25#1234257@@
    
```

@ = separator nX = identifier %L = sub identifier Lot-ID
 %W = sub identifier Wafer String # = Delimiter for Quantity @@ =suffix

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3.3 Standard MAT-Label Data

This chapter explains the required data for

- MAT Label Data Matrix Code
- printed values

according to the Bosch-AE Instruction MAT-Label.

3.3.1 Main Section Table

This Main Section Table aligns with table “2.1.2 Definition of the MAT-Label content” in Bosch-AE Instruction MAT-Label.

We added the column “Value is Standard(S) or ...” at the end to mark predefined and changed values:

- S (Standard) : value is according to Bosch-AE Instruction MAT-Label
- P (Processed Wafer) : value is predefined for Processed Wafer
- C (Changed) : added in case that the field value differs from previous version
- N (New) : added in case it is a new field

All modified or new cells have yellow background and are described in detail in chapter “3.6 Changes to initial version”.

No.	Data Field	Proposals for field description	Definition / Description	Data Identifier	Length	Format N = Numerical, A/N = Alphanumerical, D =day, M = month, Y = year	Example	Machine-Readable Code 2D-Code Data Matrix Bosch	Printed Text Bosch	Value is Standard (S) or specific for Proc. Wafer (P)/ Changed (C) or New (N)
Label Information										
1.	Label Version		The revision level (version) is a fixed entry and serves as recognition of the label or its version. The first digit “P” indicates that this label has two Data Matrix Codes.	12S	4	N (“P002”)	P002 (fixed data)	yes	no	PC
Part Information										
2.	Customer Part Number	Part No.	Part number of Bosch (10 digits without separators)	P	10	A/N	1223344556	yes	yes (highlighted)	S
3.	Manufacturer Part Number	Man. Part No.	Internal manufacturer part number.	1P	Max. 35	A/N	PW2021556	yes	yes	S
4.	Ordering Code	Ord. Code	As Bosch does not use this field, it is utilized for the Country of Origin as ALPHA ISO 2	31P	2	A/N	DE	yes	no	PC
5.	Part Description (Part Name)	Part Name	Specified description of the ordered part (or part name).	-	Max. 30	A/N	ProWaf_2021	no	yes (highlighted)	S
6.	Manufacturer Number		Explicit identification for the manufacturer, e.g. DUNS-Nr.	12V	Max. 13	A/N	22446688	yes	no	S
7.	Manufacturer Location	Man. Loc.	Naming the manufacturing location/locations	10V	Max. 20	A/N	DEU-DRESDEN	yes	no	S
8.	Revision Level/ Index	Index	Revision status of the part. The actual Bosch- Revision-Index must be filled in. If not existing the change number must be given here.	2P	Max. 14	A/N	AA	yes	yes	S
9.	Additional Part Information	Add. Info	Lasered Lot Delimiter # mark for measure : U : Unmeasured Wafer M : Measured Wafer	20P	Max. 30	A/N	ABC123#U	yes	yes	P

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No.	Data Field	Proposals for field description	Definition / Description	Data Identifier	Length	Format N = Numerical, A/N = Alphanumerical, D =day, M = month, Y = year	Example	Machine-Readable Code 2D-Code Data Matrix Bosch	Printed Text Bosch	Value is Standard (S) or specific for Proc. Wafer (P)/ Changed (C) or New (N)
More Part Information										
10.	Date of Manufacturing	Man. Date	Date of manufacturing is related to the last manufacturing process	6D	8	YYYYMMDD	20210708	yes	yes	S
11.	Expiration Date	Exp. Date	The Expiration Date of the part. Fixed value "20991231" if not specified otherwise	14D	8	YYYYMMDD	20991231	yes	yes	S
12.	RoHS		Indicator for RoHS compliance N: no RoHS Y: RoHS 0: not applicable	30P	1	A/N (upper case)	Y	yes	Logo	S
13.	MS-Level	MSL or MS-Level	Moisture Sensitivity Level according to IPC/JEDEC J-STD-020.	Z	Max. 2	A/N, "N" if not applicable (text)	1	yes	yes	S
Logistic Information										
14.	Purchase Order Number	Purchase	Order number assigned by customer to identify a purchasing transaction.	K	Max. 18	A/N	55197828	yes	yes	S
15.	Shipping Note Number	Shipping Note	Shipping Note Number of the shipping note and MAT-Label must be the same. If supplier cannot provide the shipping-note, the field must be filled with "0". If mutually agreed, it also may be empty.	16K	Max. 12	A/N	2153698754/85	yes	yes	PC
16.	Supplier Name (no real data field!)	Suppl.	The Supplier Name.	-	Max. 30		Sample_CO	no	yes	S
17.	Supplier-ID (Vendor Number)		The fixed vendor number (of the customer) for the supplier.	V	Max. 10	A/N	777	yes	yes	S
18.	Package-ID		The explicit, unique number per single package. It has to be unique per supplier (vendor number) and package. It is always related to the smallest package unit. If possible, chronologically related to the production process (e.g. reel-ID).	3S	13	A/N	S20210708AXBA (first Byte reserved for specifying single)	yes	yes	S
19.	Quantity		Quantity of the smallest package unit. Unmeasured wafer: quantity of wafer Measured wafer: sum of all good dies	Q	Max.18	12ISO3 to be aligned to the right, see example	8NAR000 (in DMC) (printed: 8)	yes	yes (highlighted)	S
Traceability Information										
20.	Batch-Counter		Batch ID identifies the number of batches	20T	1	N	1	yes	no	P
21.	Batch-No. #1	1. Batch No.	With this number the supplier has to be able to retroactively provide information about the batch (e.g. volume, production, delivery). The batch identification should be based on same manufacturing conditions. If a manufacturing condition changes batch number should be changed too.	1T	Max. 17	A/N	SLOT2021	yes	yes (highlighted)	SC
22.	Batch-No. #2	2. Batch No.	Batch number for the second batch – always empty because mixing of two batches is not allowed.	2T	Max. 17	A/N		yes	yes	S
Other										
23.	Supplier Data		Supplier own information that may be used by the supplier.	1Z	Max. 30	A/N	Supplier_Own_Data	yes	optional	S
24.	Country of Origin	CoO	This printed field contains the value of field 4. Ordering Code as ALPHA ISO 2	-	2	A	DE	no	yes	PN

Table 1: Main Section Table

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3.3.2 Additional Part Information (Field No. 9)

This field needs to be filled with the lasered Lot on the Wafer. This part of the lasermarking is unique for all wafers of a lot.

Separated by a #-delimiter the kind of the processed Wafer has to be notified:

U: Unmeasured Wafer

M: Measured Wafer

3.3.3 Quantity (Field No. 19)

In case of unmeasured wafer this is the quantity of wafer, in case of measured wafer this is the sum of all good dies.

3.3.4 Country of Origin (Fields No. 4 and No. 24)

The field Ordering Code (Field No. 4, Identifier 31P) of the Main Section DMC is used to carry the information Country of Origin as Bosch does not use this field as originally defined. There the code must be filled as ALPHA ISO 2.

The field Manufacturing Location in parallel to CoO as printed text (Field No. 24) may be misleading. In this case it must be defined with Bosch, which field shall be used as printed text. Generally, for packaged devices, for "Country of Origin", the country of assembly must be used.

The legal requirements for CoO for the receiving countries for the printed text must be followed in any case,

e.g. CoO for Taiwan when shipping to China: "Made in Taiwan"
when shipping to USA: "CoO / Made in TW"

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3.4 Wafer Data DMC

Processed Wafer need an additional Data Matrix Code to include wafer data. This DMC contains the following informations:

- Supplier-ID & Package-ID (same values as in the MAT-Label DMC)
- Wafer Data

3.4.1 Wafer Data Table

No.	Data Field	Proposals for field description	Definition / Description	Data Identifier	Length	Format N = Numerical, A/N = Alphanumerical, D =day, M = month, Y = year	Example	Machine-Readable Code 2D-Code Data Matrix Bosch	Printed Text Bosch
Logistic Information									
26	Supplier-ID		Supplier-ID, same value as Field No. 17 in MAT-Label DMC	V	Max. 10	A/N	777	yes	no
27	Package-ID		Package-ID, same value as Field No. 18 in MAT-Label DMC	3S	13	A/N	S20210708AXBA	yes	no
Wafer Information									
28	Wafer Data		%L as Lot-identifier Lot-ID (same as in Field No. 21. In MAT-Label DMC) %W as Wafer-Identifier Wafer-IDs w/o quantity of good dies, separated by commas Quantity by wafer assigned with #-sign	31T	Max. 297	A/N	Unmeasured wafer: %LSLOT2021 %W01,02,03,04, 05,06,07,08 Measured wafer: %LMAX2021 %W01#1234017, 02#1234027	yes	no

Table 2: Wafer Data Table

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3.5 Differences to Bosch-AE Instruction MAT-Label

3.5.1 Standard fields

Field No.	Data Field	Identifier	contents	comment
1.	Label Version	12S	"P002"	first sign "P" indicates additional DMC
4.	Ordering Code	31P	Country of Origin	required Country of Origin according ISO 3166-1 ALPHA-2 in DMC
9.	Additional Part Information	20P	Lasered Lot Delimiter # mark for measure : U : Unmeasured Wafer M : Measured Wafer	contents of this field may be used for additional data depending on product groups
15.	Shipping Note Number	16K	empty if not available at printing time	necessary for automatic booking

Table 3: Differences of Standard fields

3.5.2 Additional field

Field No.	Data Field	Identifier	contents	comment
24.	Country of Origin	-	Country of Origin	Two-digit value according to ISO 3166-1 ALPHA-2 only as printed value

Table 4: Additional Field for Processed Wafer

3.5.3 Second DMC for Wafer Data

Detailed description in chapter "3.4. Wafer Data DMC" .

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3.6 Changes to initial version

The initial version was part of the MAT-Label-Specification as addendum
 “MAT-Label for Processed Wafer Appendix to Bosch-AE Instruction” from 15.Oct.2019

Field No.	Data Field	Identifier	new	old	comment
1.	Label Version	12S	"P002"	"0002"	necessary due to essential changes; first sign "P" indicates additional DMC
4.	Ordering Code	31P	Country of Origin (two-digit value)	Ord. Code	required to include Country of Origin according ISO 3166-1 ALPHA-2
15.	Shipping Note Number	16K	empty field if SNN is unknown	"0" if SNN is unknown	alignment with spec for final tested devices
1.	Batch-No. #1	1T	Supplier Lot No. (without prefix "***")	prefix "***" to indicate second DMC	alignment with AE MAT-Label spec and spec for final tested devices
1.	CoO	-	printed (two-digit value)	-	required to include Country of Origin according ISO 3166-1 ALPHA-2

Table 5: Changes to initial version