The Global Language of Business

GS1 Germany

GS1 DQX - General information

Data quality service for product master data

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Summary of the document

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Change history

Version	Date of modification	Change Description
1.0	02.04.2020	Initial creation
1.1	24.06.2020	Update based on the changes in the document "Description of the Functionality of Data Quality Excellence (GS1 DQX)" in version 2.4
1.2	07.09.2020	Minor adjustments
1.2.1	23.11.2020	Notice that the correction period is suspended until further notice
1.2.2	21.10.2021	Minor adjustments
1.2.3	08.11.2021	Added missing listing - code value: "PRODUCT_LABEL_IMAGE"
1.2.4	11.02.2022	Removed chapter 2.3.2 Stop of transmission Minor adjustments
1.2.5	03.04.2025	Change of the contact address

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1 The GS1 DQX Data Quality Service

1.1 Background

Since 2017, GS1 Germany has been developing a centralized data quality service for product master data together with the Fast Moving Consumer Goods (FMCG) community, consisting of representatives from industry and commerce. Product master data that is made available via the Global Data Synchronization Network (GDSN) is to be validated in a standardized way via this data quality service. The basis for this validation is the scope of "Complete Master Data" (CMD) based on the attribute set of the German target market (FMCG profile), which has been agreed upon in the community. The data quality service will initially be applied to the food and near-food sector.

Product master data is validated by the GS1 DQX Data Quality Service in a two-stage validation process consisting of an automatic and a visual validation.

The automatic quality validation of the product master data with regard to completeness, correctness, consistency and plausibility is performed using standardized validation rules. This validation is comparable to the validation of the Data Quality Gate.

In addition, provided product master data, as far as these are consumer units from the food or near-food sector, are compared with the corresponding product images/artworks within the scope of a visual validation.

Based on the validation results of both, the data quality certification (GS1 DQX Certificate) is awarded, which reflects the data quality of the validated product. The GS1 DQX Certificate is transmitted to the data recipient as information. Data provider also receive a quality reporting, which provides detailed information about the quality as well as possible errors of the validated product master data. This information is provided with a CIN message (Catalogue Item Notification).

1.2 Benefits

The participation in GS1 DQX offers numerous advantages for data providers and data recipients.

Product master data that has been subjected to the central quality validation by GS1 Germany and awarded with a GS1 DQX Certificate is considered quality assured with regard to the validated attributes within the community. This centralized award of the data quality certification increases the acceptance of the data in the exchange between data providers and data recipients. This increased acceptance of the data leads to a significant reduction in the scope of bilateral agreements between data providers and data recipients, and also actively contributes to a significant reduction in the exchange of item passports.

Further information on the benefits of the GS1 DQX Service can be found on the GS1 DQX Website at www.gs1.de/dqx.

2 The GS1 DQX Data Quality Service Process

The basic process of the GS1 DQX Data Quality Service is illustrated in the figure below.
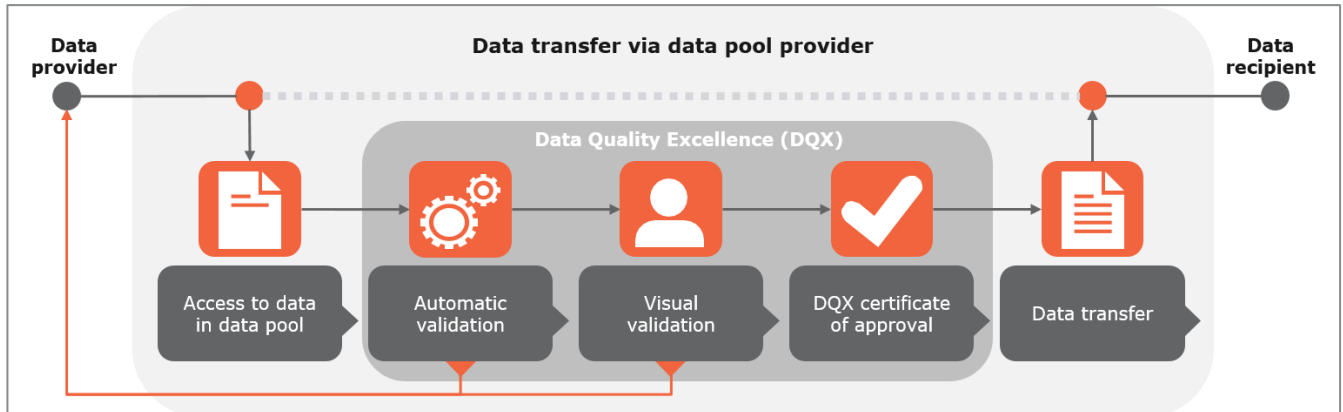

Figure 1: Process of the GS1 DQX Data Quality Service

For the provision of product master data to be verified by GS1 DQX, the standardized previous publication process via the GDSN will be retained.

After product master data has been published, it is automatically validated immediately and, if necessary, visually validated against the product images/artworks provided within a maximum of 72 hours. The GS1 DQX Certificate is awarded on the basis of this validation[1].

The individual steps of the GS1 DQX process are explained below. Particularly important notes are highlighted with the following symbols at the end of each chapter:

for the data provider   for the data recipient

What do data providers have to do?

To participate in the GS1 DQX Service, the data provider has to agree to the "General Terms of Use of GS1 DQX"[2].

2.1 Publishing product master data to GS1 DQX

Data publishing via the GDSN triggers the validation process.

The publishing of product master data to GS1 DQX is done via the GDSN standard process.

In the context of publishing, a distinction is made between an Initial Load for the publishing of inventory data and the regular publishing of new installations and changes/corrections to inventory items.

1. Initial Load:

   The Initial Load is used for the initial publishing of inventory data at the beginning of participation in GS1 DQX. Data published within the Initial Load is subject to automatic validation only.

2. Regular publishing:

   After completion of the Initial Load, newly created data (new installations) or changes/corrections to inventory data is automatically validated as part of regular publishing and subjected to a visual validation if relevant. It should be noted that visual validations are only performed for consumer units from the food or near-food sector.

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[1] See "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.

[2] "General Terms of use Data Quality Excellence (GS1 DQX)", available at *www.gs1.de/dqx*.

What do data providers have to do?

At the beginning of the data publishing, the notification about the start of the Initial Load as well as the type of publishing of product images/artworks is necessary. This message is sent to GS1 DQX.

If the data to be validated is already published to the German target market, no further step needs to be taken by the data provider. If it concerns so-called non-public items (for example own brands), which are published only to selected GLNs (Global Location Number), these data have to be published additionally to the GLN of the GS1 DQX Data Quality Service (4063319000006). A separate order confirmation in addition to the publishing is not required.

For the execution of visual validations during regular publishing, product master data as well as product images/artworks for corresponding items must be transferred to GS1 DQX.

2.2 Validation process

The GS1 DQX Validation Process consists two validation steps, an automatic validation and a visual validation. The automatic validation is based on standardized validation rules, the GS1 DQ standard and the FMCG validation rules. It essentially corresponds to the current version of the DQ standard and thus to the validation in the Data Quality Gate. This means that product master data of an entire product and packaging hierarchy (several Global Trade Item Numbers (GTIN) in connection) are validated.

The visual validation represents a comparison of the provided product master data with the corresponding product images/artworks (information on a consumer unit) provided by the data provider. This visual validation is performed exclusively for consumer units. Whether an item or product master data set is relevant/intended for the visual validation and is determined after the automatic validation is completed. If the product master data set is relevant for the visual validation, it will be performed subsequently. Whether a GTIN in terms of GS1 DQX is relevant for visual validation is decided based on the GPC class[3].

After completion of the validation process, a GS1 DQX Certificate per GTIN is calculated based on the validation results from the automatic and the visual validation[4]. In addition, the GS1 DQX Report is generated for the data provider. This report shows, among other things, detected errors/deviations within the data set, further data quality KPIs (Key Performance Indicator) and the certificate information of all validated GTINs[5].

What do data providers have to do?

To initiate the validation process, product master data must be provided to the GLN of the GS1 DQX Data Quality Service (4063319000006) or to the German target market. In addition, the provision of product images/artworks is a prerequisite for the execution of a visual validation.

2.2.1 Automatic validation

The automatic validation is based on standardized validation rules, the GS1 DQ Standard and the FMCG validation rules. It essentially corresponds to the current version of the DQ Standard and thus to the validation in the Data Quality Gate.

Depending on the type of publishing, the automatic validation of the product master data is carried out at different times. When using atrify's publishing (WebUI), the automatic validation takes place already during data entry. This has the advantage that any errors can be identified and corrected before publishing. If data is provided to GS1 DQX via an M2M connection, the automatic validation takes place after publishing.

All data providers have the option of using a free public interface of the Validation Service[6] to let their product master data automatically validated as part of a preliminary validation. It is recommended that all data provider use this pre-validation service and only publish and cerificate data that does not contain any errors in the automatic pre-validation.

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[3] See "GS1 DQX Validation Matrix", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[4] See "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[5] See "Manual for the GS1 DQX Report", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[6] See "Validation Service API – Specification", available in the atrify Download Center, at *http://www.atrify.com/kundenbereich/downloadcenter*.

What do data providers have to do?

In addition to providing product master data to GS1 DQX, data provider do not have to take any other measures to trigger a cerificate or automatic validation.

For the use of the public interface of the validation service for preliminary validations, data provider may have to adapt their systems accordingly.

2.2.2 Visual validation

After the automatic validation, product master data is validated against provided product images/artworks, provided that these are consumer units from the food or near-food sector. On the basis of Service Level Agreements (SLA), visual validations are performed after the data has been entered into the GS1 DQX Systems[7].

The basis for the visual validation of consumer units is the GS1 DQX Validation Matrix[8].

For a visual validation, product images/artworks with the code "VISUAL_VERIFICATION_IMAGE", "PRODUCT_IMAGE", "PACKAGING_ARTWORK" or "PRODUCT_LABEL_IMAGE" in attribute M379 "Referenced file type code" is required. Alternatively, the images/artworks can also be uploaded via GS1 DQX Upload[9].

The images/artworks must be suitable for visual validations. This is the case if all information required for the visual validation can be read by the visual inspector. Blurred images, reflections and distortions may lead to a termination of the visual validation. The GS1 DQX Data Quality Service is responsible for the decision on usability.

Within the GS1 DQX Data Quality Service, the visual validation of an item can be actively suspended by setting the attribute AVP "DQX Non Visual Validation" = "true"[10]. This is possible up to six weeks before "Start availability date time" by the data provider. It is strongly recommended to provide the product images/artworks for the visual validation directly via GDSN or via GS1 DQX Upload.

After agreeing to the "General Terms of Use Data Quality Excellence (GS1 DQX)"[11], GS1 DQX Support must be informed during onboarding whether access to GS1 DQX Upload is required for the provision of product images/artworks. If necessary, this will be provided by email.

A combined use of GDSN and GS1 DQX Upload is basically possible. **A combination of both methods for a single GTIN is not permitted**. The data provider thus defines a path for each GTIN.

What do data providers have to do?

The product images/artworks are to be provided via GDSN or via GS1 DQX Upload to GS1 DQX.

2.2.2.1 Requirements of a visual validation

After completion of the Initial Load, visual validations are performed, provided the following conditions are met. A distinction must be made between new installations and changes/corrections.

New installations

A complete visual validation is carried out for a new installation if the following conditions are met:

a. The GTIN provided is a consumer unit.

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[7] See "Service Level Agreement (SLA) for Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.

[8] "GS1 DQX Validation Matrix", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.

[9] For image provision, refer to chapter 1.4.2.1 of the documentation "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.

[10] See "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.

[11] "General Terms of Use Data Quality Excellence (GS1 DQX)", available at *www.gs1.de/dqx*.

b. The GPC of the GTIN to be validated lies within the GS1 DQX Validation Matrix[12] (food or near-food sec-tor).

c. The AVP "DQX Non Visual Validation" attribute is not set to "true".

d. The Initial Load (fourteen calendar days) is completed.

Changes and corrections

In the case of changes, at least one of the following situations must exist in addition to the above-mentioned prerequisites:

a. A change is made to an attribute relevant to visual validation.

b. Product images/artworks of a data set with the GS1 DQX Certificate FAILED are added, deleted or ex-changed via GDSN.

c. Product images/artworks of a data set are added or exchanged via GS1 DQX Upload.

d. The GPC brick of the affected data set is changed and the new GPC brick of the data set is relevant for visual validation.

<u>No</u> visual validation is triggered:

a. If only product images/artworks of a data set with the GS1 DQX Certificate PASSED are added, deleted or exchanged via GDSN[13].

b. If only changes are made to attributes that are not relevant for visual validation and at the same time a result of a previously performed visual validation is available, this also applies to inventory items.

c. If changes have been made to visual validation-relevant attributes, but the AVP attribute "DQX Non Vis-ual Validation = true" is set.

2.2.3   GS1 DQX Certificate Assignment based on the validation results

Certificate information including the GS1 DQX Certificate is issued on a GTIN basis. All data sets provided are automatically validated, regardless whether it is a consumer unit or a food or near-food item. But only GTINs that originate from the food or near-food sector and represent a consumer unit are subject to visual validations.

The GS1 DQX Certificate is calculated based on the results of the automatic and the visual validation. The calculation of the GS1 DQX Certificate is based on a defined certificate logic[14].

What do data providers have to do?

On receipt of the PENDING status, the data provider has to check whether any additional images/art-works need to be provided.

Upon receipt of a GS1 DQX Certificate with the cerificate information FAILED, the affected product master data must be processed by the data provider or the errors in these data sets must be corrected. The GS1 DQX Report serves as a basis and support for this action. This report is made available to the data provider by GS1 DQX after the certificate has been applied. After existing errors have been cor-rected, the product master data set must be made available to GS1 DQX again so that it is validated again. All inquiries should be directed to GS1 DQX Service Support[15].

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[12] GS1 DQX Download Center: "GS1 DQX Validation Matrix", available at
https://www.gs1-germany.de/gs1-solutions/stammdaten/produktdatenmanagement/download-center/.
[13] See figure 12 and 13.
[14] See "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[15] Contact the GS1 DQX Support at *www.gs1.de/dqx*.

2.3 Data transfer

2.3.1 Enrichment of product master data with certificate information

If certificate information are available after product master data has been validated, they are transmitted to data recipients via enriched technical messages (CIN)[16].

CIN messages are enriched with the following content, if available:

- Result of automatic validation and corresponding date (1)
- Result from visual validation and corresponding date (2)
- Calculated GS1 DQX Certificate based on validation results (1 + 2) and corresponding date
- Error messages from visual validation at attribute level (if relevant)

If, after the data has been extracted, validation results or certificate information are supplemented or subsequently changed (e.g. following a complaint by the data provider or recipient), the updated certificate information are also extracted via a CIN message to the data recipient.

Enriched CIN messages enable the data recipient to take the results of the certificate into account in his internal systems.

For the enrichment of CIN messages, data pool operators technically implement the GS1 DQX Functionality[17] for their data recipients.

What do data recipients have to do?

The data recipient's participation in GS1 DQX is required to receive certificate information. For this purpose, the data recipient informs his data pool operator that the GS1 DQX Data Quality Service should be activated for him. The data recipient accepts the functionality agreed for GS1 DQX[18].

To read the certificate information from the CIN message, adjustments to the systems of the data recipient may be necessary.

What do data providers have to do?

Data that has received the certificate information FAILED must be corrected by the data provider and made available completely free of errors.

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[16] See "Description of the Functionality of Data Quality Excellence (GS1 DQX)", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[17] See ibid.
[18] See ibid.

2.4 GS1 DQX Reporting

All participating data providers receive a GS1 DQX Report. The report will be delivered as an Excel file in a Zip archive via email. The reports are sent weekly and on specific occasions, provided that a visual validation has been carried out. The weekly dispatch is always carried out until Tuesdays, the dispatch of the event-related report is carried out on the following working day (Mondays to Fridays) after at least one visual validation has been carried out or new data has been received in the GS1 DQX Systems. For both reports the national/NRW-wide holidays and regional custom days in Cologne are excluded. In this case the report will be sent on the next regular working day.

All GTIN-related certification and error information are communicated via this reporting. It also contains a consolidated view of relevant KPIs[19].

The same notification channel is used to provide information on release notes, changes to DQ validation rules and new GS1 DQ standards.

What do data providers have to do?

When ordering GS1 DQX, an email address for delivery of the GS1 DQX Reporting must be provided by the data provider.

What do data recipients have to do?

Data recipients can also register an email address with GS1 DQX Support so that they can receive this information via email.

2.5 Billing and pricing model

Visual validations performed within a calendar month are invoiced monthly. The invoice is sent as an e-bill to the data provider. The biller is GS1 Germany. The data provider is provided with itemized proof of his visual validations via the GS1 DQX Report.

The price model of the certification service covers all costs of the GS1 DQX Data Quality Service for the data provider. All services provided by GS1 Germany or subsidiaries follow the "not-for-profit" maxim. The prices are based on the total costs of the underlying business case for GS1 DQX, which covers the expenses for (further) development, operation and execution of the service.

The specific modalities and costs can be found in the "General Terms of Use Data Quality Excellence (GS1 DQX)"[20]. Itemized records for invoice verification are added monthly in the GS1 DQX Report ("Billing Details").

What do data providers have to do?

By ordering GS1 DQX, an invoice recipient must be specified.

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[19] See "Manual for the GS1 DQX", available in the GS1 DQX Download Center, at *www.gs1.de/dqx*.
[20] "General Terms of Use Data Quality Excellence (GS1 DQX)", available at *www.gs1.de/dqx*.

3   The GS1 DQX Support

Support is available to all participants for questions regarding the introduction or implementation of GS1 DQX, but also for complaints about validation results or invoices.

GS1 DQX Support can be reached at the following contact information:

Phone	+49 221 94714-690
email	*dqx-support@gs1.de*

The service times are:

Monday - Thursday	08:30 - 16:30
Friday	08:30 - 14:00

Exceptions are nationwide/NRW-wide holidays and regional custom days in Cologne.

4 The GS1 DQX Process Clearing Organization

The GS1 DQX Process Clearing Organization is the management organization for the GS1 Data Quality Excellence (DQX) Data Quality Service, GS1 DQX PCO forshort.

It consists of the following organizational units:

- GS1 DQX Decision-making group

- GS1 DQX Expert Group

- GS1 DQX

Organizational units	Main tasks
Decision-maker group GS1 DQX	- Highest escalation authority for the decision of disputed cases - Taking over the tasks of the Alignment Team of the program "Complete Master Data" (CMD) - Processing of comprehensive topics on the GS1 DQX Data Quality Service - Processing and decision preparation of strategic topics
Expert group GS1 DQX	- Processing of disputed cases as escalation instance - Checks, processes and decides on operational issues with a focus on visual validation
GS1 DQX	- Execution of the operational business of GS1 DQX - GS1 DQX decides on validation issues, defines validation rules and validation structures - Organizes the review of these decisions by the GS1 DQX PCO - Process Owner of the GS1 DQX Process Clearing Organization Process

Figure 2: Overview of the structure and main tasks of the GS1 DQX Process Clearing Organization (GS1 DQX PCO)

The main task of GS1 DQX PCO is to ensure that the GS1 DQX Data Quality Service is carried out at all times in accordance with the agreed SLAs.

Organizational governance is described in the separate document "GS1 DQX PCO Manual". The process steps are also described in a separate document "GS1 DQX PCO Process Manual".

Adaptations to standards and validation rules of any kind are NOT the task of the GS1 DQX PCO. These take place in the structures and committees of GS1 Germany.

Glossary

A

Automatic validation · *Automatic data verification according to defined validation rules*
AVP DQX Non Visual Validation · *Is used to suspend a visual validation of visual validation-relevant items up to six weeks before availability start date*

C

Certification logic · *Logic on the basis of which the GS1 DQX Certificate is calculated from the results of the automatic and visual validation*
CIN message · (*Catalog Item Notification) This message contains the information on the respective master data that the data provider records*

G

GS1 DQX · *Data quality service "GS1 Data Quality Excellence" for valdidating product master data in the GDSN*
GS1 DQX PCO · *Management organization for the GS1 Data Quality Excellence data quality service*
GS1 DQX Validation Matrix · *The GS1 DQX Validation Matrix can be used to compare GPC classes with visual validation-relevant attributes. This enables an analysis of which items are visually validated and to what extent. In addition, the document provides information about the type of visual validation and establishes a reference to legal requirements*

I

Initial Load · *The period of time during which a new GS1 DQX subscriber (data provider) provides their inventory data to the service so that they are excluded from an initial visual validation*
Inventory data · *Data provided to GS1 DQX in the Initial Load excluded from visual validation as long as no change has been made to an attribute relevant to visual validation*

R

Regular publishing · *The period of time after completion of the Initial Load in which GS1 DQX participants (data provider) provide new installations and changes/corrections to inventory data to the service so that they are fully validated*

V

Visual validation · *Check/comparison of visual validation-relevant attributes in the data set against provided image material*

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Publisher:
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Managing Director:
Thomas Fell

GS1 Germany GmbH

Stolberger Str. 108 a, D-50933 Cologne, Germany

P.O. Box 30 02 51
D-50772 Cologne

T +49 (0)221 94714-0
F +49 (0)221 94714-990

E info@gs1.de
www.gs1-germany.de

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