

Note: 000101

Overview

Number	000101
Description	Measurement Standards - Development Planning
Version	08 from 13.04.2023
Status	Released to Customer
Language	EN
Responsible	Markus Seng
Product	BCS
Category	Documentation

Symptom

QuantityWare develops implementations of petroleum and natural gas measurement standards delivered within the BCS solution. [Measurement standard organizations](#) issue and constantly update/revise standard documents via a defined revision and balloting process - typically every 5 to 10 years.

QuantityWare keeps track of existing standards changes and continuously monitors appropriate sources for new standards, thereby extending the portfolio of [supported measurement standards for BCS](#).

In this note, we list all measurement standards which are under consideration for addition into the supported standards portfolio, or have been revised and require additional developments.

Read the [FAQ New Development](#) for additional information.

Cause

Development planning.

Solution

The following measurement standards **are being added** into the BCS supported standards portfolio:

1. High pressure hydrogen quantity conversions: Although a complete and well defined measurement standard defining all required quantity conversions - including a precise implementation instruction - for such calculations is currently not available, QuantityWare is planning - in response to strong industry demands - to deliver a basic solution for 100% high pressure hydrogen gas - considering hydrogen density and compressibility factors as defined in **J. Res. Natl. Inst. Stand. Technol. 113, 341-350 (2008) - Revised Standardized Equation for Hydrogen Gas Densities for Fuel Consumption Applications**.
This solution is available as an [advanced development \(AD\)](#) in Q3 2022. See [Note 000106](#) which explains the QuantityWare Hydrogen Quantity Conversion Development Strategy. With the [next BCS CSP](#), the related template configuration will also be delivered.
2. In order to enable the calculation of compression factors and gas law deviation factors based on the SGERG equation also at higher hydrogen content of [hydrogen - natural gas mixtures](#), the existing algorithm has been modified. This new equation is denoted [SGERG-mod-H2](#). An implementation of SGERG-mod-H2 will be shipped with the [next BCS CSP](#),
3. Anhydrous ammonia (NH₃): a [national standard document](#) from [Measurement Canada](#), based on experimental data, is available for the liquid phase product – the experimental data is defined in “The Thermodynamic Properties of Ammonia, by L. Haar and S.J. Gallagher, Journal of Physics Chemistry Ref. Data, Volume 7, No. 3, 1978.” – One [solution is available based on a ASTM D1250-04 regression analysis](#) of this data. QuantityWare delivered a second solution, which utilizes all VCF table values of this national standard, as an [advanced development \(AD\)](#) in Q1 2022. See [Note 000106](#) which explains the QuantityWare Hydrogen Quantity Conversion Development Strategy. With the [next BCS CSP](#), the related template configuration will also be delivered.
4. AGA Report No. 8 - Part 2 - Thermodynamic Properties of Natural Gas and Related Gases GERG–2008 Equation of State - April 2017: Provides technical information necessary to compute thermodynamic properties including compressibility factors, densities, speeds of sound, and dew and bubble points for natural gas and related gases. It is based on the research performed at the Ruhr University in Bochum, Germany, and published in 2006 as the doctoral dissertation of Oliver Kunz under the direction of Prof. Dr.-Ing. Wolfgang Wagner.
An implementation of the GERG-2008 equation will be made available with the [next BCS 3.0 CSP - BCS 30B-02 / BCS 30A-03](#), together with new BCG template conversion groups.
5. Brazilian Standard [RESOLUÇÃO ANP No 894 - 2022](#) - replacing C.N.P. No. 6 – 70, Table I & II [MINISTÉRIO DAS MINAS E ENERGIAS, CONSELHO NACIONAL DO PETRÓLEO, 1521. ^a SESSÃO ORDINÁRIA, (25 de junho de 1970) RESOLUÇÃO No 6 – 70, TABELA I,II] - As described in [note 000113](#), the current extent of BCP support is a Table II, algorithm based, implementation. This implementation will be extended to support Table I density corrections - both algorithm based and for hard coded table values. Since this now newly reconfirmed national Brazilian standard are the [printed table values](#) (as e.g., ASTM D1250-1952 Table 6), a complete validation of the formula

based approach against the all table values is required as part of this development. This solution is planned to be available as an [advanced development \(AD\)](#) in Q3 2023 - more than 200 000 table values need to be validated, computerized and tested during this development. With the [next BCS CSP](#), the related template configuration will also be delivered.

NOTE: With [RESOLUÇÃO ANP No 894 - 2022](#), RESOLUÇÃO No 6 – 70 has been revoked, and technically been put into force again. No changes to the 1970 Tables 1 and 2 content and description have been made. Thus, from an implementation point of view, the documentation of this new implementation will refer to it as [RESOLUÇÃO ANP No 894 - 2022 / RESOLUÇÃO No 6 – 70](#), whereas the technical implementation continues to utilize RESOLUÇÃO No 6 – 70 / CNP 6 - 70 as technical ID (e.g. ABAP programs).

The following measurement standards **have been revised** and require additional developments:

1. ISO 6976: The third edition of the standard “ISO 6976 Natural gas – Calculation of calorific values, density, relative density and Wobbe indices from composition” was issued in 2016. Through technical revision, it cancels and replaces the second edition from 1995. As stated in the third editions’ introduction, adoption of the revisions detailed in this standard will not be without cost, as instrumental (and ERP business) software will need updating. QuantityWare has carefully analyzed this third edition. The major technical changes are:
 - a. New method to calculate ideal and real molar-based calorific value and thus subsequent calorific values (mass and volume based)
 - b. Introduction of net Wobbe index
 - c. New component data (n-dodecane, n-tridecane, n-tetradecane, n-pentadecane)
 - d. Completely updated physical property data and auxiliary constants
 - e. Harmonization with GPA 2172 and related U.S. customary based standards – Provision of different reference pressures in all formulas of ISO 6976.
This new version will be made available with [the next BCS 3.0 CSP - BCS 30B-02 / BCS 30A-03](#).
2. ABNT NBR 5992: This standard has been revised and published in November 2016 as ABNT NBR 5992 (2016). QuantityWare has carefully analyzed this latest version. The basic formulas for calculation of the alcohol densities and mass proportions did not change when compared with the 2008 version; however, the definition of the volume correction factor (VCF) changed between the 2008 and 2016 version. The 2008 version requires the multiplication of the densities related VCF with the expansion coefficient of stainless steel (0.000036 / °C). The 2016 version does not contain this storage device correction any longer. Thus, a new MQCI implementation of ABNT NBR 5992 (2016) has been delivered by QuantityWare as an Advanced Development (AD) in Q2 2022 - see [QW Note 000108](#). With the [next BCS CSP](#), the related template configuration will also be delivered.

Transport Reference

No SAP-based transport

Validity

SAP Release	From SP	To SP	In SP Shipment
ECC600	ALL	ALL	
S/4 HANA	ALL	ALL	

