

## Note: 000106

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### Overview

Number	000106
Description	Hydrogen Quantity Conversions - QuantityWare Development Strategy
Version	01 from 02.02.2022
Status	Released to Customer
Language	EN
Responsible	John Mantle & Markus Seng
Product	BCS
Category	Documentation

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### Symptom

In the near future, a strongly increasing demand for hydrogen production, transportation and storage is expected.

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### Cause

QuantityWare BCS supports all bulk product quantity conversions in SAP Oil & Gas. **Hydrogen quantity conversions** have not been in scope of BCS so far; however there is an increasing demand for such calculations, as expressed by the [Hydrogen Council](#) – “a global CEO-led initiative of leading companies with a united vision and long-term ambition: for hydrogen to foster the clean energy transition for a better, more resilient future”, many major leading Oil & Gas companies already participate in this council and will play a decisive role therein in the coming decades.

The idea of a [hydrogen economy](#) is the guiding principle here; however, “as of 2019, hydrogen is mainly used as an industrial feedstock, primarily for the production of [ammonia](#) and [methanol](#), and in petroleum refining (hydrogen cracking).”

Thus, the oil and gas industry already has a strong process knowledge on hydrogen production and “in-house” consumption, which requires quantity conversions for hydrogen (and ammonia) in existing SAP ERP systems too.

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## Solution

Concerning hydrogen, an [ideal gas solution is already available to all BCG](#) customers.

For [hydrogen transportation and storage](#), three main options are in discussion, or currently utilized by the industry:

1. High-pressure storage & transportation in the gaseous form - **HPH**
2. Very low temperature storage & transportation in the liquid form - **LDH**
3. Hydride-based storage in the solid or liquid form – Liquid hydrogen carrier (LHC) technology - **LHC**

**The following four development phases have been defined by QuantityWare:**

1. Development Phase LHC 1 – Liquid Hydrogen Carriers - completed Q1 2022 - anhydrous ammonia solution
2. Development Phase HPH 1 – High pressure hydrogen gas calculations – volumes and masses - planned delivery Q3 2022
3. Development Phase LDH 1 – Low temperature Liquid hydrogen calculations- planned delivery - t.b.d. - depending on specification requirements
4. Development Phase HPH 2 – High pressure hydrogen gas calculations – energies and other enhancements - planned delivery Q2 2024
5. Development Phase LHC 2 – Liquid Hydrogen Carriers - planned delivery - t.b.d. - depending on specification requirements

QuantityWare first focuses on the development of a **high-pressure hydrogen quantity conversion solution**, as storage (and transportation) of hydrogen under high pressure is already utilized on a global scale and can be expanded with the lowest capital investment (e.g. usage of existing natural gas pipeline capacities).

Very low temperature hydrogen processes are currently not in scope of this development, as the storage hydrogen in the liquid form is being [reserved for certain special applications, in high-tech areas such as space travel](#) and [first experimental applications](#); like LNG, this will require a dedicated measurement standard to implement quantity conversion calculations, which to our knowledge is not available yet (Q1 2022).

If customers and consulting partners provide detailed requirements for such liquid hydrogen calculations, these requirements will be analyzed (feasibility) and then utilized as basis for the **QuantityWare BCG hydrogen development phase LDH 1**.

For **LHC** processes, the same argument is currently true, with the exception of anhydrous ammonia (which is [considered as potential large scale Liquid Hydrogen Carrier](#)): For anhydrous ammonia, ASTM D1250 special applications quantity conversions are one [suggested approach from QuantityWare](#) – and an AD (Advanced Development) of a measurement data-based anhydrous ammonia solution is also made available in Q1 2022 as a result of a fast **development phase LHC 1** – [see Note 000101](#) for details.

*Final note: All HPH and LDH Hydrogen implementations will become part of BCG. Hydrogen will appear as a new product in the BCG usage questionnaire. LHC implementations will become part of BCP.*

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## Transport Reference

No SAP-based transport

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## Validity

SAP Release	From SP	To SP	In SP Shipment
ECC600	BCS 3.0 CSP02		
S/4 HANA	BCS 3.0 CSP01		