

Traceability of components within the utility sector

Document information

The intend of this document is to lay out the general guidelines for marking traceability information on products used in the utility sector on a transnational level. The content is based on the experiences achieved though the traceability development project, carried out by several Danish water utility compagnies.

The document should allow the reader to understand the basic principles of the project and act as a decision basis for future contribution to the project.

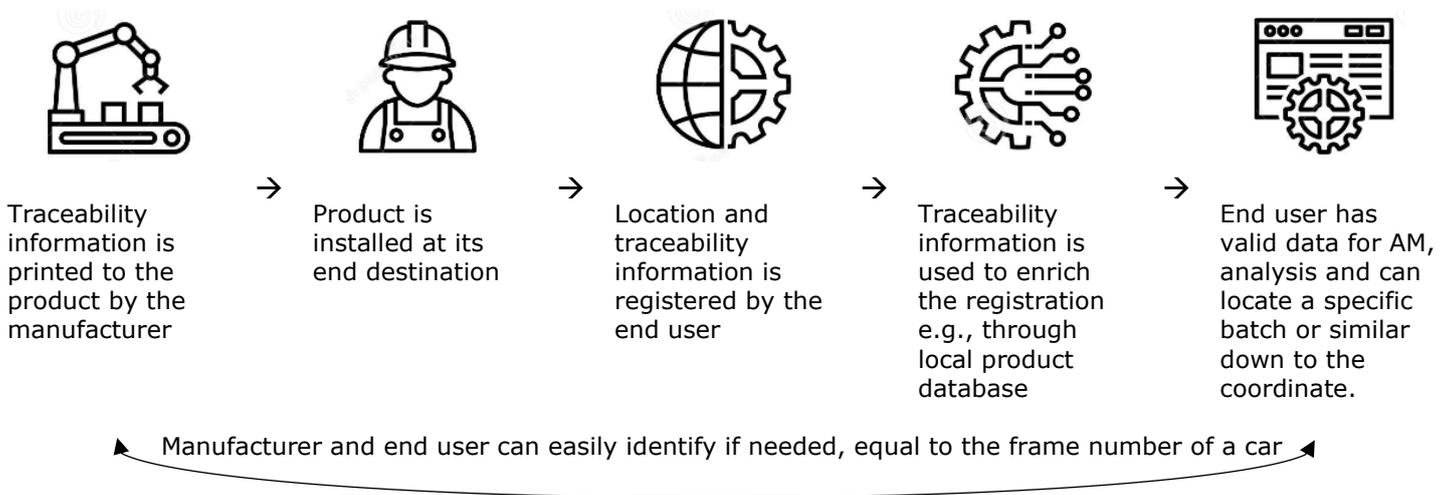
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1. Foreword

To support the digitalization of the drinking and wastewater sector, the need for a secure and efficient way to obtain key information of used products is present. By applying key information, in a standardized language and digital readable way, the end-users will be able to achieve the benefits of a more complete registration of their assets. Identification of an assets down to the individual batch or unique id at its specific coordinate, will benefit the end user by:

- Delivering valid and detailed data for Asset Management
- Allowing full traceability, manufacturer-to-field e.g., in relation to drinking water quality
- Facilitating automated registration process for network components

2. Workflow manufacturer to end user



By delivering a product with a digital readable traceability information printed to it, the manufacturer allows the end user to easily collect this information along with the coordinate of the installation by using a smartphone, tablet, or GPS-unit.

The traceability information is then used to add additional information, by referring the EAN number to a local product database. In a Danish term, a product database as "Branchehuset" allows the utility company to collect product specific information through an API.

A full registration of both manufacturer, product type, material, dimension, batch number etc. can then be stored into the utilities own network database.

The utility company can from here used the complete registration for well-founded Asset Management, valid documentation, and unique reference back to manufacturer if needed.

3. Digital content

The traceability information must enable the end user to identify:

- The manufacturer
- The type of product
- The batch or unique serial number.

The language of the information must be identical across manufacturer, to allow an optimal registration process in the field.

The GS1 standard is a worldwide accepted system and will in most cases be known to the manufacturer. The GS1 standard provides a set of application identifiers (AI), which makes it possible for a scanner software to identify specific data fields. This will allow the manufacturer to fulfil more demand by the same code, hence each end user will be able to pick the wanted information from the code string.

A minimum content of a code should be as shown in the table below:

Information	AI-Code	Data content
Manufacturer and type of product	01	GTIN number
Traceability (one or more of the listed)	10	Batch og lot number
	11	Production date
	21	Serial number
	8008	Production time

Additional information such as customers order number (AI=400), dimensions (AI=31-36) or expiry (AI=15), can freely be added to the code e.g., to comply with transportation information, without interrupting with registration process for the end user.

To contain the needed amount of information, a 2D-barcode is suggested as barcode type, e.g., the DataMatrix symbology. The standards ISO/IEC 16022 should in this case be respected. Other machine-readable representations could be used, the DataMatrix has however shown to have a low cost of implementation and a decent durability.

4. Physical design

The code should be printed or labeled to the product in a manner that sustains the readability of the code, during the different handling processes from production to final installation.

The readability of the code can be improved by increasing the size of the code. Sizes as low as 10x10 mm has shown to be readable at approx. 50 cm. The design and size should also take the shape of the product in consideration, as a large code on a small and round surface can make the code curved and complicate the registration.

The contrast between the color of the code itself, and the color of the background, will have a significant factor to the readability.

5. Partners

The work described in this document has its origin from a development project at Herning Vand, a Danish utility company, in cooperation with several partners within the water and sewage sector in Denmark.

Among these partners NPG Nordic, Wavin and Uponor has been the main contributors with their experience and insight from the manufacturing segment.

Several other partners have provided knowledge within their own field. References to these and additional information can be obtained through the contacts below.

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