Bulk Calculations – Gas
BCG 3.0

Project Assessment and Implementation
Guidelines (PAIG)

Notes

The latest version of this documentation can be found in the QuantityWare [Knowledge Base](#). All documentation is kept current for the combinations of latest BCS release with the latest supported SAP Oil, Gas, & Energy release. For all currently supported combinations see [Note #000086 "Support and Release (Lifecycle) details" page 2, "Release Lifecycle"](#).

Your release level can be determined via:

"/o/QTYW/COCKPIT" -> "Cockpit" -> "Support Package Level"

Version History

Version	Date	Description
00	2017-03-31	Initial Release
01	2017-11-11	S/4HANA 1709 validity added
02	2019-02-17	S/4HANA 1809 validity added
03	2019-11-20	S/4HANA 1909 validity added
03	2020-07-11	Editorial update
04	2021-09-24	S/4HANA 2020 / 2020_EX validity confirmed Modern QW document style applied 30A CSP02 / 30B CSP01 changes
05	2023-11-01	30A CSP03 / 30B CSP02 changes

Contents

1. Introduction

This document describes the proven QuantityWare project methodology that enables technical consultants to successfully design and configure quantity conversion solutions that run in an SAP Oil, Gas, & Energy ERP system. This methodology reflects the logical structure of the Gas Measurement Cockpit (GMC), whose design in turn was influenced heavily by the methodology.

The GMC is the single access point for measurement specialists and technical consultants to the QuantityWare BCG solution. Here you design, monitor, maintain and enhance complex, measurement standard based quantity conversion implementations that run within the SAP Oil, Gas, & Energy ERP system. The GMC provides an easy-to-use user interface (UI), which is structured so that measurement experts and technical consultants can organize their work efficiently.

The methodology is called **Project Assessment and Implementation Guidelines**, or "PAIG" for short. The methodology is intended for medium to very complex requirements and/or large-scale implementations (e.g., cross country, complex product portfolio, etc.), but should also be consulted for apparently easy quantity conversion implementations.

You should always apply the methodology as a check list for your SAP Oil, Gas, & Energy quantity conversion implementations. By combining the PAIG methodology with the BCG QuantityWare template configuration, you will be able to obtain a maximum return on investment as Quantity conversion set-up is an important part of any SAP Oil, Gas, & Energy implementation project (new installation or upgrade/change project). It should be carefully planned and is typically the first project step before business process implementation can start. This is due to the fact that all processes are based upon a working and well-defined quantity conversion setup and product/material master definition.

Rough implementation time estimates are made for individual steps described in this methodology. Since quantity conversion requirements may vary dramatically for different projects (e.g., number of products and standards to be supported, process integration with respect to the configurable QCI user interface, rounding requirements for calculation models and target quantity values etc.), three new installation project cases are defined in this document in the following chapter to help support the different kinds of SAP Oil, Gas, & Energy implementation projects.

1.1. Project Complexity Cases - New Installations

1.1.1. Low Complexity Quantity Conversion Project

- Low pressure natural gas / hydrogen scenario - pipeline

- Make fast decisions on relevant measurement standards

- One country / similar countries with respect to measurement standards

- No legacy quantity conversion solution to be mapped

- Use QuantityWare template conversion groups (copy) with predefined model algorithm

- Use QuantityWare template reading groups (copy) with no changes to entries

- 1 to 3 natural gas conversion groups required

- Use QuantityWare range checks with predefined parameters – define and maintain ranges

- Use SAP & QuantityWare UoM template without changes

- Define manual test scenarios (effort then spreads to software life cycle)

1.1.2. Medium Complexity Quantity Conversion Project

- High pressure natural gas or hydrogen scenario – pipeline or LNG shipment scenario (loading & discharge at LNG terminals)

- Spend limited time to make decisions on relevant measurement standards

- One country / similar countries with respect to measurement standards

- No legacy/complex contractual quantity conversion solution to be mapped

- Use QuantityWare template conversion groups (copy) with predefined model algorithm

- Use QuantityWare template reading groups (copy) with changes to entries (e.g., descriptions, remove or add parameters)

- 1 to 3 natural gas / hydrogen or LNG conversion groups required

- Use QuantityWare range checks with additional parameters – define and maintain ranges

- Use SAP & QuantityWare UoM template and define new UoM

- Define specific UoM rounding

- Define automated test scenarios (effort reduction for software life cycle)

1.1.3. High Complexity Quantity Conversion Project

- High pressure natural gas or hydrogen scenario – pipeline or LNG shipment scenario (loading & discharge at LNG terminals)

- Spend considerable time on decision making for complex measurement standards situations (customer specific requirements, legal requirements)

- Many countries / differences with respect to measurement standards

- Legacy quantity conversion solution to be mapped or complex contractual requirement with respect to quantity conversions to be considered

- Use QuantityWare template conversion groups (copy) but change/enhance predefined model algorithm

- Use QuantityWare template reading groups (copy) with changes to entries (e.g., descriptions, remove or add parameters)

- 3 to >5 conversion groups required for natural gas / hydrogen and LNG process steps

- Use QuantityWare range checks with additional parameters – define and maintain ranges

- Use SAP & QuantityWare UoM templates and define new UoM

- Define specific UoM rounding for SAP / QW UoM and own new UoM

- Define automated test scenarios (effort reduction for software life cycle)
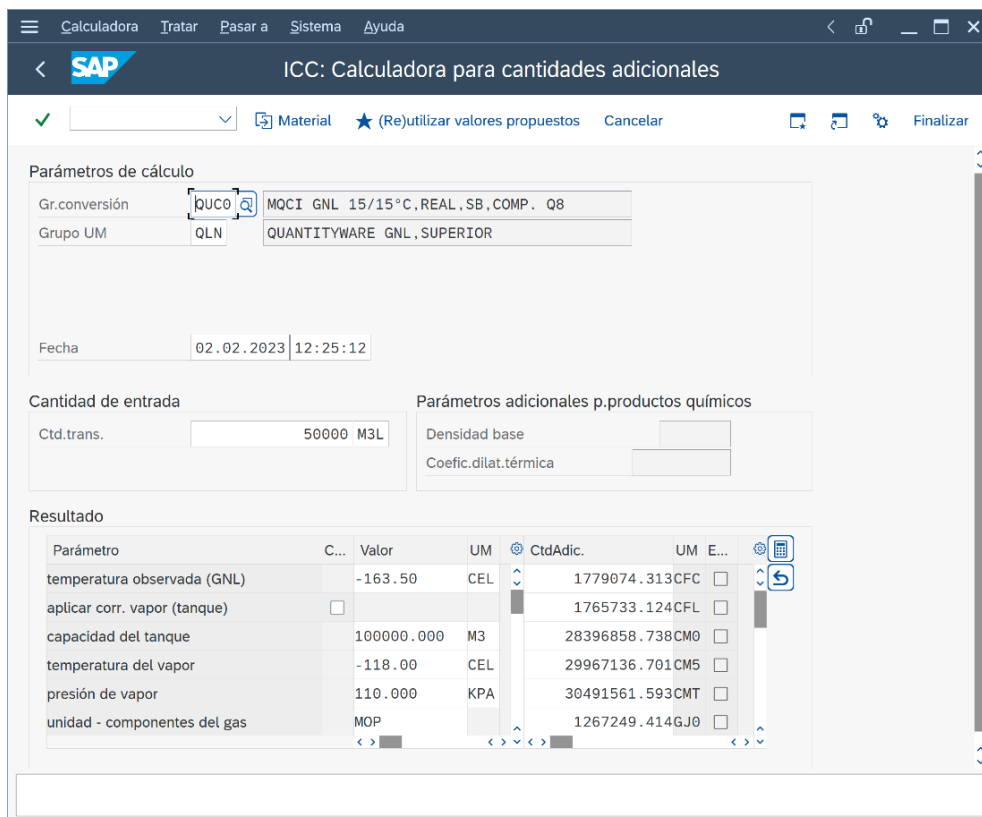
1.2. Project Complexity - Legacy Implementations

If you are implementing BCG into a productive landscape, see summary of this document for rough estimates.

2.   Language Support

With BCG, QuantityWare ships all UI relevant and language-dependent customizing template entries in four languages (listed in alphabetical order):

- English

- French

- Portuguese

- Spanish

Thus, all Unit of measure (UoM) definition texts, all 500+ conversion groups, more than 5000 reading group and range group entries (descriptions and parameter texts) are available in these four logon languages. The Gas Measurement Cockpit UI itself is only available in English. Thus, you should do the initial configuration work in English and make the final tests in your preferred language, as shown here for conversion group QUC0 – LNG in Spanish:

More details can be found in the BCG Reference Manual.

3.   Prerequisites

- You have concluded a usage agreement for BCG and the technical implementation of QuantityWare BCG has been completed successfully

- The appropriate BC set /QTYW/BCG_<30A/B/*> has been applied to client 045 (or equivalent client if client number 045 is already in use for other purposes)

- Composite Role Y_QTYW_CR_ALL must be assigned to your user to be able to work with the Gas Measurement Cockpit

- You have successfully executed the BCG installation test, which is the last post installation step described in the BCG Technical Installation Guide

Per system, the technical installation should take:

- Study documentation: 2 hours

- Package and CSP download: 15 minutes (one time for all systems)

- Installation via SAINT: 15 minutes

- Template client-copy from 000:   30 minutes to 2 hours (system speed dependent)

- Template BC sets distribution: 30 minutes

- QuantityWare installation test: 15 minutes

In total, 3-6 hours per system.

4.   Overview

As noted above, these guidelines are aligned around the QuantityWare Gas Measurement Cockpit (GMC). The GMC provides all tools necessary to complete the challenging task of setting up quantity conversion solutions. The GMC is accessible via transaction /n/QTYW/COCKPIT_GAS. More details on the GMC can be found in the BCG 3.0 Documentation Reference Manual.

- Chapter 5 describes the implementation steps that need to be followed

- Chapter 6 provides a summary with effort estimates for the three project complexity cases

5. The Methodology - PAIG

In this chapter, high level guidelines are provided, which list all relevant project steps in chronological order. Several steps may also be executed in parallel.

If one step is a definite prerequisite before next steps can be tackled, this is noted at the beginning of each step description

The project steps are based upon the unique and extensive experience gained through QuantityWare involvement in many customer implementations.

The completion time effort estimates are based on times for **highly skilled quantity conversion experts.**

- "L" denotes the low complexity case,
- "M" the medium complexity case,
- "H" the high complexity case.
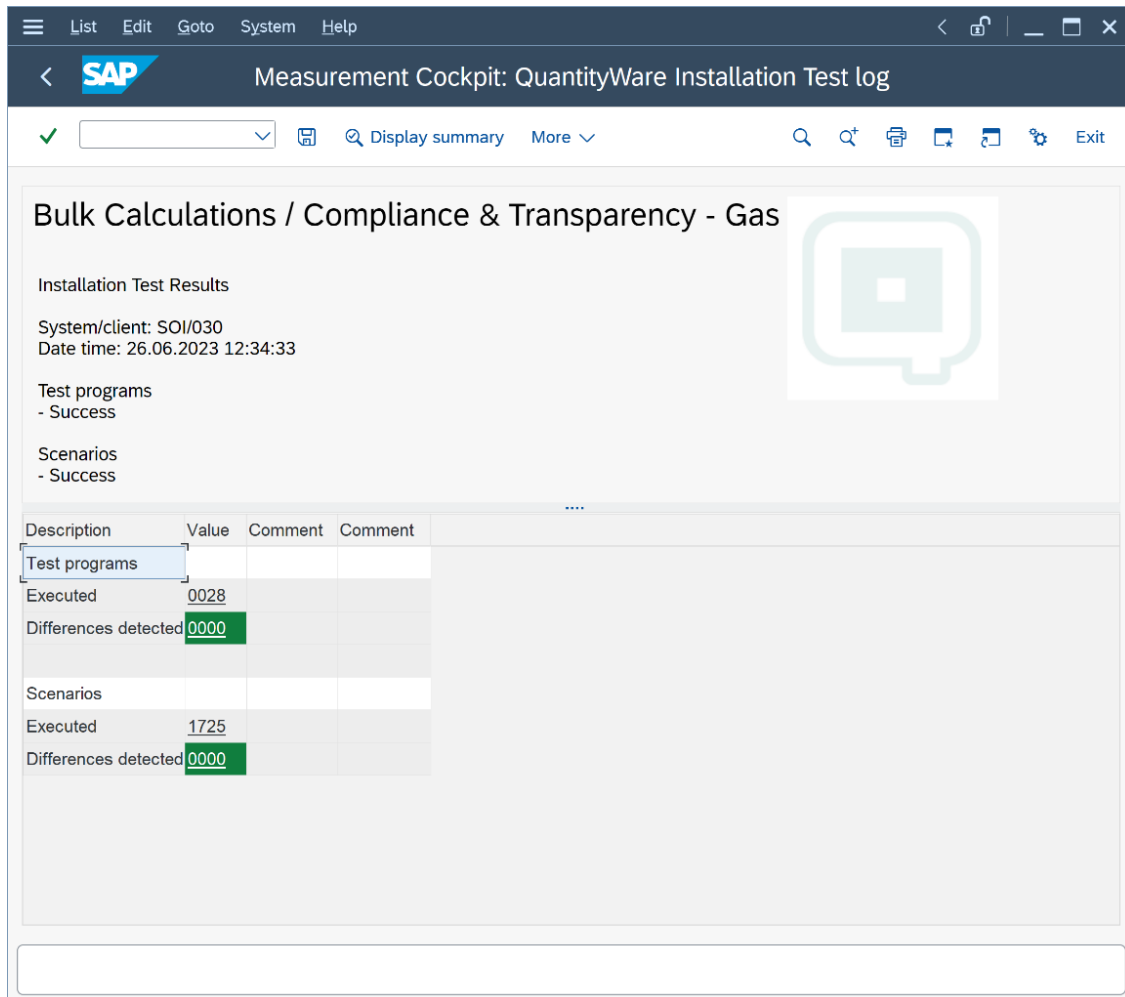
5.1. Run Installation Test in Client 045

Implementation step	1
Estimated time to completion	L: 0.1 hours M: 0.2 hours H: 1 hour
Next major step	2
Related project teams	Technical SAP basis experts or certified BCG consultants

The GMC (Gas Measurement Cockpit) is the central access point for all QuantityWare test tools that are delivered with BCG.

- Log on to **client 045** (or relevant client where the BCG BC set template is installed) and start transaction /n/QTYW/COCKPIT_GAS - The GMC is launched.

- Navigate to tab strip "Test Tools": Execute the installation test by selecting the push button: "Run Installation Test":
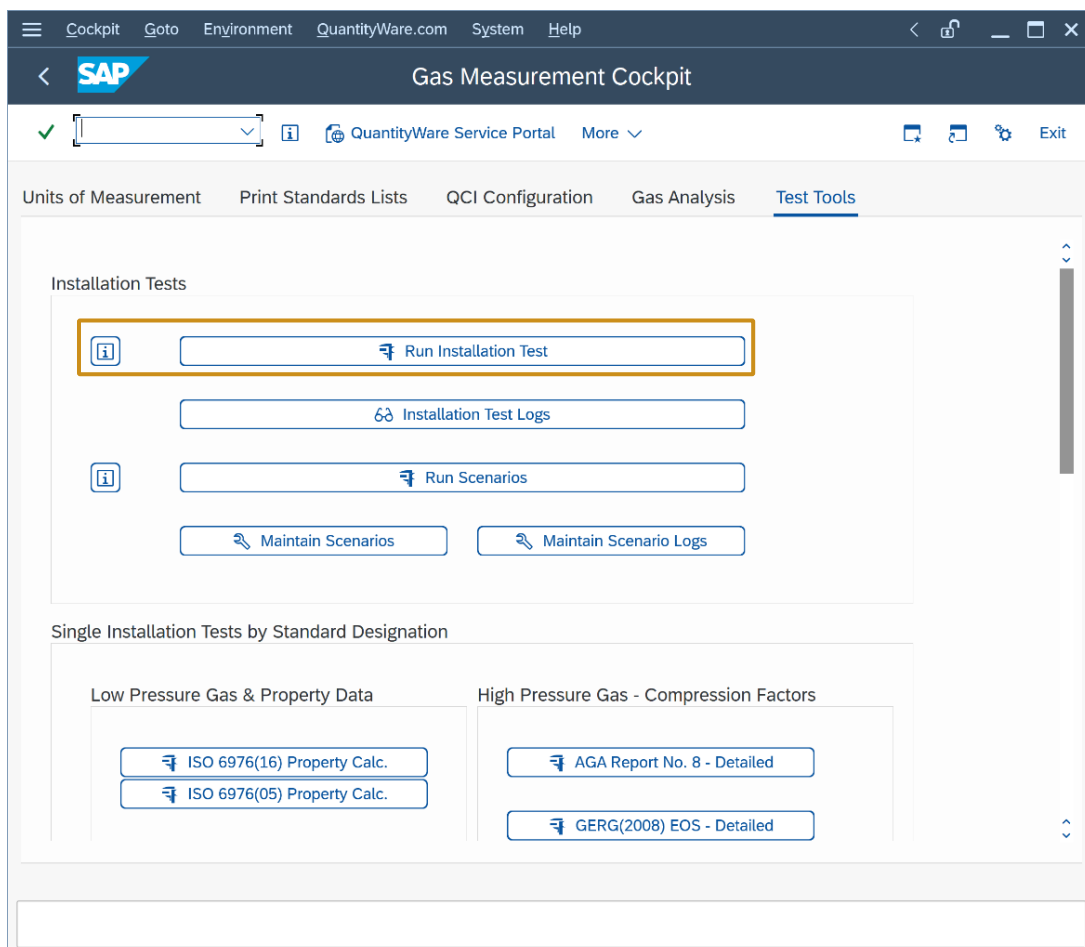
The complete installation test run takes typically less than one minute. You should then see the following result list on your screen:

Select "Display Summary" and then, "Export to PDF" and save the installation test results to a local PDF fie which you send to QuantityWare support – QuantityWare Service Portal to confirm that your installation has been validated successfully.

This completes the installation test. Your system is now ready for project implementation of your quantity conversion solutions.

QuantityWare recommends that you develop your own customer project specific tests scenarios that contain manually calculated results (cross checked by at least two experts), allowing an automated check of system calculations against these results. Thus, a high degree of automation is ensured, as well as system compatibility with your measurement standards during productive usage.

Alternatively, a manual test procedure with at least four test calculation scenarios for one conversion group should be developed, which serves as a base for manual quality assurance processes.
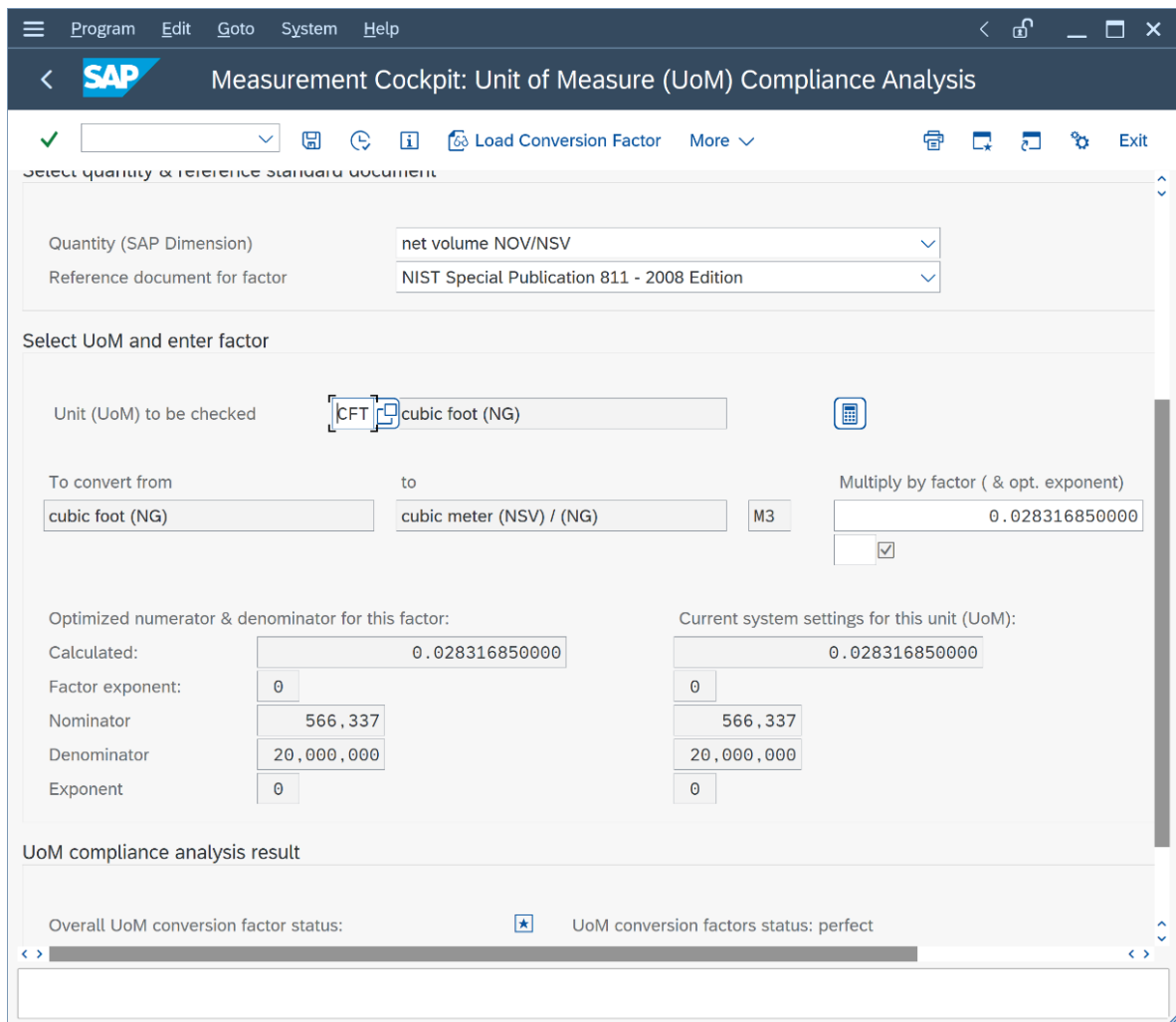
5.2. Definition of Units if Measurement

Implementation step	2
Estimated time to completion	L: 1.5 days / M: 4.5 days / H: 12 days
Next major step	3
Related project teams	Measurement specialists - customer / implementation team and certified QuantityWare BCG consultants
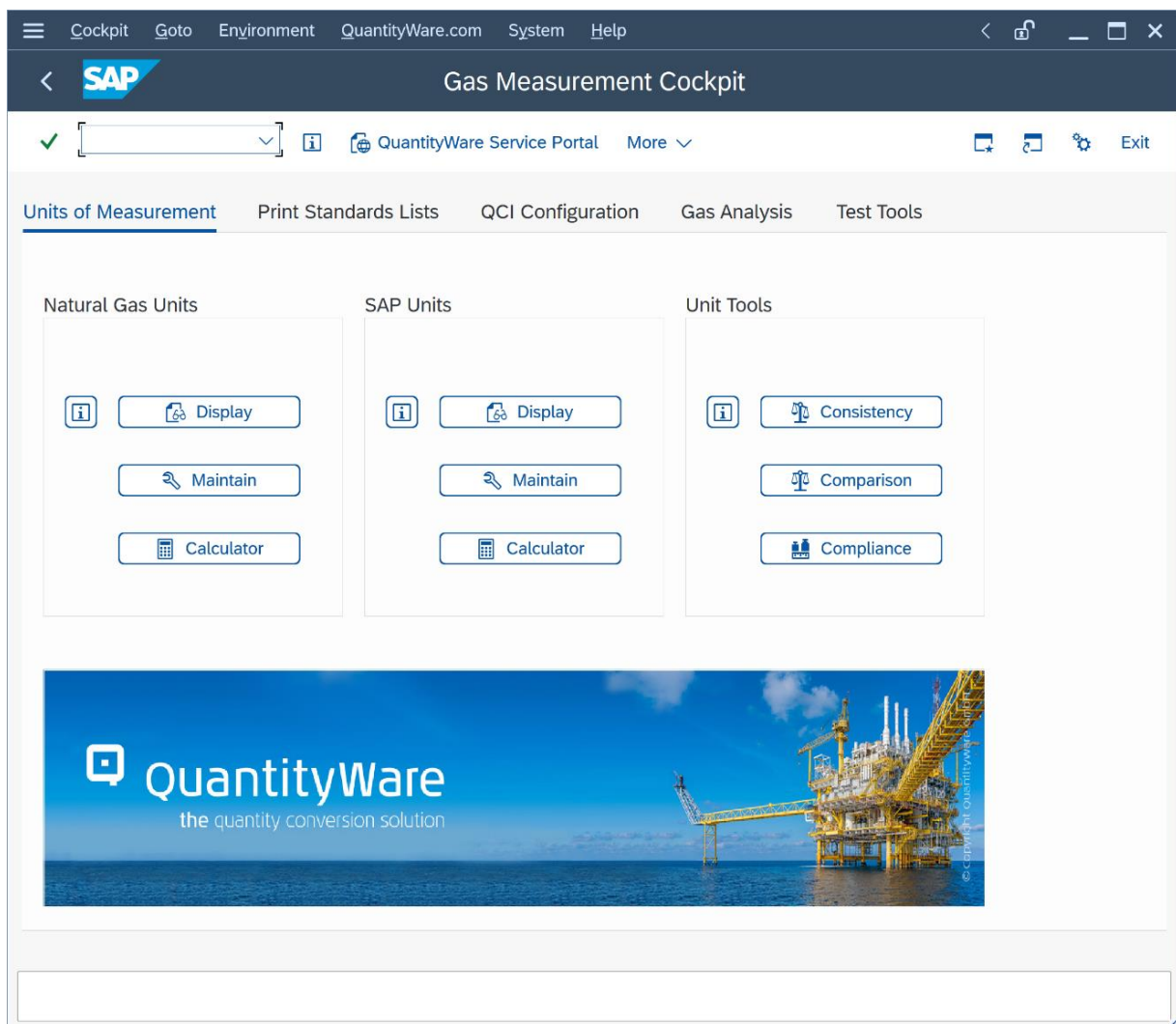
- Define all relevant Units of Measurement (UoM) and settings for quantity conversion calculations **in project development client XXX**.

- Use the GMC to select required UoM from the list of available UoM in the template client 045.

- Collect all UoM requirements from all relevant departments.

- Document required UoM.

- If UoM are missing **in your project development client XXX**, select missing UoM definitions in the QuantityWare template client 045 **and transport these UoM into project development client XXX.**

- Define & select **UoM reference data** in template client 045 and transport required reference data to project development client.

- Run UoM Compliance Analysis **in project development client XXX** and resolve issues if any are found.

5.2.1. Units of Measurements - Usage

Implementation step	2.1.
Estimated time to completion	L: 4 hours / M: 12 hours / H: 40 hours
Next step	2.2
Related project teams	Measurement specialists - customer / implementation team and/or certified QuantityWare BCG consultants

Define all UoM that are relevant for the business processes, i.e., UoM required for:

- Stock keeping (Bulk products are kept in stock with several UoM in parallel)
- Pricing
- Reporting
- Natural gas / hydrogen base UoM: standardized energy UoM or mass UoM or standardized volume UoM?
- LNG: Which SAP dimension do you define for LNG liquid volumes and which SAP dimension for LNG gaseous volumes?

5.2.2. Units of Measurements - Definitions

Implementation step	2.2.
Estimated time to completion	L: 4 hours / M: 16 hours / H: 40 hours
Next step	2.3
Related project teams	Measurement specialists - customer / implementation team and/or certified QuantityWare BCG consultants

Define & check the following parameters for all UoM that are relevant for your business processes **in development client XXX**

- Rounding (display and calculation)
- Significant digits
- Commercial keys
- Descriptions

- **Conversion factors**

The conversion factors of the QuantityWare Template UoM have been validated via the UoM Compliance Analysis in client 045 and can be used as a reference for customer specific UoM compliance analysis in the **development client XXX.**

5.2.3. Define Unit of Measurement Groups

Implementation step	2.3.
Estimated time to completion	L: 4 hours / M: 8 hours / H: 16 hours
Next step	3
Related project teams	Inventory mangers customer / master data experts

For all materials, define a collection of UoM, which is added to a UoM group. The UoM group is then assigned to the material master. Stock keeping is done in parallel for all UoM that are defined in the UoM group. Typically, you assign at least one standardized energy UoM (e.g., GJ0, GJ5 etc.), one mass UoM, and a standardized volume UoM (e.g., MC2, CM0, etc.) to a UoM group.

> Once a UoM group is assigned to a material and stock has been posted, it **CANNOT** be changed in ECC 600. Read SAP note 145824 for details. S/4HANA 1610 onwards supports the addition of a new UoM to a UoM group via the utilization of an expert SAP report which must be run locally in every SID.

5.3. Define Product Measurement Standards

Implementation step	3
Estimated time to completion	L: 6 days / M: 11 days / H: 20.5 days
Next major step	4
Related project teams	Master data team – material master
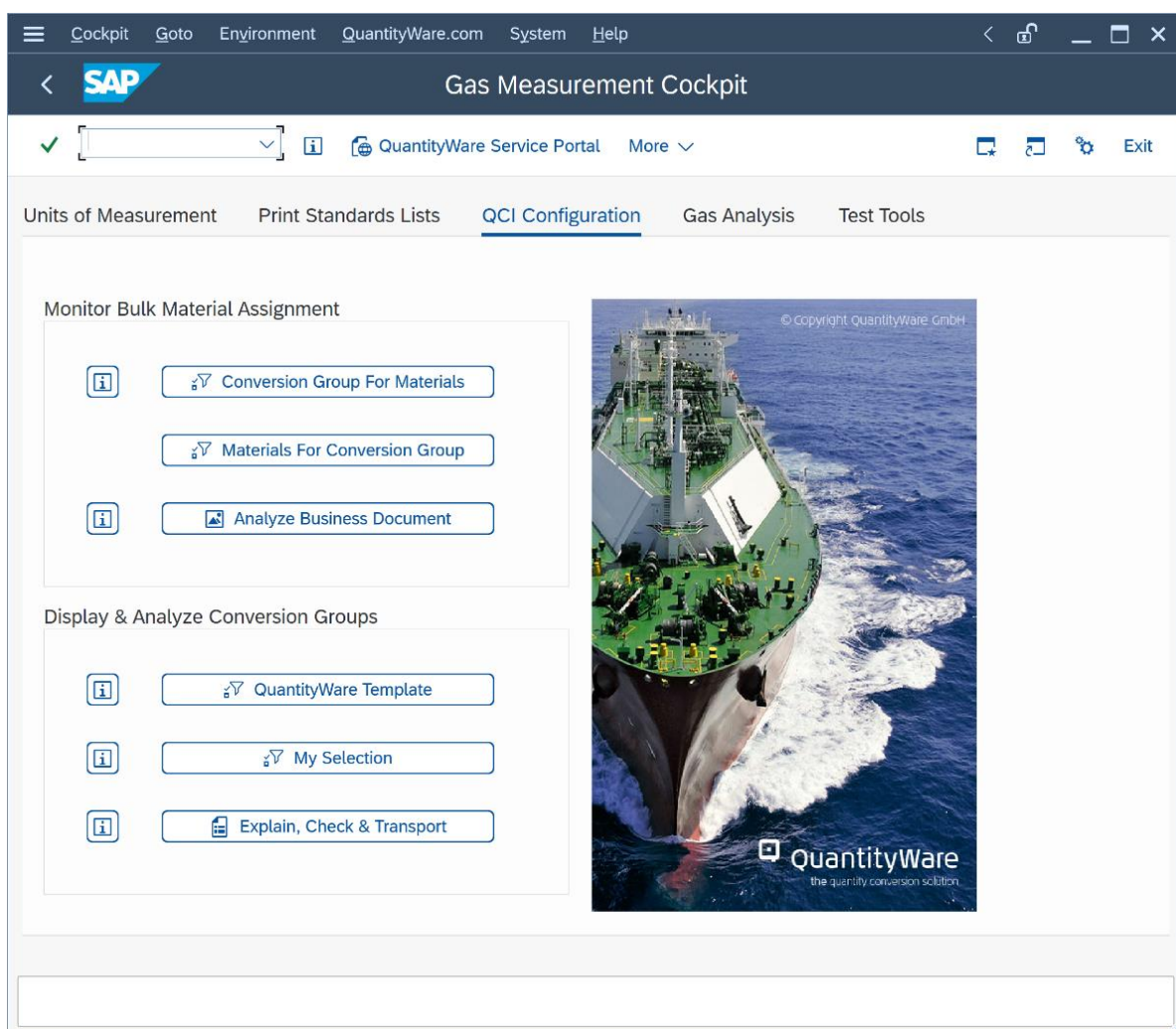
Establish an expert team (consultants and company business experts). Align with the master data team.

> If quantity conversion calculations are required that map existing legacy system calculations, collect legacy system conversion data – example calculations - and contact QuantityWare for expert consultancy – a solution feasibility analysis is needed!

5.3.1. Define Raw Data List

Implementation step	3.1
Estimated time to completion	L: 4 hours / M: 8 hours / H: 20 hours
Next step	3.2
Related project teams	Master data team – material master

You should define a raw data list of all natural gas bulk materials / products that require dynamic quantity conversions. Classify the products following a classification scheme e.g., as defined in the QuantityWare conversion group delivery (LNG, natural gas, hydrogen, NGL). All template conversion groups are available **in client 045** via the GMC using tab page "QCI Configuration & Products".

5.3.2. Assign & Confirm – Standards for Products

Implementation step	3.2
Estimated time to completion	L: 24 hours / M: 36 hours / H: 40 hours
Next step	3.3
Related project teams	Measurement specialists - customer / implementation team and certified QuantityWare BCG consultants

For natural gas, natural gas / hydrogen mixtures, pure hydrogen and LNG, several standards (e.g., national standards versus a global standard) or differing versions of standards are available. LNG contracts typically define calculation procedures as well. Contact the business owners and discuss the possibilities to define which standards (and their versions) are relevant. Define standard versions for all process steps. Confirm and document specific national business requirements. Confirm and document specific national legal requirements.

5.3.3. Assign QuantityWare Template Conversion Groups

Implementation step	3.3
Estimated time to completion	L: 16 hours / M: 24 hours / H: 44 hours
Next step	3.4
Related project teams	Measurement specialists - customer / implementation team and certified QuantityWare BCG consultants

Define a list of relevant QuantityWare template conversion groups as a basis for your customer specific conversion groups. In the GMC **in client 045**, the QuantityWare template conversion groups can be displayed and analyzed via tab page "QCI Configuration" - Choose button: "QuantityWare Template" and select the relevant product groups or select "My Selection" to map conversion groups to products. There, you define the detailed calculation scenario which is relevant for your natural gas or LNG product processing. QuantityWare delivers MQCI conversion groups for 17 different calculation scenarios:

The scenario category:

LPNG - Low Pressure Natural Gas

HPNG - High Pressure Natural Gas

LNG - Liquefied Natural Gas

HPH - High Pressure Hydrogen

and the scenario types:

PROP - Enter physical property data (e.g., density, heating value, limited number of chemical composition data...)

COMP - Enter complete chemical composition data

Define the calculation model scenario:

_ LPNG PROP - heating value & density

----

1 LPNG COMP - complete composition data

----

2 HPNG PROP - heating value/density/CO2/H2 - SGERG 88 - G

G HPNG PROP - heating value/density/CO2/H2 - SGERG-mod-H2 - G

3 HPNG PROP - heating value/density/CO2/H2 - AGA8 - G1

4 HPNG PROP - heating value/density/CO2/CO/H2 - AGA8 - G2

A HPNG PROP - density/N2/CO2 - GERG 91 / GOST 30319-2 G1

B HPNG PROP - density/N2/CO2 - NX19 modified /GOST 30319-2 G2

----

5 HPNG COMP - compos. data AGA8-92DC, use all AGA8 res. - D1

6 HPNG COMP - compos. data AGA8-92DC, use ISO res. & AGA8 - D2

E HPNG COMP - compos. data GERG2008, use all GERG 2008 r. - D1

F HPNG COMP - compos. data GERG2008, use ISO res. & GERG - D2

C HPNG COMP - composition data - VNIC SMV / GOST 30319-2 D

----

7 LNG PROP - heat. value/liquid density/gas density - G1

8 LNG PROP - heat. value/liquid density/gas mol. mass - G2

----

9 LNG COMP compos. data, ISO 6578 rev. Klosek-McKinley - D

D HPH COMP - flowing p, T - 100% hydrogen NIST JR VOL 113

Additional information/documentation for all supported standards and products can be found in the BCG Supported Standards Documentation.

5.3.4. Copy Template Conversion / Reading / Range Groups

Implementation step	3.4.
Estimated time to completion	L: 4 hours / M: 20 hours / H: 60 hours
Next step	4
Related project teams	Measurement specialists - customer / implementation team and certified QuantityWare BCG consultants

Copy the relevant QuantityWare template conversion groups and reading groups from Q*** to Z*** (customer name space range) **in client 045** and transport that Z*** configuration into **project development client XXX** (e.g., using transaction SCC1) or via SAP TMS (Transport Management System) from the template **client 045**.

Although QuantityWare conversion groups can be directly used in production, **we strongly recommend that you perform the copy described above to keep the template intact**. Typically, you need to:

- Change control settings in a conversion group for rounding procedures

- Add or remove reading group parameters depending on business requirements

- Change parameter names as defined by customer specific business terminology

- For complex requirements, add specific conversion functions to the MQCI model sequence

- Define ranges for reading group parameters (warning and error messages)

The time required for this step depends heavily on the complexity of your project.

A **reading group** is linked to a conversion group and defines which parameters (temperature, density, etc.) are input into the conversion. It also defines which results are displayed to a user (heating values, Wobbe index, pressure, and temperature correction factors, etc.).

All QuantityWare customizing transactions are accessible via the GMC.

5.4.   Define Test Calculation Matrix for Conversion Groups

Implementation step	4
Estimated time to completion	L: 1 day / M: 3 days / H: 10 days
Next step	5
Related project teams	Master data team – material master & measurement experts

For each conversion group, define at least 10 test calculations (e.g., with varying flowing temperature and pressure values, for all UoM in the UoM group) and calculate the expected results using e.g., a pocket calculator or software calculator (64-bit FLTP processor).

The GMC provides list printouts of all relevant natural gas, LNG, and NGL/LPG measurement standards. Use these printouts to obtain the VCF (volume correction factors) and compression factors for your example calculations (QuantityWare standard implementations are validated in the implementation step). QuantityWare also recommends that you obtain your own measurement standard copy from the relevant standard organization as a reference and to allow the validation to be cross-checked.

The list of sources for standards can be found in QuantityWare Note 000008

Calculate all expected results and have them cross-checked by a second expert. Document your results.

The next step is to compare the expected results with the results obtained from the Oil & Gas test calculator (which can be accessed from the Gas Measurement Cockpit). Document the degree of similarity. If deviations are found, analyze the conversions (manual and system) to determine the deviation reason.

5.5. Assign Conversion Groups and UoM Groups to Material Master

Implementation step	5
Estimated time to completion	L: 0.5 days / M: 2 days / H: 4 days
Next step	6
Related project teams	Master data team – material master

Assign the conversion groups and UoM groups to all materials (at plant level) in **project development client XXX**. Once you are finished, check the assignment via tab strip "QCI Configuration" -> "Conversion Group For Materials" in the GMC to ensure that all materials are correctly set up.

Test the quantity conversion results once more using the Oil & Gas Test Calculator, this time with the material & plant data.

5.6. Define Test Calculation Quality Procedure

Implementation step	6
Estimated time to completion	2 days / 7 days / 17 days
Next step	-
Related project teams	Master data team – material master

Define the overall quality assurance test procedure for the software life cycle. There are two main options.

- Define a manual procedure – manual test using the oil & gas test calculator after system changes (e.g., SAP Enhancement Package updates)

- Develop fully automated test scenarios (e.g., using a spreadsheet for each calculation) and then use the QuantityWare test tool to store your tests in the system, transport the test scenarios to any required system and run them at any desired point in time in your system

In the GMC, you access the test scenario tool via Tab strip "Test Tools", Push button: "Maintain Scenarios" in **project development client XXX:**
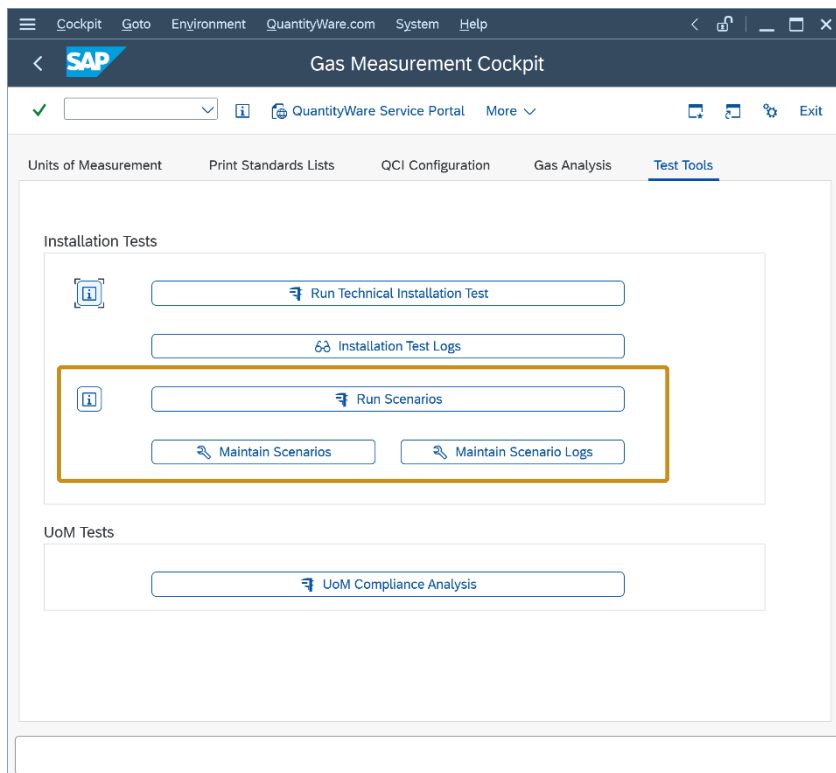
If you decide to rely on a manual procedure, you will save project implementation time and budget, however you will then massively increase in the required test time in the software life cycle, since manual tests require a much higher effort then an automated test.

> For the development of test scenarios based on your test example definitions, an experienced measurement consultant requires 2 to 17 days (Low to High complexity case), including definition of the test scenarios in the system, which is included in the previous figures. 90% of this time is required for the manual calculation of the expected results.

6. Summary

After you have completed the test calculation procedure based on your test conversion matrix and you have established functional correctness of your conversion configuration, you can hand over your work to the project team. You have now established a state-of-the-art quantity conversion solution for the project, which can be tested, monitored (and extended in the same way as described above) via the GMC.

The time estimates for a Low, Medium, and High complexity project are summarized in the list below (rounded to full working days):

Complexity	Low	Medium	High
Effort estimate (**days**):	11	28	64

As noted in the definition of the project complexity cases, added complexity needs to be considered if BCG is implemented "into" an existing productive system landscape. Depending on the customer specific system set up and requirements, **between 5 and 24++ additional days of effort need to be considered, based on the CTG PAIG.**

These estimates assume that an **experienced** quantity conversion consultant leads these tasks, and the quantity conversion implementation sub-project is well integrated into the overall implementation project, with well-established communication and decision channels through all relevant areas of the organization.

The overhead times of geographic separation and internal procedures are not contained in the figures.

Legal Notices