Note: 000106

Overview

Number	**000106**
Description	**Hydrogen Quantity Conversions - QuantityWare Delivery & Development Strategy**
Version	**07 from 02.01.2024**
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 - **H**igh **P**ressure **H**ydrogen - **HPH**
2. Very low temperature (< -250 °C) storage & transportation as a liquid - **L**iquefie**D** **H**ydrogen - **LDH**
3. Hydride-based storage as a liquid – **L**iquid **H**ydrogen **C**arrier technologies - **LHC**

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

1. Development LHC 1 – Liquid Hydrogen Carriers I - 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 in Q3 2022 with note 000100
3. Development HPH 2 – High Pressure Hydrogen gas calculations – energies and other enhancements - HPH 1 feedback and additional requirements feedback phase - planned delivery in Q4 2025 - next CSP
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 II - 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 (Q4 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		