

Note: 000106

Overview

Number	000106
Description	Hydrogen Quantity Conversions - QuantityWare Delivery & Development Strategy
Version	05 from 21.04.2023
Status	Released to Customer
Language	EN
Responsible	John Mantle & Markus Seng
Product	BCS
Category	Documentation

Symptom

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

Cause

QuantityWare BCS supports all bulk product quantity conversions in SAP Oil & Gas. **Hydrogen quantity conversions are part of this support.** 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; however, “as of 2019, hydrogen is mainly used as an industrial feed stock, 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.

Solution

NOTE: Concerning hydrogen blended natural gas, read the [FAQ Natural Gas / Hydrogen Blending Support](#). Basically, natural gas / hydrogen blends are already fully supported.

For [100% hydrogen transportation and storage](#), three main options are in discussion, or currently utilized by the industry:

1. High-pressure storage & transportation as a gas - **High Pressure Hydrogen - HPH**
2. Very low temperature (< -250 °C) storage & transportation as a liquid - **Liquefied Hydrogen - LDH**
3. Hydride-based storage as a liquid – **Liquid Hydrogen Carrier technologies - LHC**

The following five developments have been defined by QuantityWare, two have already been completed & delivered:

1. Development LHC 1 – Liquid Hydrogen Carriers - completed and released Q1 2022 with [note 000102](#) - anhydrous ammonia solution
2. Development HPH 1 – High Pressure Hydrogen gas calculations – volumes and masses - completed and released Q3 2022 with [note 000100](#)
3. Development HPH 2 – High Pressure Hydrogen gas calculations – energies and other enhancements - t.b.d. - depending on HPH 1 feedback and additional requirements
4. Development LDH 1 – Low temperature Liquefied Hydrogen calculations - planned delivery - t.b.d. - depending on specification & requirements
5. Development LHC 2 – Liquid Hydrogen Carriers - planned delivery - t.b.d. - depending on specification & requirements

QuantityWare first focused on the development of a **high pressure hydrogen (HPH) quantity conversion solution**, as storage (and transportation) of hydrogen under very high pressure (up to 700 bar and above for storage) 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).

Demand for liquefied hydrogen processes is currently very low; the storage of 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 (Q2 2023).

If customers and consulting partners provide detailed requirements for **LDH** calculations, the 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 available since 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.

Transport Reference

No SAP-based transport

Validity

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