



# Compliance & Transparency – Gas

## CTG 3.0

### Documentation Reference Manual

## 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 Version
01	2017-11-11	S/4HANA 1709 validity added
02	2019-02-17	S/4HANA 1809 validity added
03	2021-09-21	Modern QW document style applied – BCS 30A CSP02 / 30B CSP01 changes
04	2023-11-01	30A CSP03 / 30B CSP02 changes

## Contents

---

<b>1. Introduction .....</b>	<b>5</b>
<b>2. Documentation Overview .....</b>	<b>6</b>
<b>3. CTG - Gas Measurement Cockpit .....</b>	<b>9</b>
3.1. Introduction .....	9
3.2. Structure of the Gas Measurement Cockpit (GMC) .....	10
3.3. GMC Methodology .....	23
3.4. GMC Tab Strip Details .....	23
3.5. GMC Documentation .....	39
3.6. Summary.....	39
<b>4. CTG – Test Scenarios.....</b>	<b>40</b>
4.1. Introduction .....	40
4.2. Test Scenario – Delivery with BC Set.....	41
4.3. Test Scenario – Definition .....	41
4.4. Access to the Test Scenario Tool.....	42
4.5. Test Scenario Tool Activities .....	43
4.6. Summary.....	54
<b>5. CTG - Configuration Template.....</b>	<b>55</b>
5.1. Introduction .....	55
5.2. Unit of Measure Definitions .....	56
5.3. Conversion Group Configuration.....	57
5.4. QuantityWare IMG Access .....	59
5.5. Summary.....	59
<b>6. CTG - SAP QCI Enhancements of Legacy Configurations .....</b>	<b>60</b>
6.1. Introduction .....	60

6.2.	Parameter Range Check Settings.....	61
6.3.	Conversion Group Documentation.....	63
6.4.	Quantity Value Synchronization.....	66
6.5.	Summary.....	66
<b>7.</b>	<b>CTG - Customizing Transactions .....</b>	<b>67</b>
7.1.	Introduction .....	67
7.2.	QuantityWare Customizing Transactions.....	67
7.3.	Summary.....	69
<b>8.</b>	<b>CTG - Gas Measurement Cockpit - Security .....</b>	<b>70</b>
<b>9.</b>	<b>CTG - Protection of Intellectual Property .....</b>	<b>72</b>
<b>10.</b>	<b>Abbreviations .....</b>	<b>73</b>
<b>11.</b>	<b>CTG - Documentation Rules.....</b>	<b>76</b>

# 1. Introduction

---

CTG (Compliance & Transparency – Gas) is delivered within the Bulk Calculations Solution (BCS) and activated for the mandatory installation test with a license key. For CTG this document provides:

- An overview of all documentation delivered for CTG
- Links to related documents
- Detailed documentation for specific areas

Read this document and - depending on your project roles - the related documents carefully before you install QuantityWare CTG or start your CTG implementation project.

## 2. Documentation Overview

---

The following CTG documents are either published as a chapter of this document, or available as separate documents in the [Knowledge Base](#).

### **BCS Technical Installation Manual:**

Audience: SAP basis experts performing the installation

Content: Describes the technical requirements and procedures to be followed during the technical installation of the BCS.

Publication: Separate Document in the [Knowledge Base](#).

### **CTG - Project Assessment and Implementation Guidelines (PAIG):**

Audience: Project team lead responsible for CTG implementation & project members

Content: Describes a high-level project methodology which enables the successful design and configuration of quantity conversion solutions that run in an SAP Oil, Gas, & Energy ERP system, based upon business requirements.

Publication: Separate Document in the [Knowledge Base](#).

### **CTG - Gas Measurement Cockpit (GMC):**

Audience: CTG implementation project team-lead and project members, as well as petroleum measurement specialists wishing to use the GMC.

Content: Describes the GMCs methodology, structure and content.

Publication: This document

**CTG - Test Scenarios:**

- Audience: CTG implementation project team-lead and project members, as well as petroleum measurement specialists wishing to use the GMC.
- Content: Describes the theory behind and the definition of, quantity conversion automated test scenarios.
- Publication: This document

**CTG - Configuration Template:**

- Audience: CTG project implementation members.
- Content: Overview of QuantityWare CTG template. Explains how to access and analyze the data via the GMC.
- Publication: This document

**CTG - Supported Standards Manual:**

- Audience: Project members implementing CTG and petroleum measurement specialists.
- Content: Lists all measurement standards that are implemented with CTG and provides detailed technical implementation information.
- Publication: Separate Document in the [Knowledge Base](#).

**CTG - SAP QCI Enhancements of Legacy Configurations:**

- Audience: Project members implementing CTG
- Content: Describes the functional possibilities provided by QuantityWare for the SAP QCI, in detail.
- Publication: This document

### CTG - Customizing:

Audience: Project members implementing CTG

Content: Describes CTG customizing options which can be accessed from the GMC.

Publication: This document

### CTG - Gas Measurement Cockpit - Security:

Audience: Project members implementing CTG.

Content: Lists the QuantityWare single & composite roles delivered with BCS which can be assigned to GMC users.

Publication: This document

### CTG - Protection of Intellectual Property:

Audience: Project members implementing CTG.

Content: Describes the QuantityWare Intellectual Property security measures.

Publication: This document



In addition to the above listed documents, QuantityWare publishes BCG notes which are also an integral part of the BCG documentation, all available in the [Knowledge Base](#).

All code corrections published via note are included in the immediately following CSP.

For an overview of note validity, see section 6 of [Note 000067](#) – “Additional Installation Information”.

The associated files must be downloaded from the [QuantityWare Service Portal](#)

Finally, Consulting and Working Papers are published frequently, which are all as well available in the [Knowledge Base](#).



## 3. CTG - Gas Measurement Cockpit

---

### 3.1. Introduction

---

The software package CTG is one important part of the overall QuantityWare solution for the oil industries. The complete solution consists of:

- QuantityWare Software Package
- QuantityWare Training Services
- QuantityWare Support Services

The Gas Measurement Cockpit (GMC) is the single access point for measurement specialists and technical consultants to the QuantityWare CTG 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 Gas Measurement Cockpit (GMC) provides an easy-to-use user interface (UI), which is structured such that measurement experts and technical consultants can organize their work efficiently.



After you log on to your SAP ERP system, enter transaction code  
`/n/QTYW/COCKPIT_GAS` to launch the Gas Measurement Cockpit (GMC)

Make sure that the required authorization profiles are assigned to your user

The technical installation team has to enter the temporary CTG license via the GMC as well for the installation test

## 3.2. Structure of the Gas Measurement Cockpit (GMC)

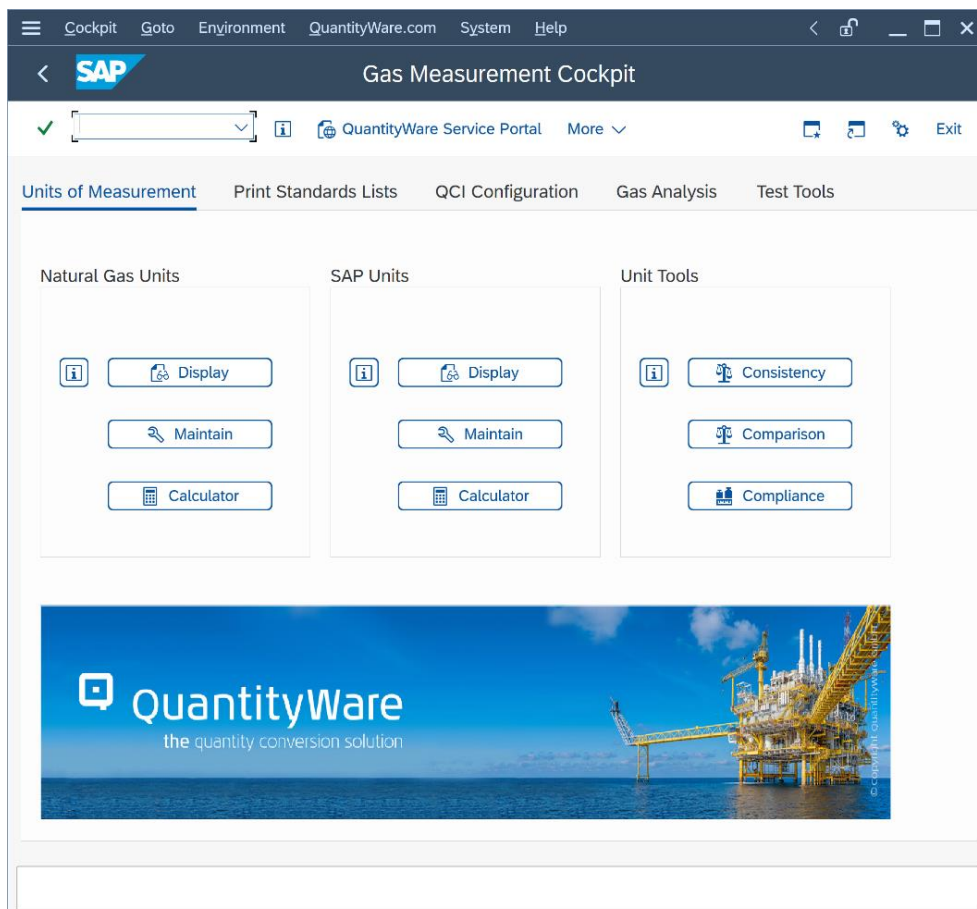
The GMC is structured with Tabs and Menus.

### 3.2.1. GMC Overview - Tabs

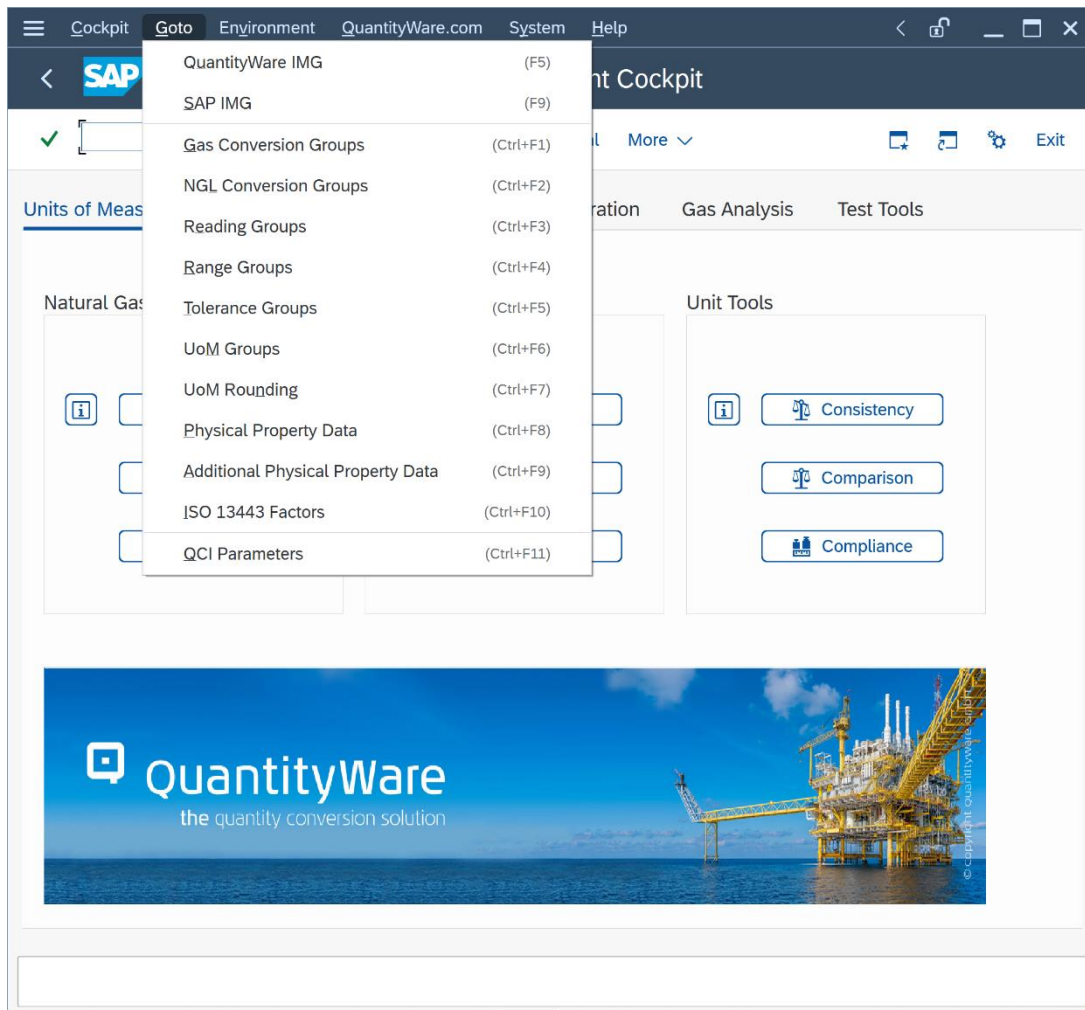
The Gas Measurement Cockpit provides five tab pages

#### 3.2.1.1. Units of Measurement

Here you define, create, change, display and monitor unit of measurement (UoM) settings. Detailed documentation of the UoM concepts is provided. You perform natural gas property conversions between different reference conditions, e.g. for heating values or densities. You also define the UoM compliance settings and prepare the UoM Compliance Analysis in this tab page. All calculations and results can be easily printed for further processing.

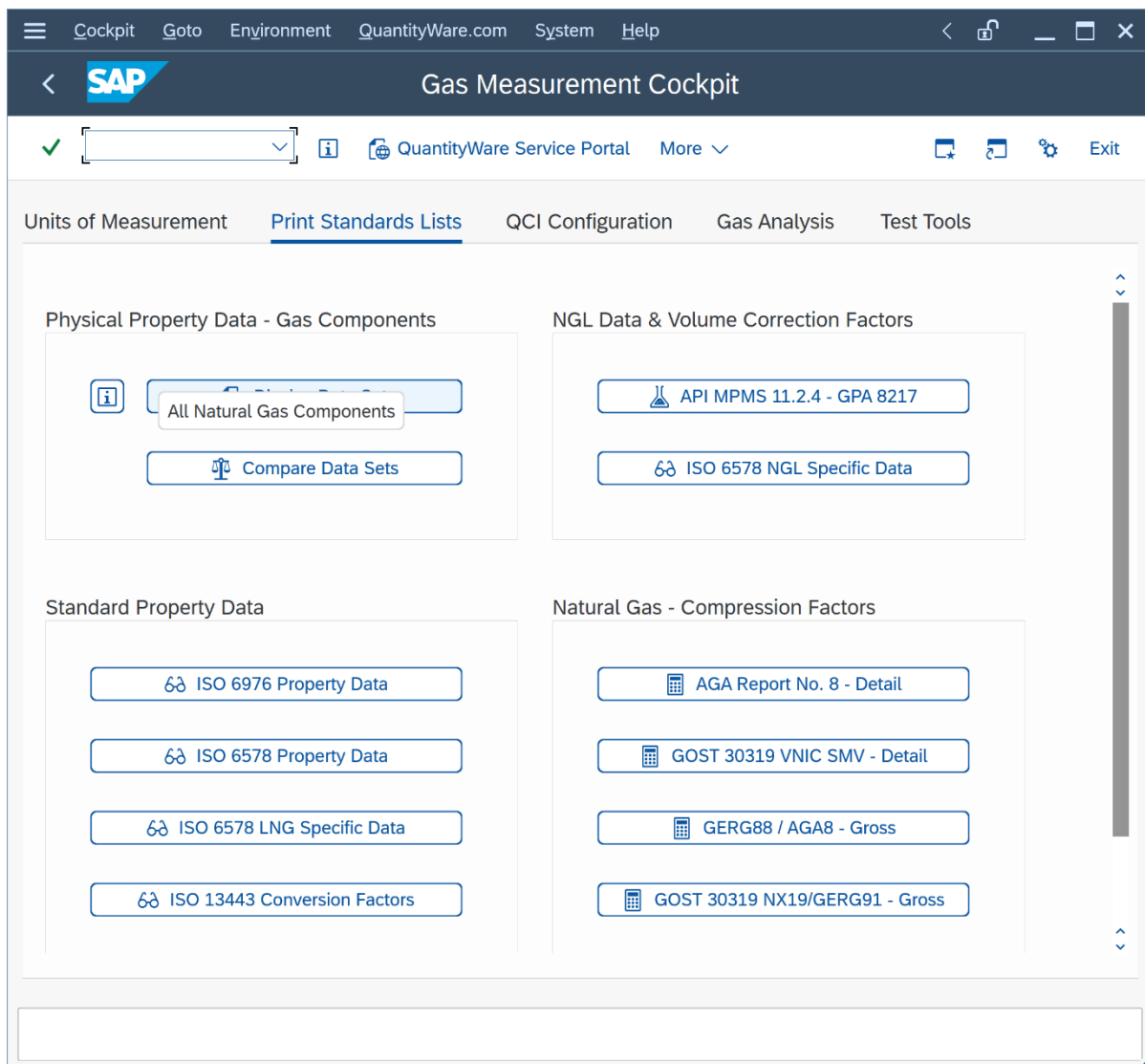


In your productive clients, you may disable access to configuration settings via customizing settings. Specifically, you may disable the maintenance access in this tab page (in addition to the general locking via SAP standard settings of customizing transactions), as well as direct customizing and technical tool access via the menu paths “Goto” and “Environment”:



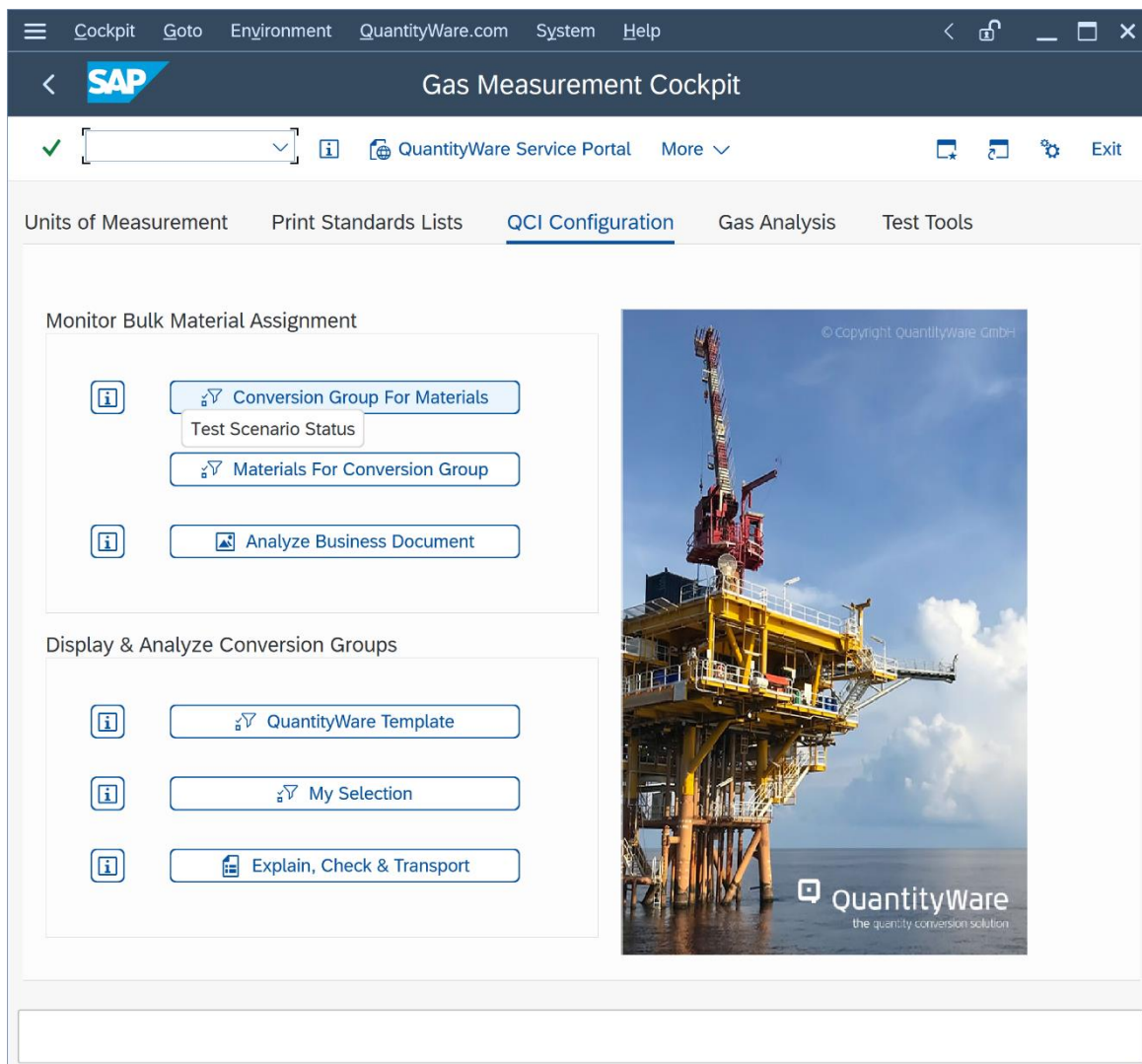
### 3.2.1.2. Print Standards Lists

Here you display and print lists of physical property data sets, compression factors and LNG specific data, as well as volume correction factors for NGL. Natural gas and LNG long term contracts specify detailed calculation procedures and property data to be utilized for custody transfer, which you monitor and verify here.



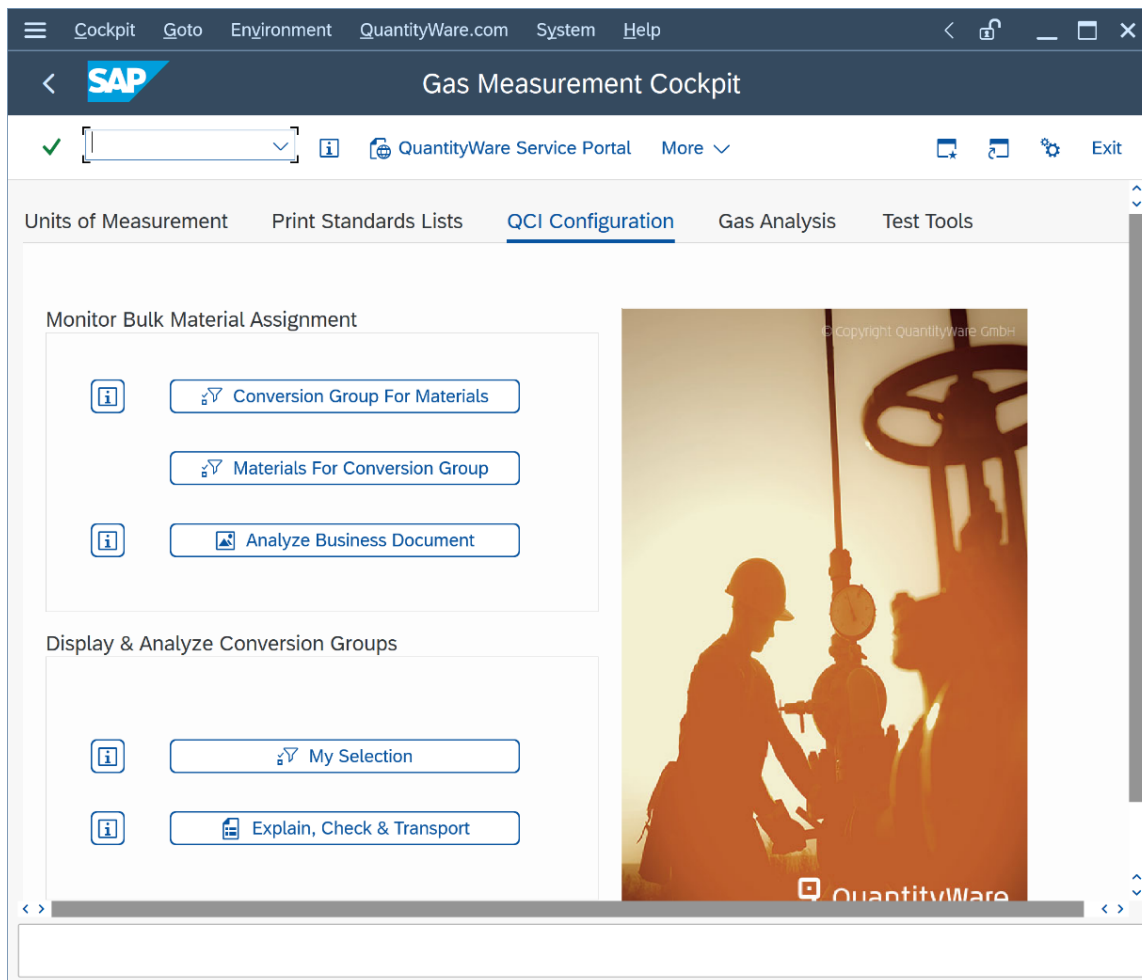
### 3.2.1.3. QCI Configuration (Template Client)

Here you display and monitor the QCI conversion group settings for various selection criteria and control the assignment of your conversion groups to your material/product master data. You also “explain” a conversion group definition and print out audit reports for conversion groups. You also analyze business documents (material documents, physical inventory documents and deliveries) with respect to the additional quantity conversion values here.

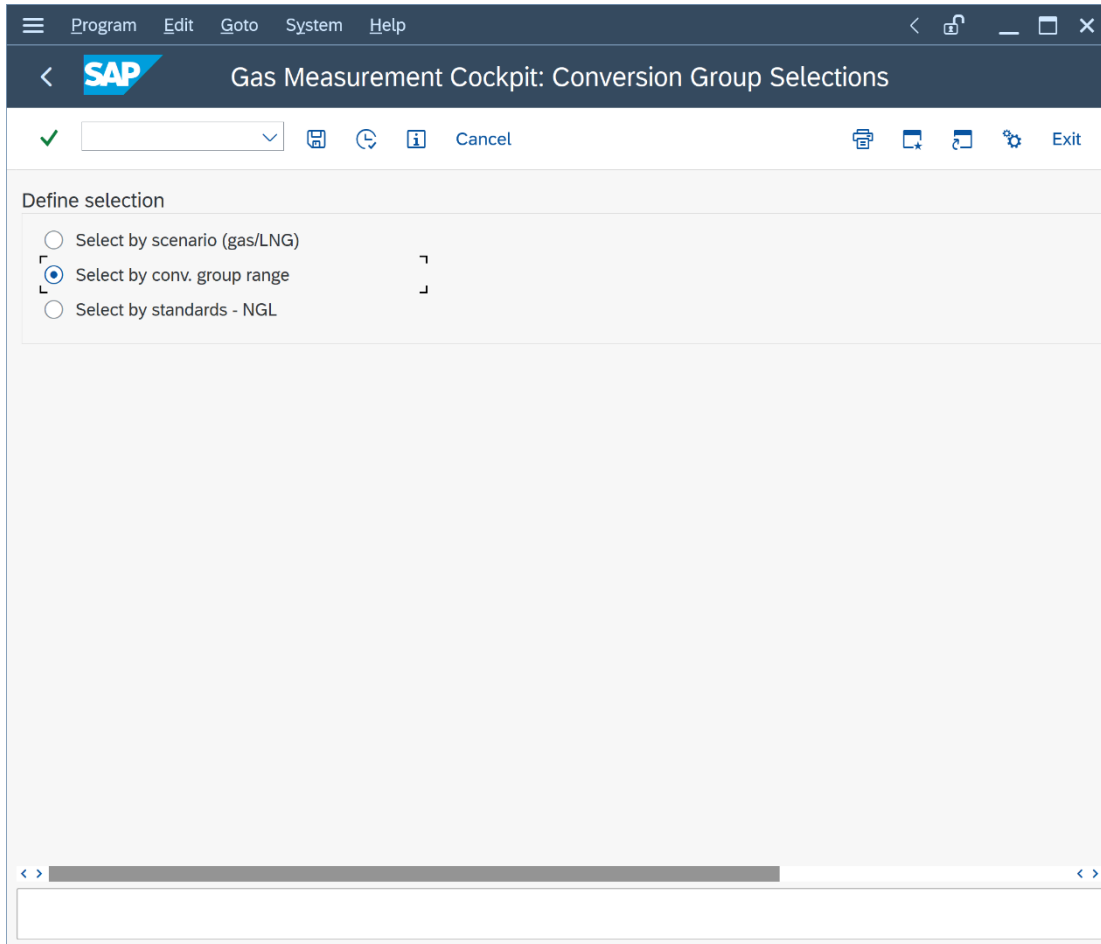


### 3.2.1.4. QCI Configuration

In clients where the QuantityWare template BC set "/QTYW/BCG\_30X" (where "30X" is the current valid installed QuantityWare BCS release – e.g. "30A") is not activated, under "Display & Analyze Conversion Groups" the template selection push button "QuantityWare Template" is not available. The "Explain, Check and Transport" push button may be also configured to be invisible.



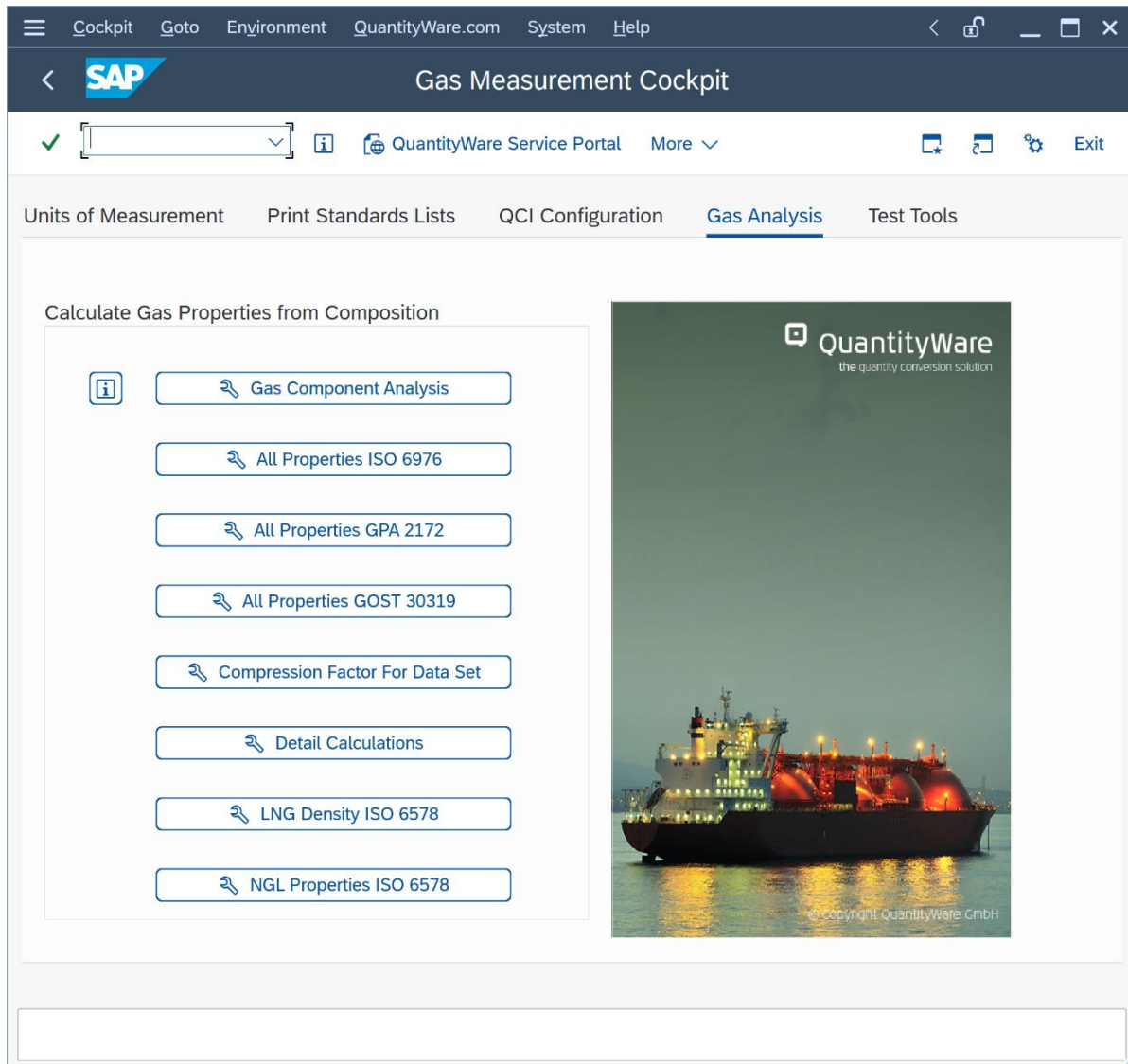
For your CTG SAP QCI legacy conversion groups, two of the three different selection methods are relevant (selection by scenario is not relevant):



Your SAP QCI legacy natural gas and LNG conversion groups may be selected by range; NGL/LPG conversion groups may be selected by range or by measurement standards.

### 3.2.1.5. Gas Analysis

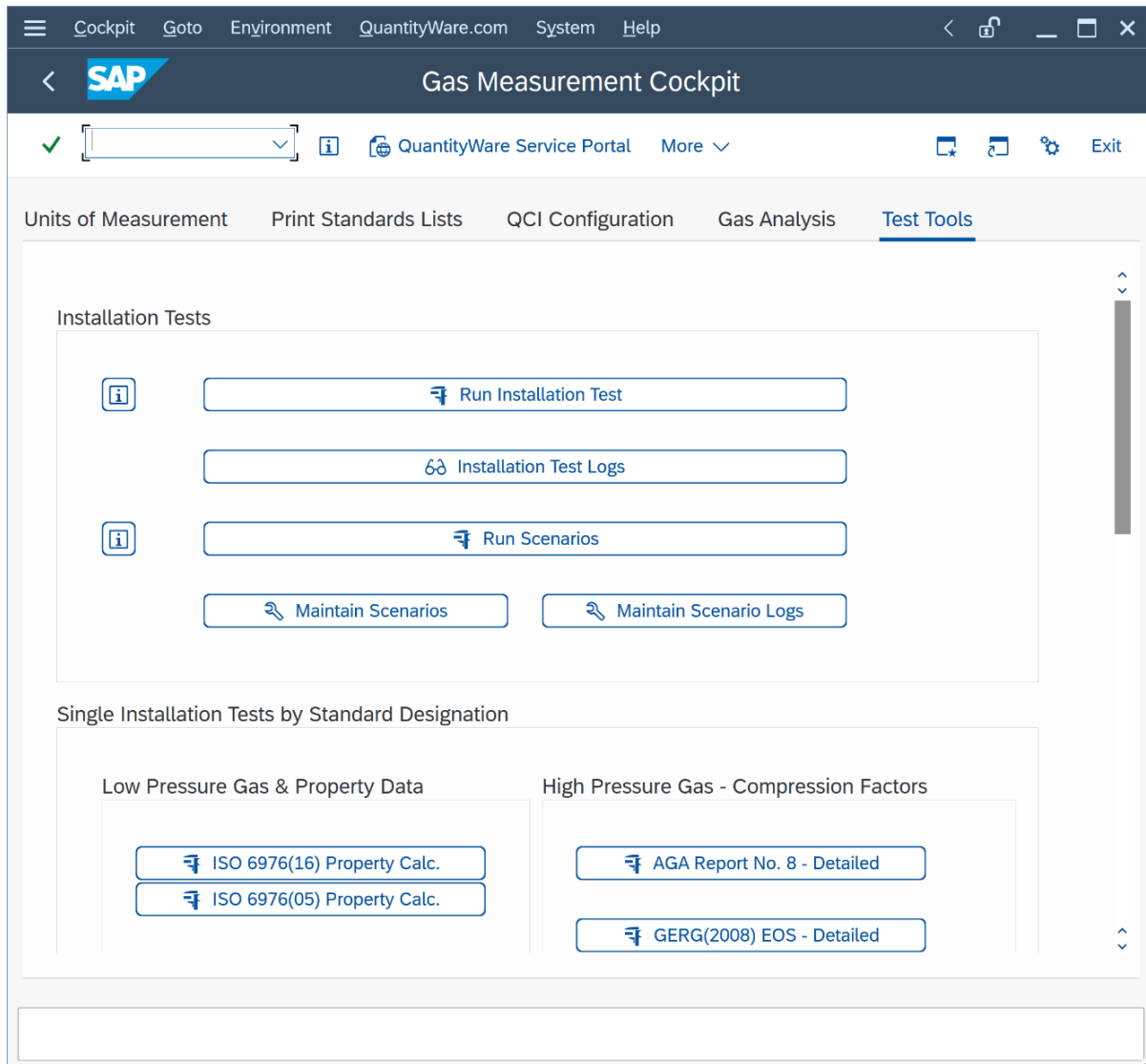
Here you perform natural gas, LNG and LPG/NGL property calculations based on various measurement standards and on laboratory data; you prepare quantity conversion default data for goods movement calculations, starting with a sophisticated gas component analyzer tool.





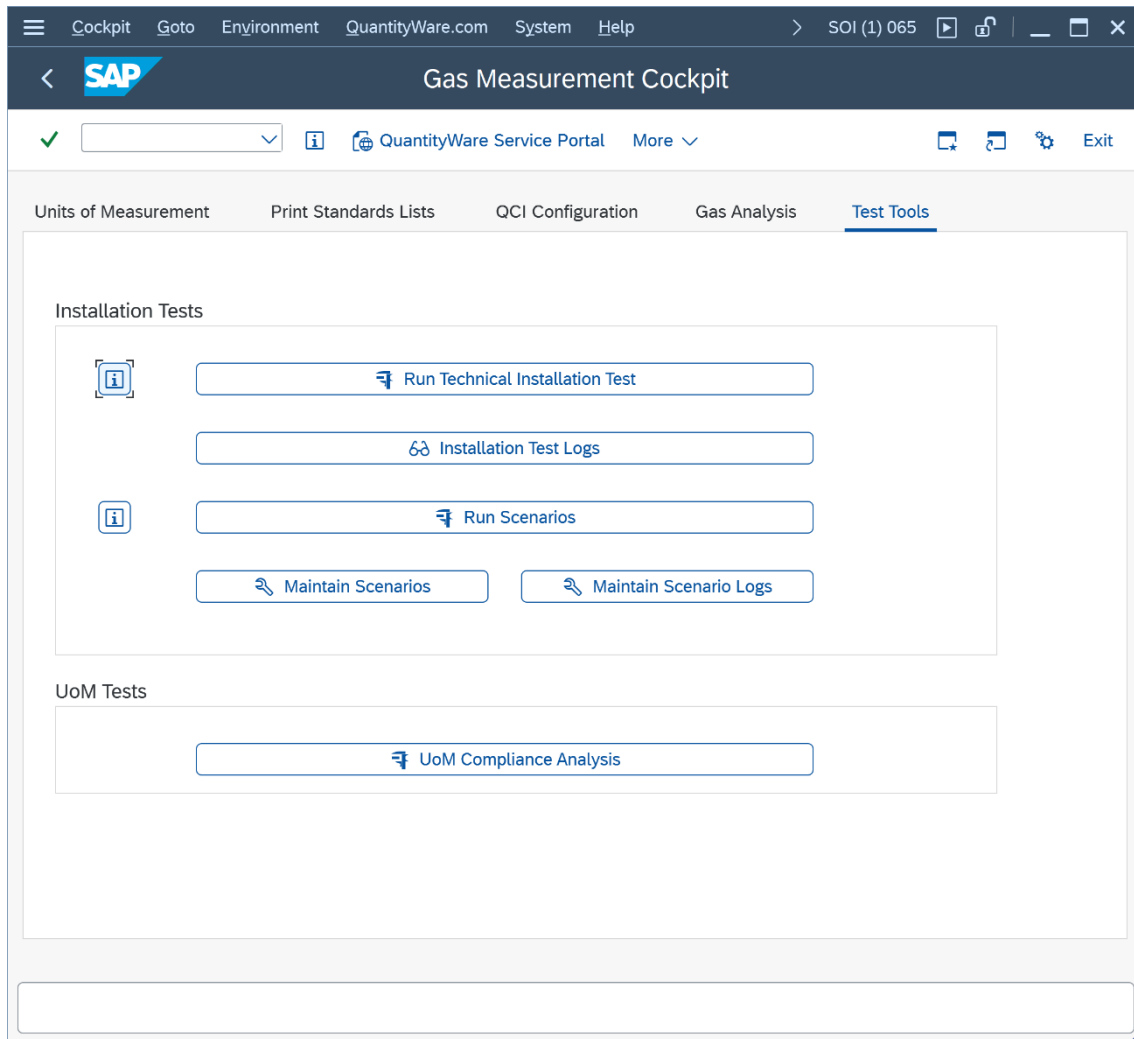
### 3.2.1.6. Test Tools (Template Client)

In template client 045 you execute the QuantityWare installation test (which includes QuantityWare Test Scenarios) to ensure the correctness of the quantity conversion implementations in your system.



### 3.2.1.7. Test Tools

In all other relevant clients, where the QuantityWare BC set is not activated, you execute your own UoM Compliance Analysis test via this tab page, as well as your own test scenarios, which you define during the CTG project. The Technical Installation Test may be executed here as well.



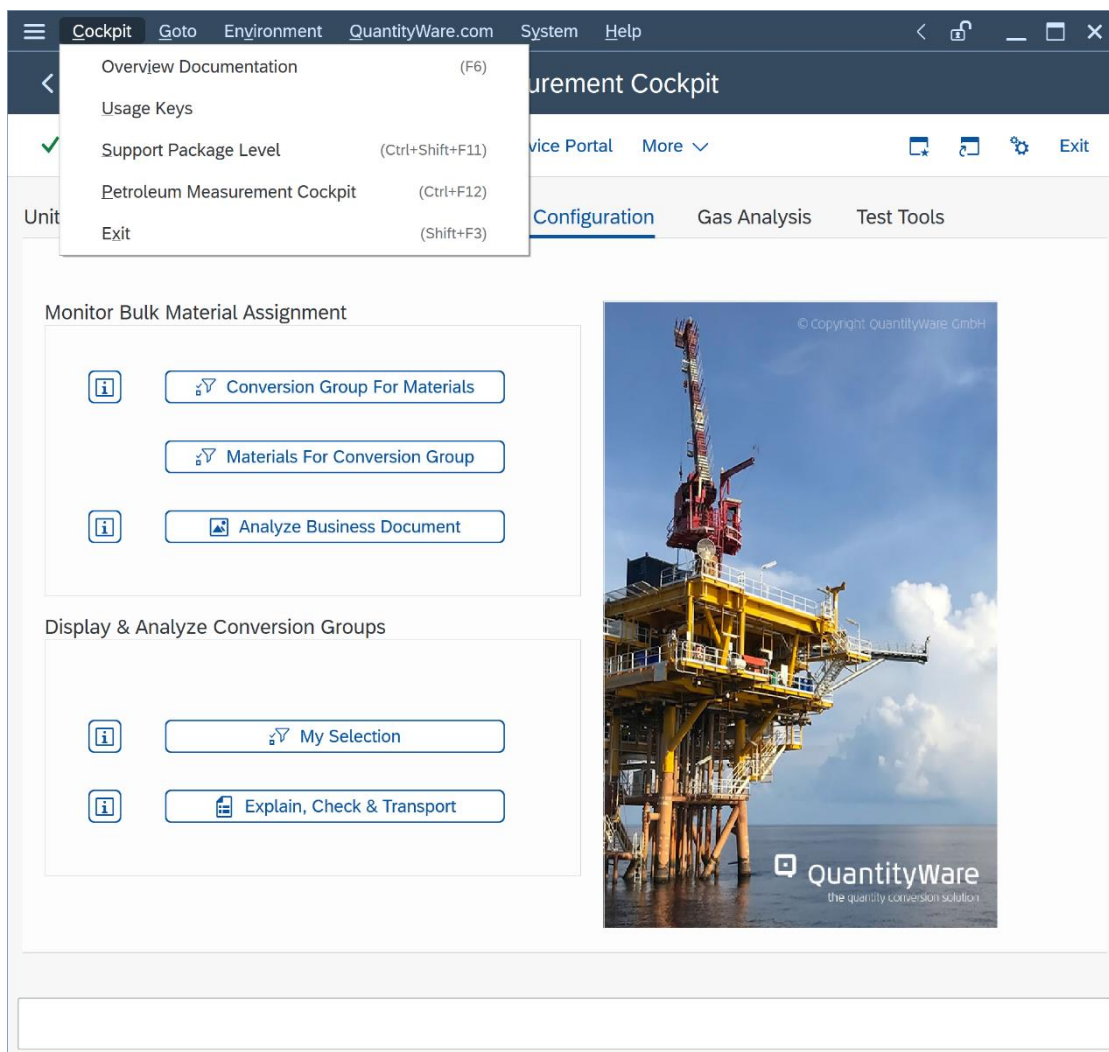
The tab page that is active when you leave the GMC transaction will be the one you see when you next use the GMC.

### 3.2.2. BCG Overview – Menus

From the BCG menu you have access via the following menu points to relevant transactions and information resources:

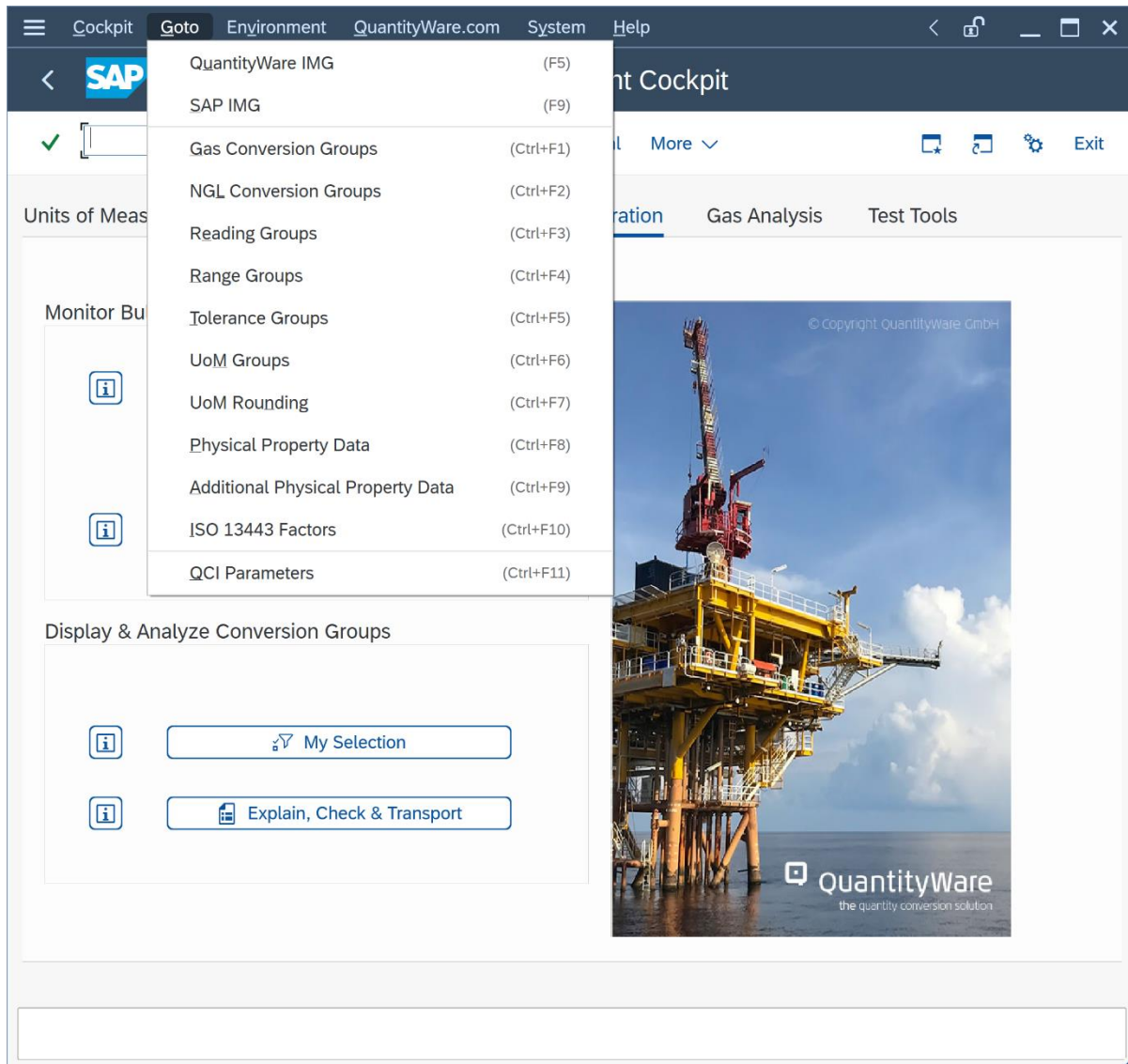
#### 3.2.2.1. Cockpit

Enter or check the QuantityWare CTG temporary installation test license, read the detailed online documentation, determine the QuantityWare support package level or navigate to the Petroleum Measurement Cockpit:



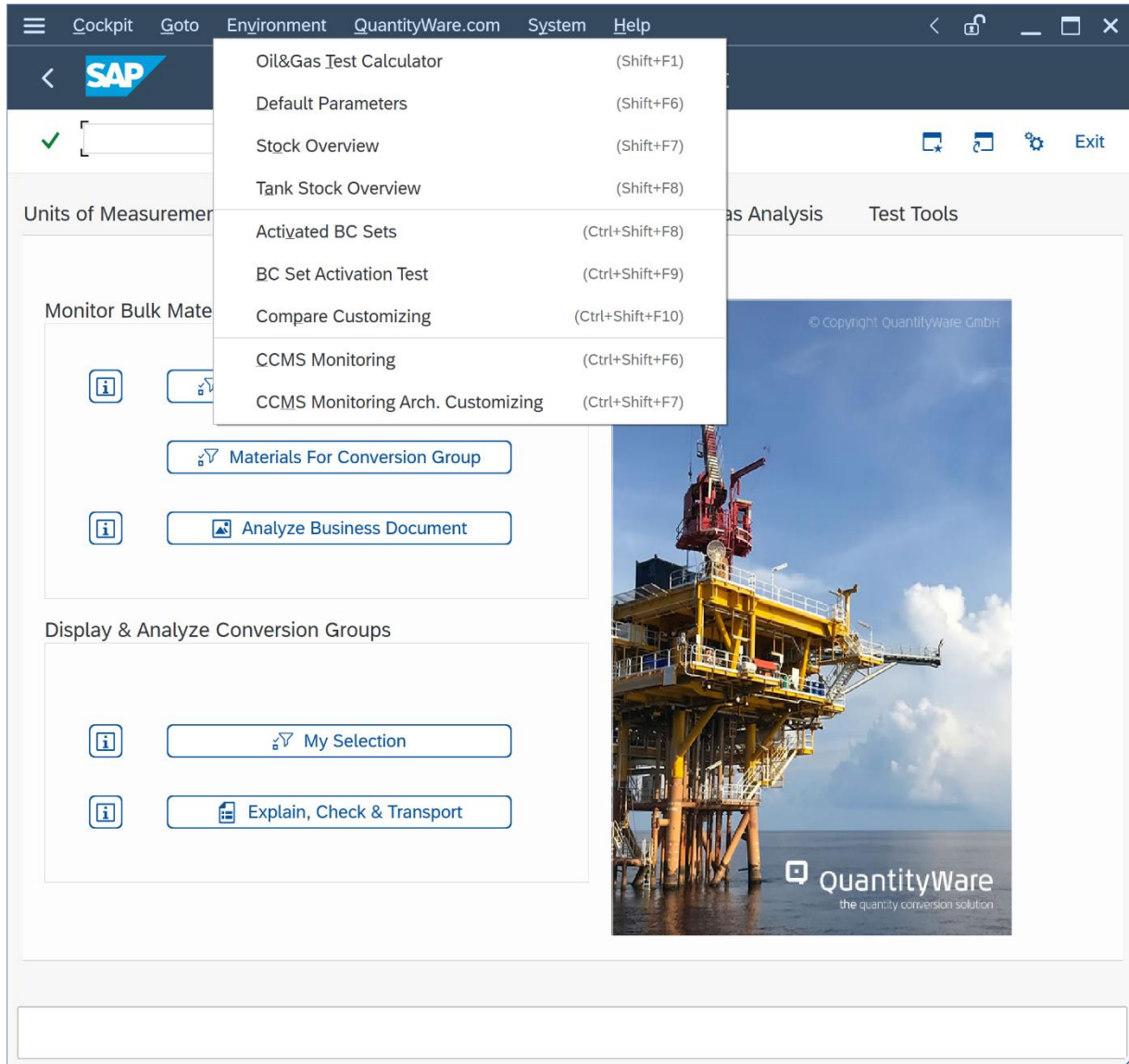
### 3.2.2.2. Goto

Navigate to all QuantityWare customizing transactions and create or change data if the client settings allow this; fast access to most important customizing transactions is also available:



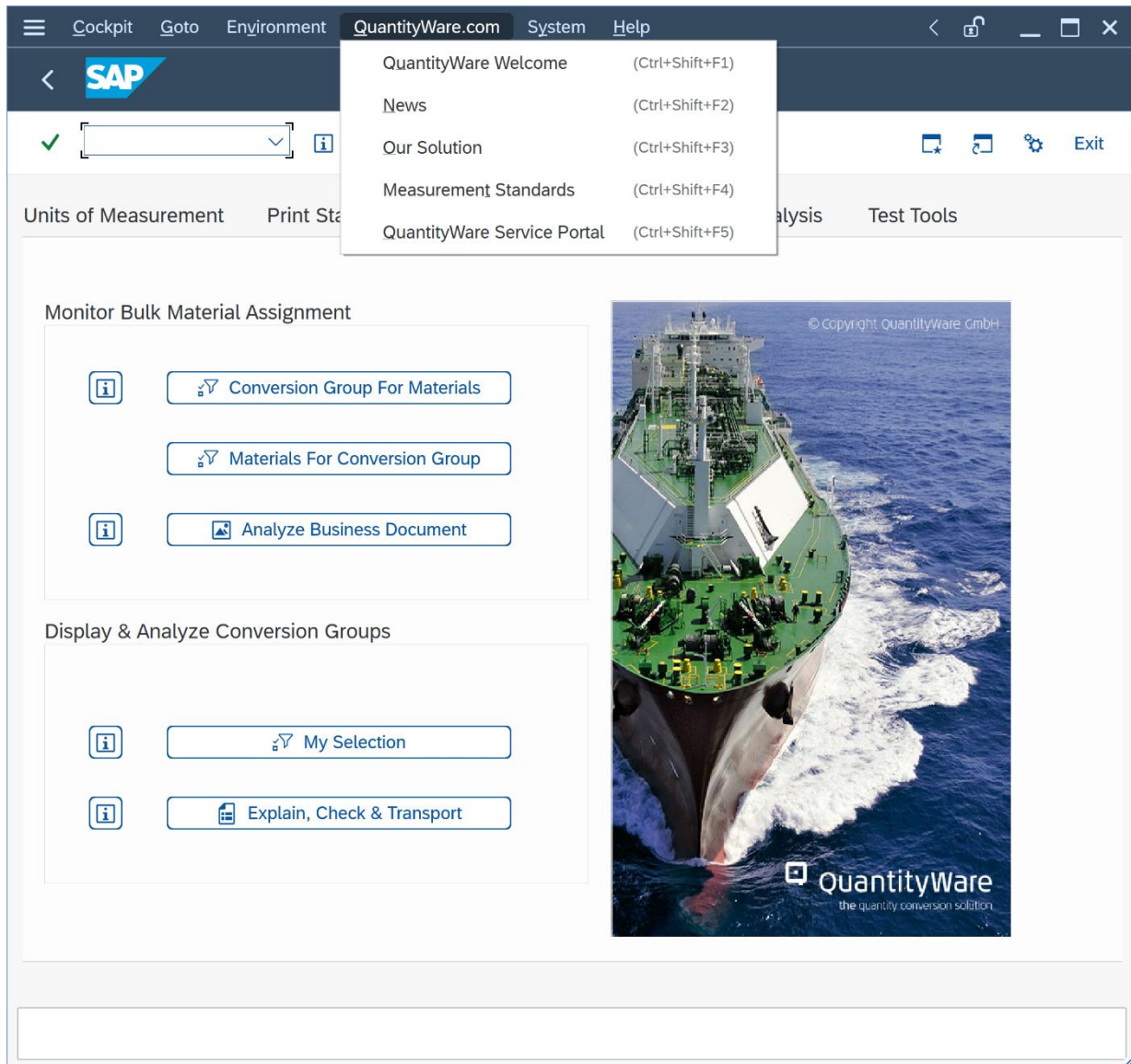
### 3.2.2.3. Environment

Navigate to related applications like the QuantityWare calculator or the tank management transaction:



### 3.2.2.4. QuantityWare.com

Navigate to the most relevant QuantityWare website pages and to the QuantityWare Service Portal site:



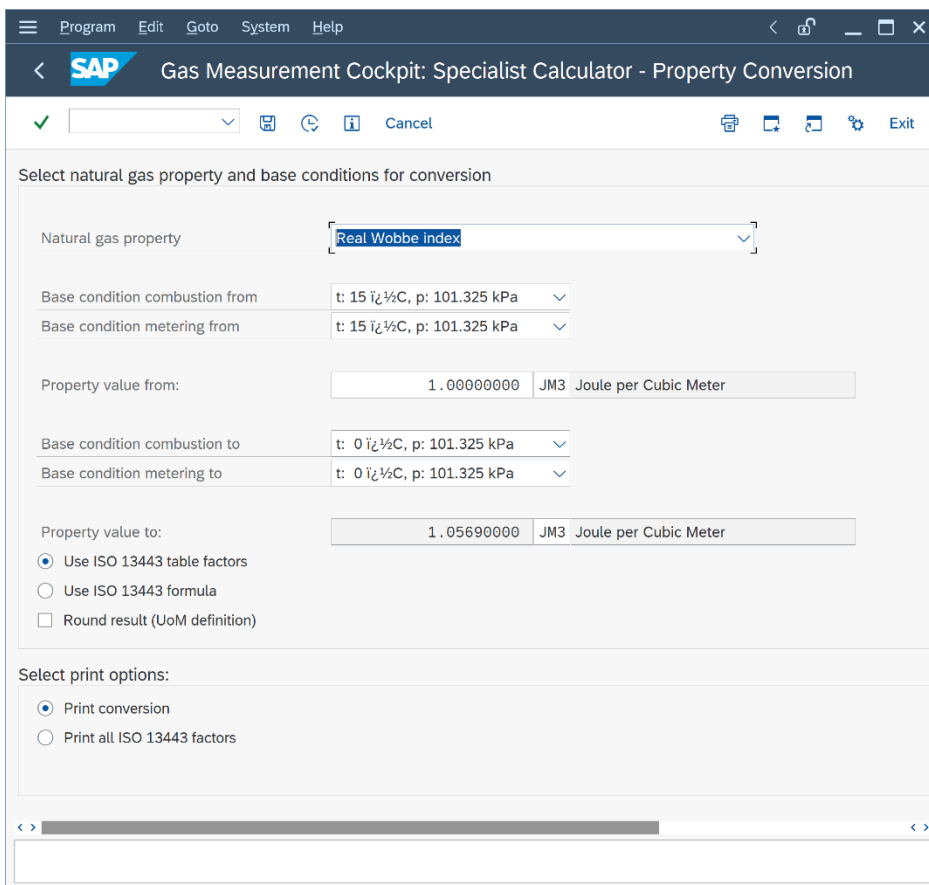
### 3.3. GMC Methodology

The five tab strips are organized so that they group complex implementation project sub tasks into “task packages”, as well as organizing regular monitoring and error analysis tasks in a structured way. The QuantityWare Project Assessment and Implementation Guidelines (PAIG) methodology provides the underlying design logic for the GMC. For more details read the separate PAIG documentation for CTG.

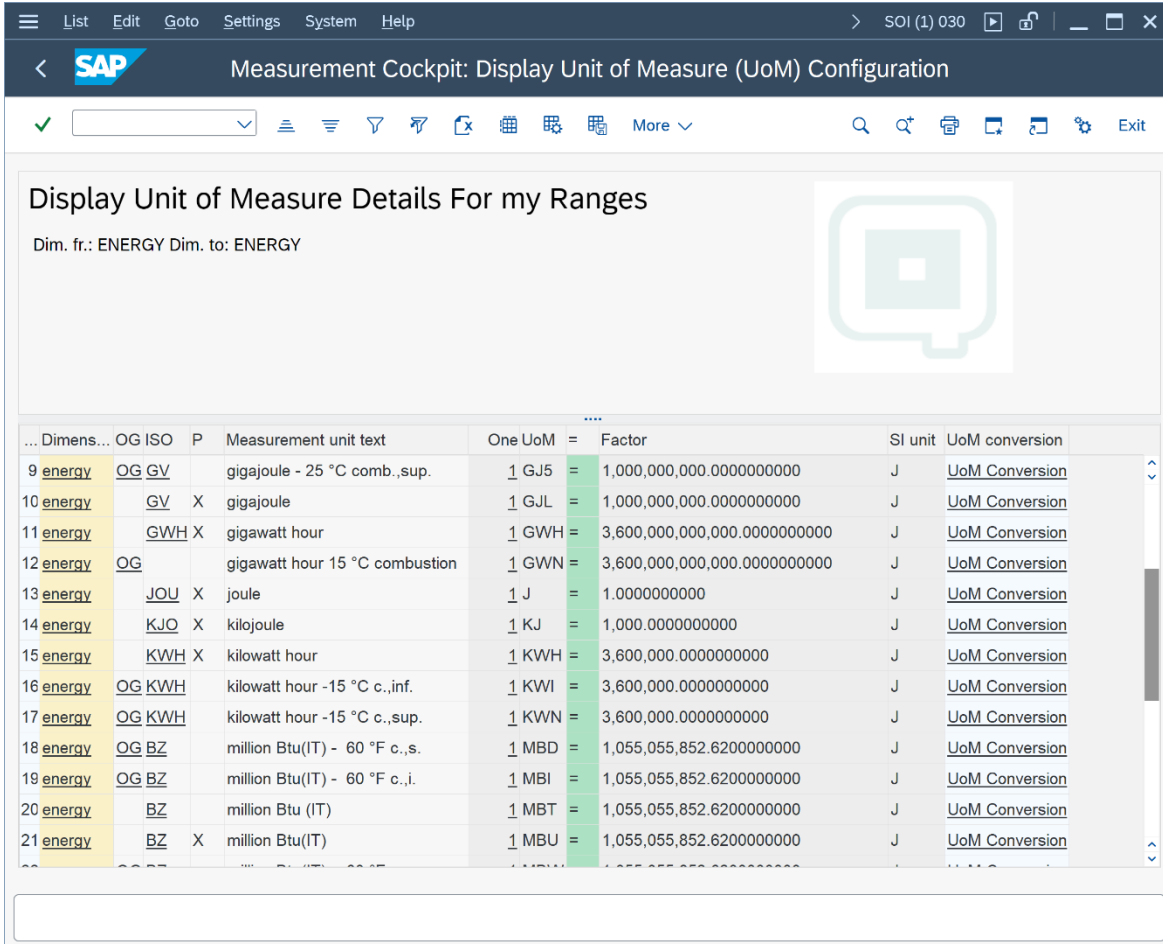
### 3.4. GMC Tab Strip Details

#### 3.4.1. Units of Measurement

Correct UoM definitions and intra-conversion factors are the basis of all quantity conversions. You need to ensure that all UoM are correctly defined. For example, you frequently need to control whether heating values that you report are accurate, or data from business partners is consistent with your data. The Natural Gas Specialist Calculator supports property conversion calculations based on ISO 13443 conversion factors or formulas for all known natural gas properties and base conditions:



You also need to monitor all UoM for your natural gas properties and stock keeping quantities:

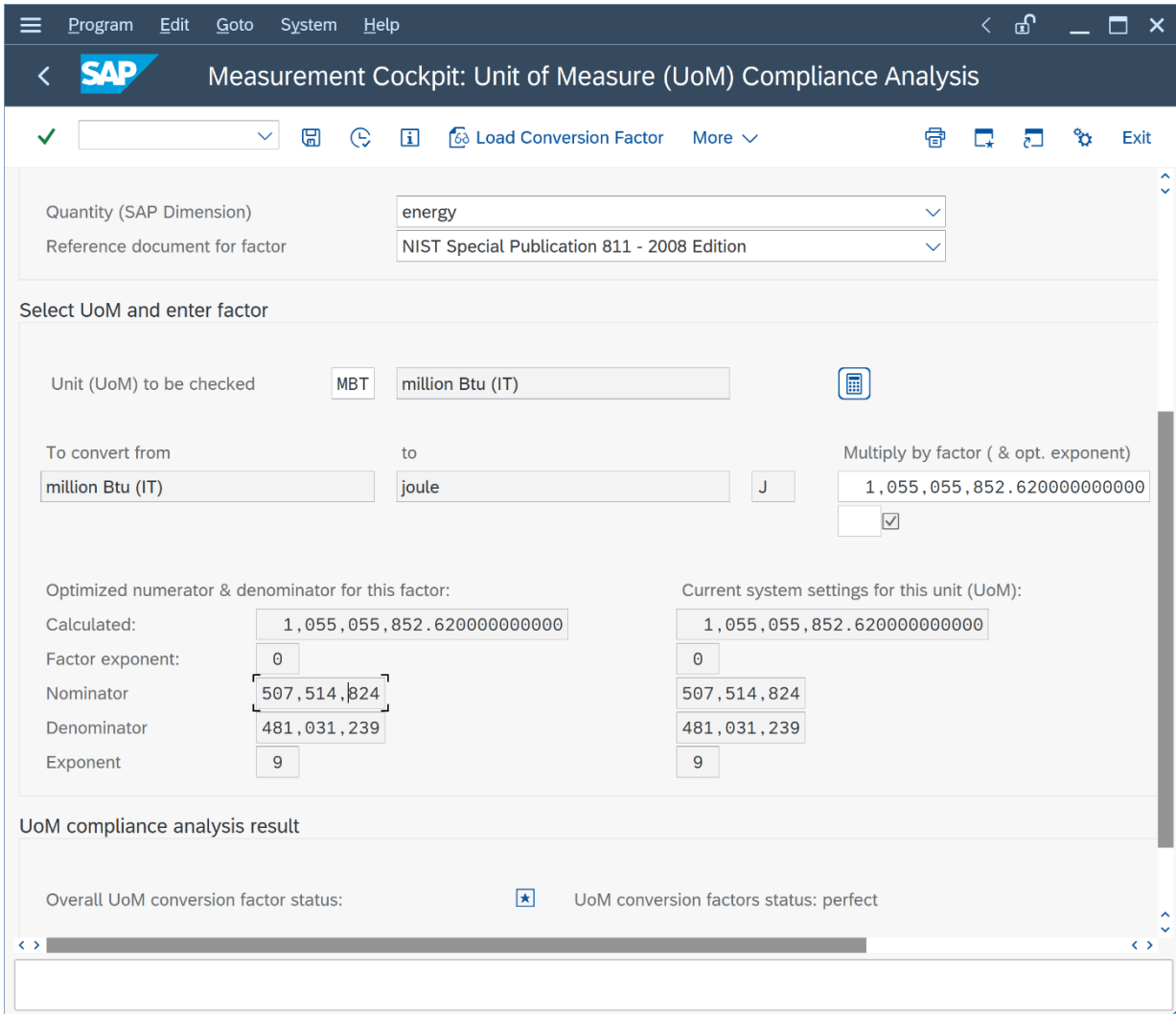


...	Dimens...	OG ISO	P	Measurement unit text	One UoM =	Factor	SI unit	UoM conversion
9	energy	OG GV		gigajoule - 25 °C comb.,sup.	1 GJ5	= 1,000,000,000.0000000000	J	<a href="#">UoM Conversion</a>
10	energy	GV	X	gigajoule	1 GJL	= 1,000,000,000.0000000000	J	<a href="#">UoM Conversion</a>
11	energy	GWH	X	gigawatt hour	1 GWH	= 3,600,000,000.0000000000	J	<a href="#">UoM Conversion</a>
12	energy	OG		gigawatt hour 15 °C combustion	1 GWN	= 3,600,000,000.0000000000	J	<a href="#">UoM Conversion</a>
13	energy	JOU	X	joule	1 J	= 1.0000000000	J	<a href="#">UoM Conversion</a>
14	energy	KJO	X	kilojoule	1 KJ	= 1,000.0000000000	J	<a href="#">UoM Conversion</a>
15	energy	KWH	X	kilowatt hour	1 KWH	= 3,600,000.0000000000	J	<a href="#">UoM Conversion</a>
16	energy	OG KWH		kilowatt hour -15 °C c.,inf.	1 KWI	= 3,600,000.0000000000	J	<a href="#">UoM Conversion</a>
17	energy	OG KWH		kilowatt hour -15 °C c.,sup.	1 KWN	= 3,600,000.0000000000	J	<a href="#">UoM Conversion</a>
18	energy	OG BZ		million Btu(IT) - 60 °F c.,s.	1 MBD	= 1,055,055,852.6200000000	J	<a href="#">UoM Conversion</a>
19	energy	OG BZ		million Btu(IT) - 60 °F c.,i.	1 MBI	= 1,055,055,852.6200000000	J	<a href="#">UoM Conversion</a>
20	energy	BZ		million Btu (IT)	1 MBT	= 1,055,055,852.6200000000	J	<a href="#">UoM Conversion</a>
21	energy	BZ	X	million Btu(IT)	1 MBU	= 1,055,055,852.6200000000	J	<a href="#">UoM Conversion</a>

Thus, GMC also provides a sophisticated UoM comparison tool which you utilize to compare UoM definitions that are delivered in BC sets with UoM definitions in your system clients.




The UoM compliance analysis is also available in this tab page:

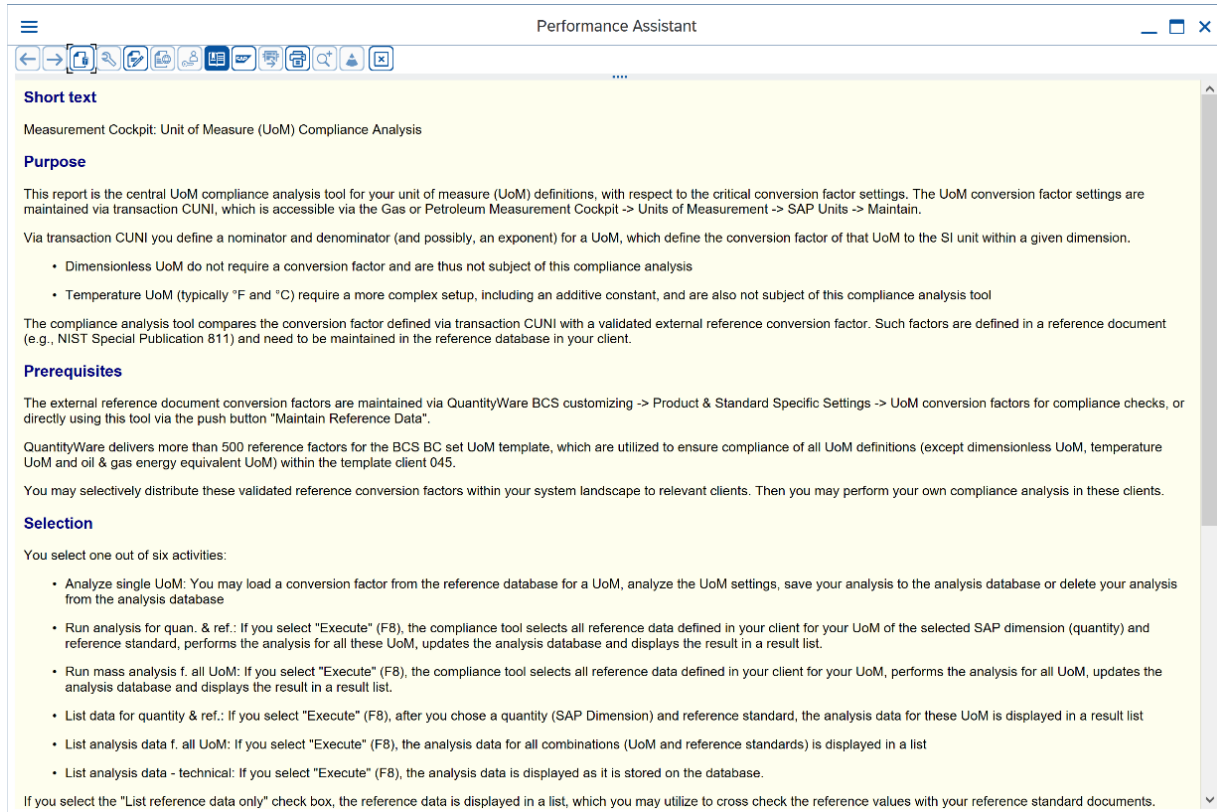


The screenshot shows the SAP Measurement Cockpit interface for Unit of Measure (UoM) Compliance Analysis. The window title is "Measurement Cockpit: Unit of Measure (UoM) Compliance Analysis". The interface includes a menu bar with "Program", "Edit", "Goto", "System", and "Help". Below the menu bar, there is a toolbar with icons for "Load Conversion Factor" and "More".

The main content area is divided into several sections:

- Quantity (SAP Dimension):** energy
- Reference document for factor:** NIST Special Publication 811 - 2008 Edition
- Select UoM and enter factor:**
  - Unit (UoM) to be checked:** MBT million Btu (IT)
  - To convert from:** million Btu (IT)
  - to:** joule
  - Multiply by factor (& opt. exponent):** 1,055,055,852.6200000000000
- Optimized numerator & denominator for this factor:**
  - Calculated: 1,055,055,852.6200000000000
  - Factor exponent: 0
  - Nominator: 507,514,824
  - Denominator: 481,031,239
  - Exponent: 9
- Current system settings for this unit (UoM):**
  - Calculated: 1,055,055,852.6200000000000
  - Factor exponent: 0
  - Nominator: 507,514,824
  - Denominator: 481,031,239
  - Exponent: 9
- UoM compliance analysis result:**
  - Overall UoM conversion factor status:  UoM conversion factors status: perfect

The online documentation provides a detailed explanation how to prepare the UoM compliance analysis:



**Short text**

Measurement Cockpit: Unit of Measure (UoM) Compliance Analysis

**Purpose**

This report is the central UoM compliance analysis tool for your unit of measure (UoM) definitions, with respect to the critical conversion factor settings. The UoM conversion factor settings are maintained via transaction CUNI, which is accessible via the Gas or Petroleum Measurement Cockpit -> Units of Measurement -> SAP Units -> Maintain.

Via transaction CUNI you define a nominator and denominator (and possibly, an exponent) for a UoM, which define the conversion factor of that UoM to the SI unit within a given dimension.

- Dimensionless UoM do not require a conversion factor and are thus not subject of this compliance analysis
- Temperature UoM (typically "F and "C) require a more complex setup, including an additive constant, and are also not subject of this compliance analysis tool

The compliance analysis tool compares the conversion factor defined via transaction CUNI with a validated external reference conversion factor. Such factors are defined in a reference document (e.g., NIST Special Publication 811) and need to be maintained in the reference database in your client.

**Prerequisites**

The external reference document conversion factors are maintained via QuantityWare BCS customizing -> Product & Standard Specific Settings -> UoM conversion factors for compliance checks, or directly using this tool via the push button "Maintain Reference Data".

QuantityWare delivers more than 500 reference factors for the BCS BC set UoM template, which are utilized to ensure compliance of all UoM definitions (except dimensionless UoM, temperature UoM and oil & gas energy equivalent UoM) within the template client 045.

You may selectively distribute these validated reference conversion factors within your system landscape to relevant clients. Then you may perform your own compliance analysis in these clients.

**Selection**

You select one out of six activities:

- Analyze single UoM: You may load a conversion factor from the reference database for a UoM, analyze the UoM settings, save your analysis to the analysis database or delete your analysis from the analysis database
- Run analysis for quan. & ref.: If you select "Execute" (F8), the compliance tool selects all reference data defined in your client for your UoM of the selected SAP dimension (quantity) and reference standard, performs the analysis for all these UoM, updates the analysis database and displays the result in a result list.
- Run mass analysis f. all UoM: If you select "Execute" (F8), the compliance tool selects all reference data defined in your client for your UoM, performs the analysis for all UoM, updates the analysis database and displays the result in a result list.
- List data for quantity & ref.: If you select "Execute" (F8), after you chose a quantity (SAP Dimension) and reference standard, the analysis data for these UoM is displayed in a result list
- List analysis data f. all UoM: If you select "Execute" (F8), the analysis data for all combinations (UoM and reference standards) is displayed in a list
- List analysis data - technical: If you select "Execute" (F8), the analysis data is displayed as it is stored on the database.

If you select the "List reference data only" check box, the reference data is displayed in a list, which you may utilize to cross check the reference values with your reference standard documents.

### 3.4.2. Print Standards Lists

---

When either adding a new product line or changing conversions for existing products, the “second task package” is the definition of the correct measurement standard, or several standards, as well as specific rules which may apply for different countries/business contracts. You need to compare legacy system results with available standards - a process which is usually considerably easier when ranges of complex correction factors can be printed. During general operations, you may also need to explain your conversion results to an independent inspector and thus need to print the relevant data. Basically, five different types of standards are relevant for your gas quantity conversion configuration:

- Standards defining the detailed calculation model
- Standards defining correction and conversion factors due to pressure and temperature on product volumes and energies and all properties (heating values, densities, Wobbe index ...)
- Standards defining calculations of densities and heating values from composition
- Standards defining physical property data
- Standards defining the conversion factors between UoM of one dimension

Gas Measurement Cockpit: Print Physical Properties of Hydrocarbons

### Physical Property Data Sets - Natural Gas Components

Select Set ID -> display Set components  
Select column 3 ... -> display Set header data

Set ID	Description	B. Tmp.	HV	Base temp	Unit	Unit description	B.Press.HV	B.Press.VL	Unit	Unit description
QS	QW: 15 °C / 15 °C ISO 6578:2017 LNG	15.00	15.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
QT	QW: 15 °C / 15 °C ISO 6578:2017 NGL/LPG	288.150	288.150		K	Kelvin	101.325	101.325	KPA	kilopascal
QX	QW: 15 °C / 101.325 KPA GPA 2145:16 H2	15.00	15.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
QY	QW: 60 °F / 14.696 PSI GPA 2145:16 H2	60.00	60.00		FAH	degree Fahrenheit	14.696	14.696	PSI	pound-force
R1	QW: 25 °C / 0 °C ISO 6976:16	25.00	0.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R2	QW: 15 °C / 15 °C ISO 6976:16	15.00	15.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R3	QW: 0 °C / 0 °C ISO 6976:16	0.00	0.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R4	QW: 15 °C / 0 °C ISO 6976:16	15.00	0.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R5	QW: 20 °C / 20 °C ISO 6976:16	20.00	20.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R6	QW: 25 °C / 20 °C ISO 6976:16	25.00	20.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R7	QW: 25 °C / 15 °C ISO 6976:16	25.00	15.00		CEL	degree Celsius	101.325	101.325	KPA	kilopascal
R8	QW: 60 °F / 101.325 KPA ISO 6976:16	60.00	60.00		FAH	degree Fahrenheit	101.325	101.325	KPA	kilopascal
R9	QW: 60 °F / 14.696 PSI ISO 6976:16	60.00	60.00		FAH	degree Fahrenheit	14.696	14.696	PSI	pound-force
RA	QW: 60 °F / 14.696 PSI ISO 6976:16	60.00	60.00		FAH	degree Fahrenheit	14.696	14.696	PSI	pound-force

Gas Measurement Cockpit: Print Physical Properties of Hydrocarbons

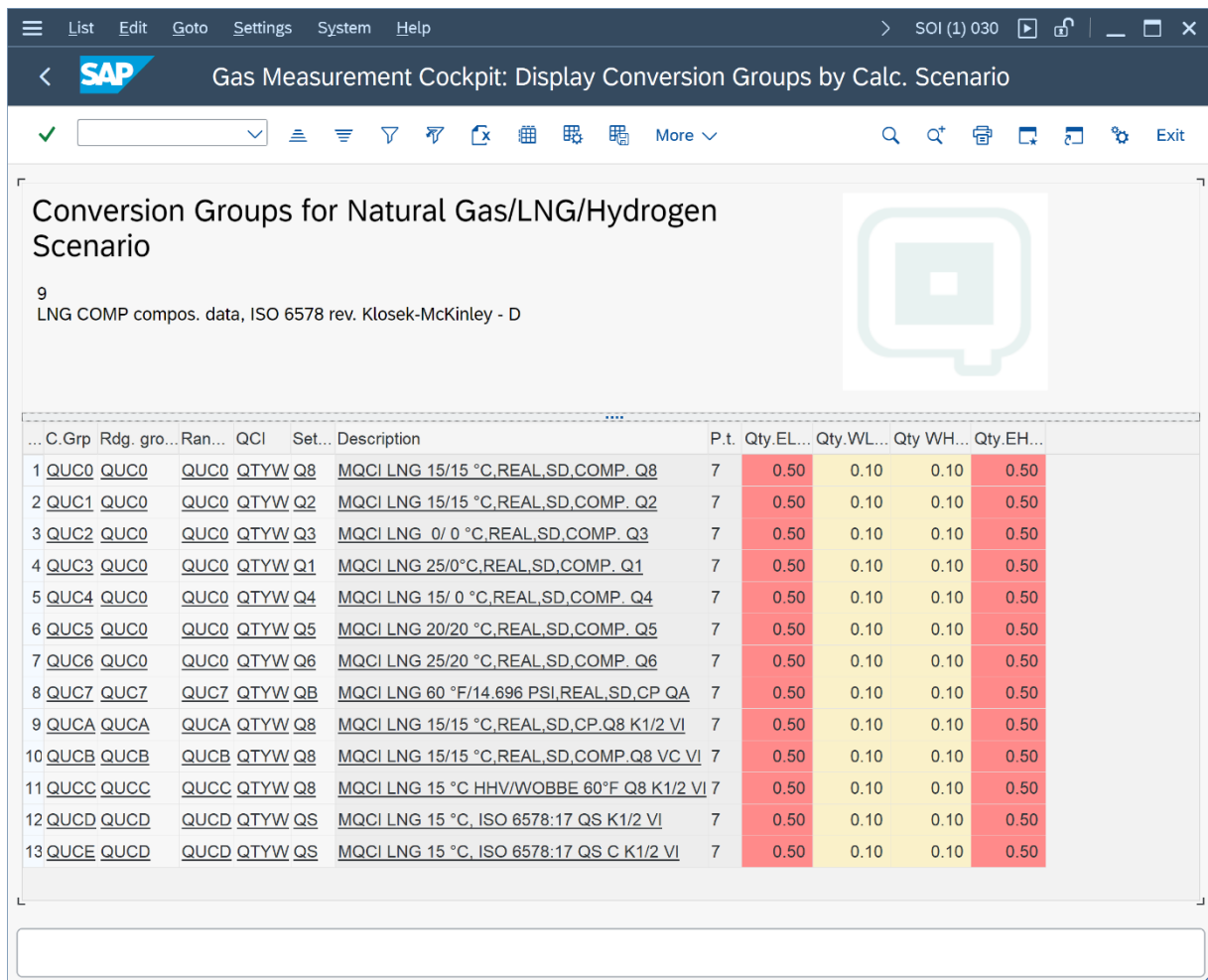
### Physical Property Set - Component Properties

Set-ID: QS - QW: 15 °C / 15 °C ISO 6578:2017 LNG  
Component: METHANE - methane  
Set is maintained with summation factors ISO 6976 def.

Parameter	Value	Unit	Unit description	Conditions
Molar mass	16.0420000	KKM	kilogram per kilomole	
Summation factor	0.0445000			at: 15.00 CEL , 101.325 ...
Heating value, superior, fuel as id. gas	55.5730000	MJK	megajoule per kilogram	at: 15.00 CEL, ideal reac...

### 3.4.3. QCI Configuration & Products

The third and most complex task package in a CTG renovation project is to update the conversion group documentation and configuration. You obtain an overview of the conversion groups, and inspect and cross check the settings.

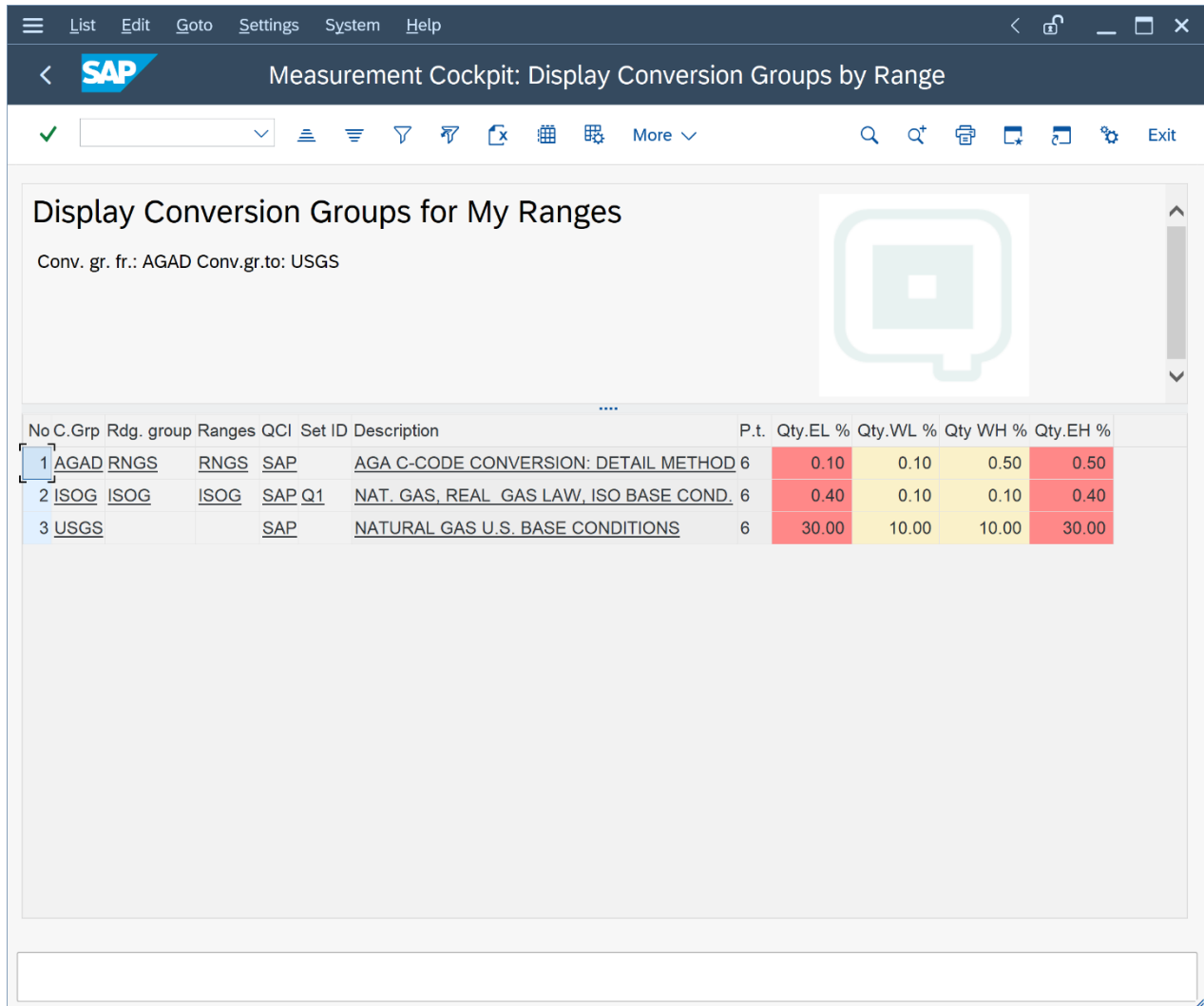


**Conversion Groups for Natural Gas/LNG/Hydrogen Scenario**

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

...	C.Grp	Rdg. gro...	Ran...	QCI	Set...	Description	P.t.	Qty.EL...	Qty.WL...	Qty.WH...	Qty.EH...
1	QUC0	QUC0	QUC0	QTYW	Q8	MQCI LNG 15/15 °C,REAL,SD,COMP. Q8	7	0.50	0.10	0.10	0.50
2	QUC1	QUC0	QUC0	QTYW	Q2	MQCI LNG 15/15 °C,REAL,SD,COMP. Q2	7	0.50	0.10	0.10	0.50
3	QUC2	QUC0	QUC0	QTYW	Q3	MQCI LNG 0/ 0 °C,REAL,SD,COMP. Q3	7	0.50	0.10	0.10	0.50
4	QUC3	QUC0	QUC0	QTYW	Q1	MQCI LNG 25/0°C,REAL,SD,COMP. Q1	7	0.50	0.10	0.10	0.50
5	QUC4	QUC0	QUC0	QTYW	Q4	MQCI LNG 15/ 0 °C,REAL,SD,COMP. Q4	7	0.50	0.10	0.10	0.50
6	QUC5	QUC0	QUC0	QTYW	Q5	MQCI LNG 20/20 °C,REAL,SD,COMP. Q5	7	0.50	0.10	0.10	0.50
7	QUC6	QUC0	QUC0	QTYW	Q6	MQCI LNG 25/20 °C,REAL,SD,COMP. Q6	7	0.50	0.10	0.10	0.50
8	QUC7	QUC7	QUC7	QTYW	QB	MQCI LNG 60 °F/14.696 PSI,REAL,SD,CP QA	7	0.50	0.10	0.10	0.50
9	QUCA	QUCA	QUCA	QTYW	Q8	MQCI LNG 15/15 °C,REAL,SD,CP.Q8 K1/2 VI	7	0.50	0.10	0.10	0.50
10	QUCB	QUCB	QUCB	QTYW	Q8	MQCI LNG 15/15 °C,REAL,SD,COMP.Q8 VC VI	7	0.50	0.10	0.10	0.50
11	QUCC	QUCC	QUCC	QTYW	Q8	MQCI LNG 15 °C HHV/WOBBE 60°F Q8 K1/2 VI	7	0.50	0.10	0.10	0.50
12	QUCD	QUCD	QUCD	QTYW	QS	MQCI LNG 15 °C, ISO 6578:17 QS K1/2 VI	7	0.50	0.10	0.10	0.50
13	QUCE	QUCD	QUCD	QTYW	QS	MQCI LNG 15 °C, ISO 6578:17 QS C K1/2 VI	7	0.50	0.10	0.10	0.50

In this example, you display the two main SAP QCI legacy conversion groups, USGS and ISOG, and the rarely used AGAD. From this list, you can directly navigate to all detailed conversion group settings or print a conversion group explanation statement by clicking on the description of a conversion group:



No	C.Grp	Rdg.	group	Ranges	QCI	Set ID	Description	P.t.	Qty.EL %	Qty.WL %	Qty.WH %	Qty.EH %
1	AGAD	RNGS	RNGS	SAP			AGA C-CODE CONVERSION: DETAIL METHOD	6	0.10	0.10	0.50	0.50
2	ISOG	ISOG	ISOG	SAP Q1			NAT. GAS. REAL GAS LAW, ISO BASE COND.	6	0.40	0.10	0.10	0.40
3	USGS			SAP			NATURAL GAS U.S. BASE CONDITIONS	6	30.00	10.00	10.00	30.00

☰ List Edit Goto System Help < 🔒 \_ □ ×

---

< **SAP** Gas Measurement Cockpit: ECT - LNG, Natural Gas, H2 & NGL Conv. Groups

---

✓  📄 Export to PDF Cancel 📄 📄 📄 📄 🔍 🔍 📄 📄 ⚙️ Exit

---

Analysis for conversion group : ISOG NAT. GAS, REAL GAS LAW, ISO BASE COND.  
 Conversion group is configured to utilize the SAP QCI quantity conversion model without QuantityWare implementations

---

- 1.) The product type defined in the conversion group is:  
Natural Gas (gaseous)
- 2.) SAP QCI conversion groups do not support MQCI calculation model scenarios
- 3.) The base temperature(volumetric) of the conversion group is:  
15.00 Celsius
- 4.) The base pressure(volumetric) of the conversion group is:  
101.325000 Kilopascal
- 5.) The base temperature(combustion) of the conversion group is:  
15.00 Celsius
- 6.) The base pressure(combustion) of the conversion group is:  
101.325000 Kilopascal
- 7.) The conversion group is configured to :  
Use ideal gas routine
- 8.) The heating value class is:  
( superior / dry ), equiv.: ( gross,upper,total / dry )

---

Conversion group details - assignments (reading group, range group, units of measure and tolerance group)

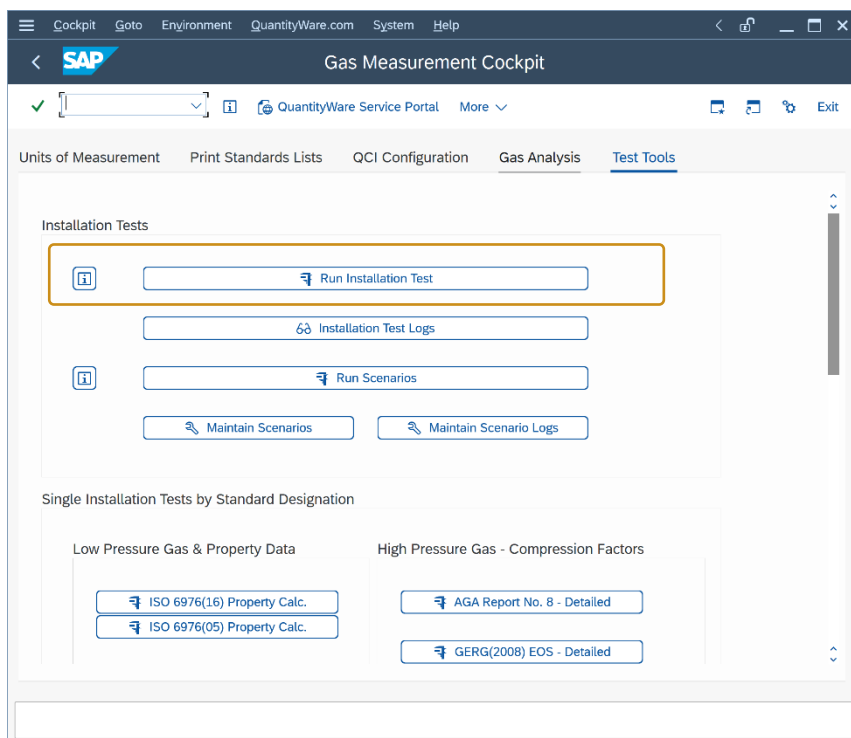
Reading group	ISOG READING GROUP FOR ISO METHOD	is assigned to conversion group
---------------	-----------------------------------	---------------------------------

### 3.4.4. Gas Analysis

The GMC Gas Analysis is only available for MQCI conversion groups.

### 3.4.5. Test Tools

All UoM and quantity conversion settings need rigorous testing and quality control. The QuantityWare installation test has to be executed from here. You also configure and run your own test scenarios with full logging and execution control in order to ensure full compliance for your implementation. Via this tab strip you access all QuantityWare test tools that are delivered with CTG:



From this tab, you either:

- In client 045, run the QuantityWare installation test with one click and obtain the test result within seconds
- In your other clients: Utilize the QuantityWare Test Scenario Tool (Run Scenarios, Maintain Scenarios, Maintain Scenario Logs) to define your own test scenarios based on your requirements and run your scenarios in your relevant clients
- Run the UoM compliance analysis in any client



Measurement Cockpit: Unit of Measure (UoM) Compliance Analysis

Display Unit of Measure Compliance Analysis Data

All UoM analysis data in system/client: SOI 065

No	Dimension text	UoM	Measurement unit text	SI	Standard	Ref./An.	Ref.Std.Factor	l/s	Cal.Denom.	Cal.Num.	Exp	Sys.Denom.	Sys.Num.	Exp	System Factor
25	volume	BBL	Barrels	M3	1	00	0.158987300000	0	10,000,000	1,589,873	0	259,303,135	41,225,904	0	0.158987294928
26	volume	BBL	Barrels	M3	3	00	0.158987300000	0	10,000,000	1,589,873	0	259,303,135	41,225,904	0	0.158987294928
27	volume	BBL	Barrels	M3	4	00	0.158987000000	0	1,000,000	158,987	0	259,303,135	41,225,904	0	0.158987294928
28	volume	BBL	Barrels	M3	5	00	0.158987304000	0	125,000,000	19,873,413	0	259,303,135	41,225,904	0	0.158987294928
29	volume	BBL	Barrels	M3	6	00	0.158987294928	0	259,303,135	41,225,904	0	259,303,135	41,225,904	0	0.158987294928
30	heating value(vol.)	BC1	BTU/Cubic Foot at 15.025/60/SD	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
31	heating value(vol.)	BC2	BTU/Cubic Foot at 14.73/60/SD	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
32	heating value(vol.)	BC3	BTU/Cubic Foot at 14.65/60/SD	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
33	heating value(vol.)	BC4	BTU/Cubic Foot at 15.025/60/SW	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
34	heating value(vol.)	BC5	BTU/Cubic Foot at 14.73/60/SW	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
35	heating value(vol.)	BC6	BTU/Cubic Foot at 14.65/60/SW	JM3	1	00	37,258.941299999999	0	10,000	372,589,413	0	10,000	372,589,413	0	0.3725894129999999
36	Volume per Height	BP2	Barrels per half inch	QMM	1	00	12.518690000000	0	100,000	1,251,869	0	100,000	1,251,869	0	12.518690000000
37	Volume per Height	BP4	Barrels per a quarter of inch	QMM	1	00	25.037370000000	0	100,000	2,503,737	0	100,000	2,503,737	0	25.037370000000

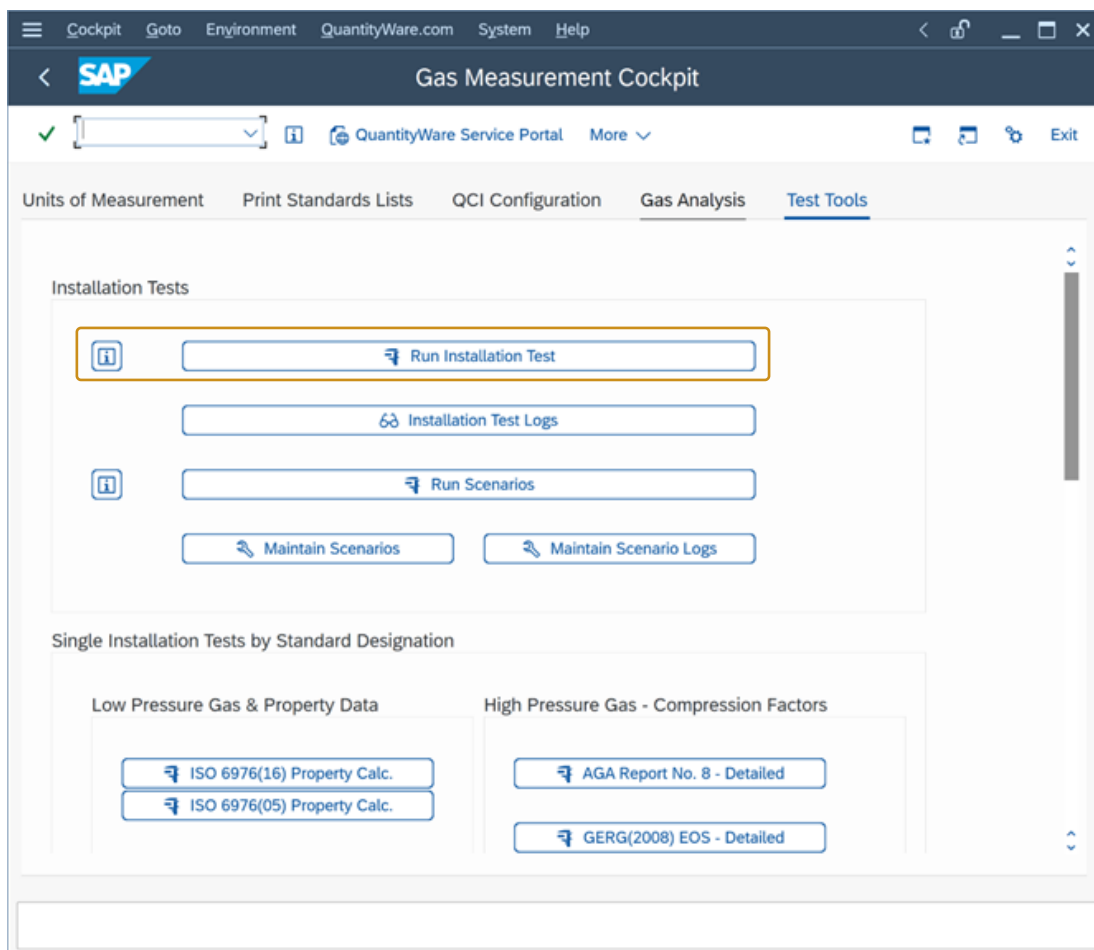
The UoM compliance analysis in client 045 is executed automatically once you execute the installation test and the result of the analysis is stored in your database. QuantityWare delivers validated UoM conversion factors which are utilized for the analysis and which you may also copy for your own analysis e.g. in your productive system and client.

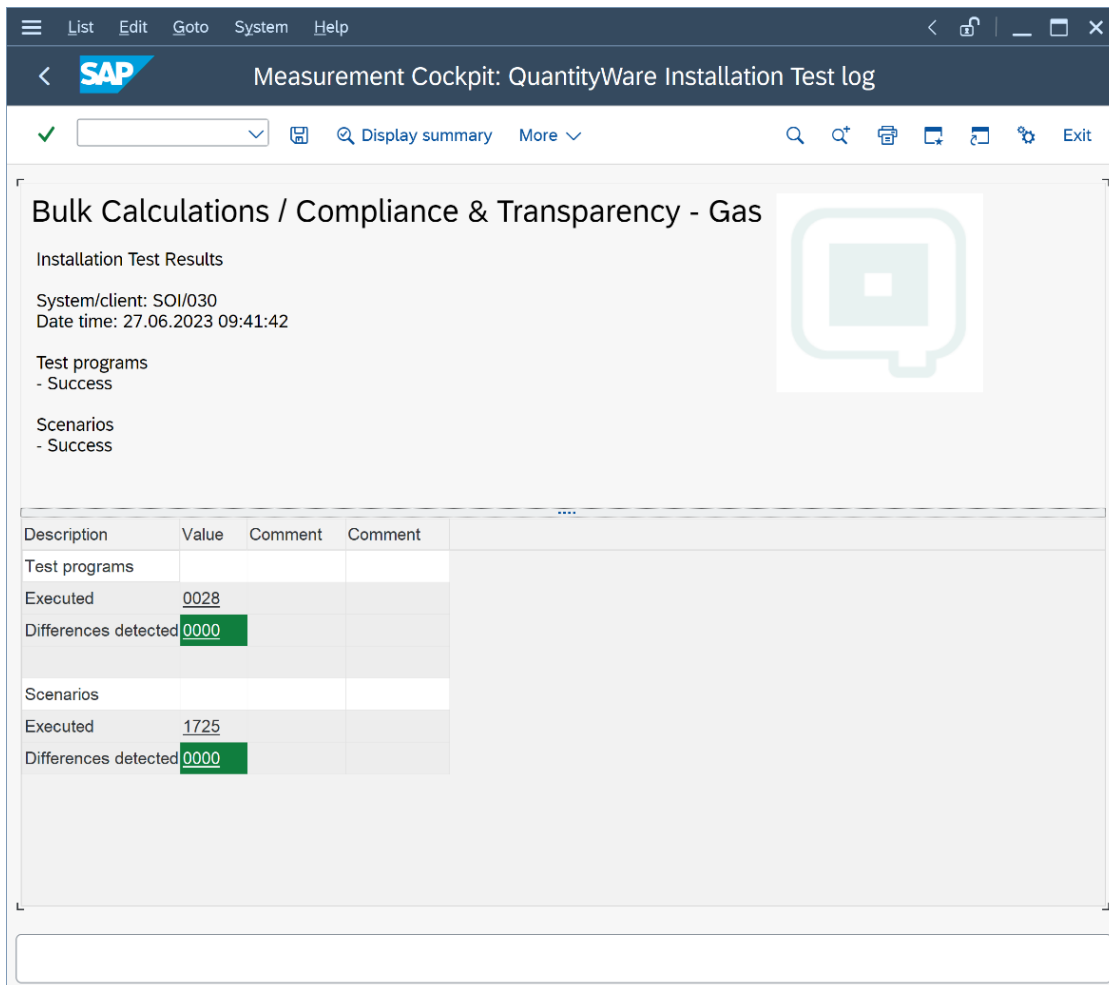
### 3.4.5.1. CTG Installation Test

The CTG Installation Test must be executed in one dedicated system per system landscape and client 045 (recommended client number if available).

The CTG Installation Test is identical with the BCG Installation Test and thus requires that the BCG BC set is activated in that client. The BCG BC Set contains a rich configuration template (only client dependent data) on which the installation test performs massive tests in conjunction with the ABAP repository installation.

The CTG Installation Test is executed from the Gas Measurement Cockpit (GMC), tab strip “Test Tools” with one single click on push button “Run Installation Test”:



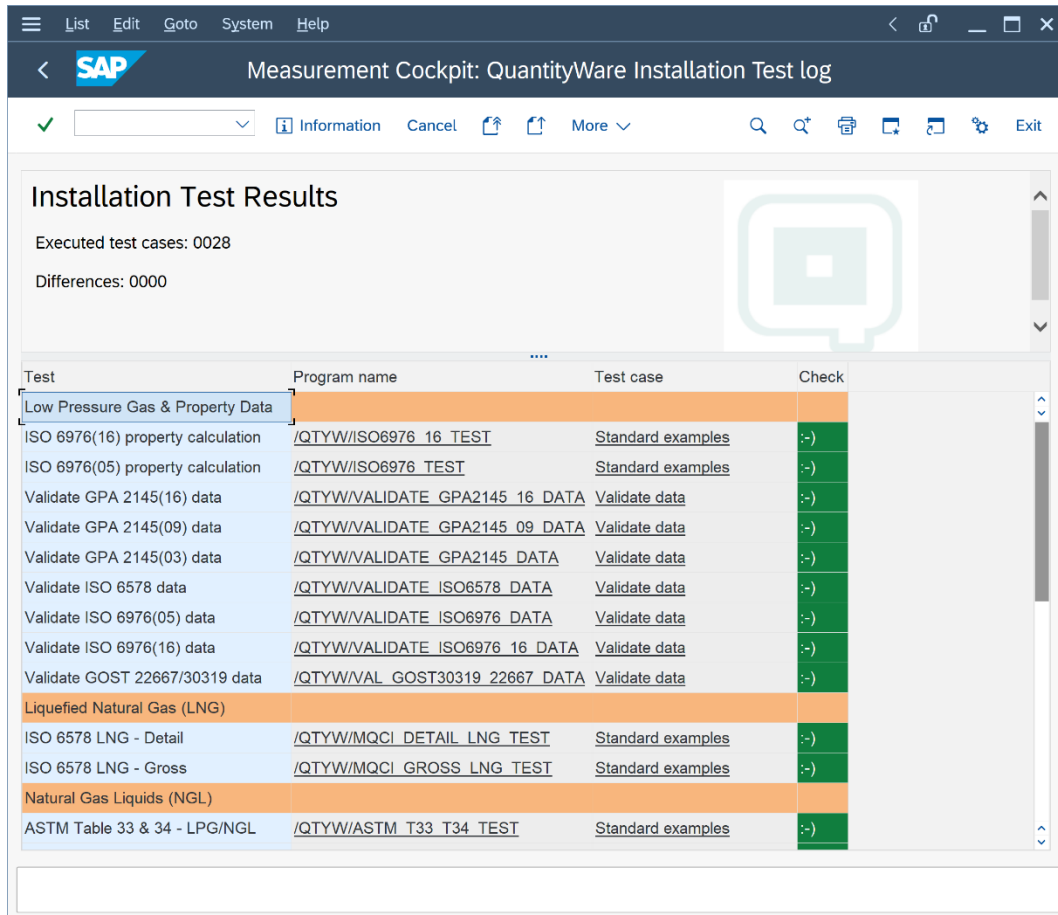


Two types of tests are executed during the installation test:

- **28** Test Programs
- **1 725** Test Scenarios

These results are also written to the installation test log database for later reference.

You navigate to the test details (either from this result list or the log database result list) by simply clicking a result line. If you select the test programs, a comprehensive list with all executed test programs and the relevant test cases is displayed:

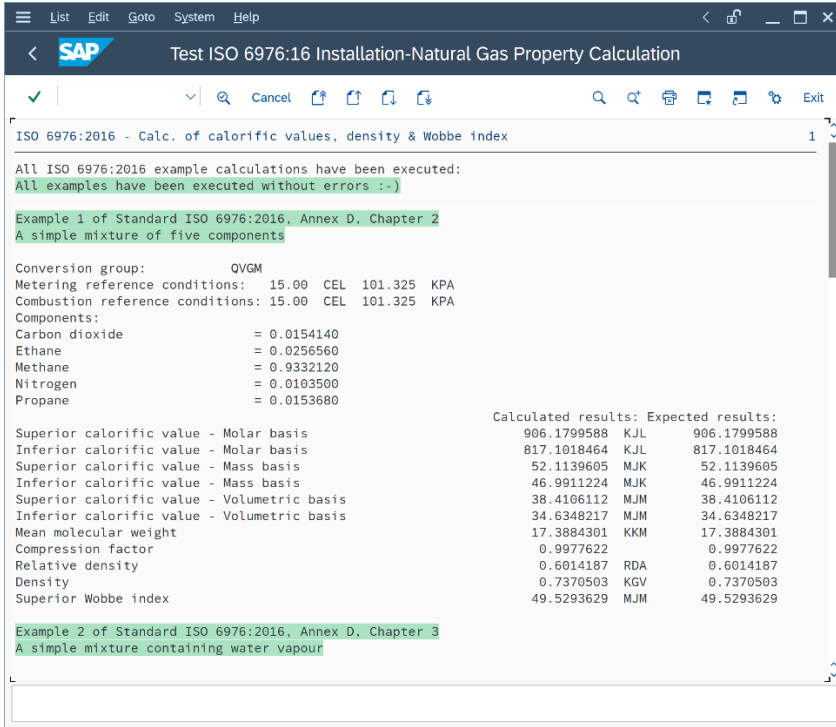


Executed test cases: 0028  
Differences: 0000

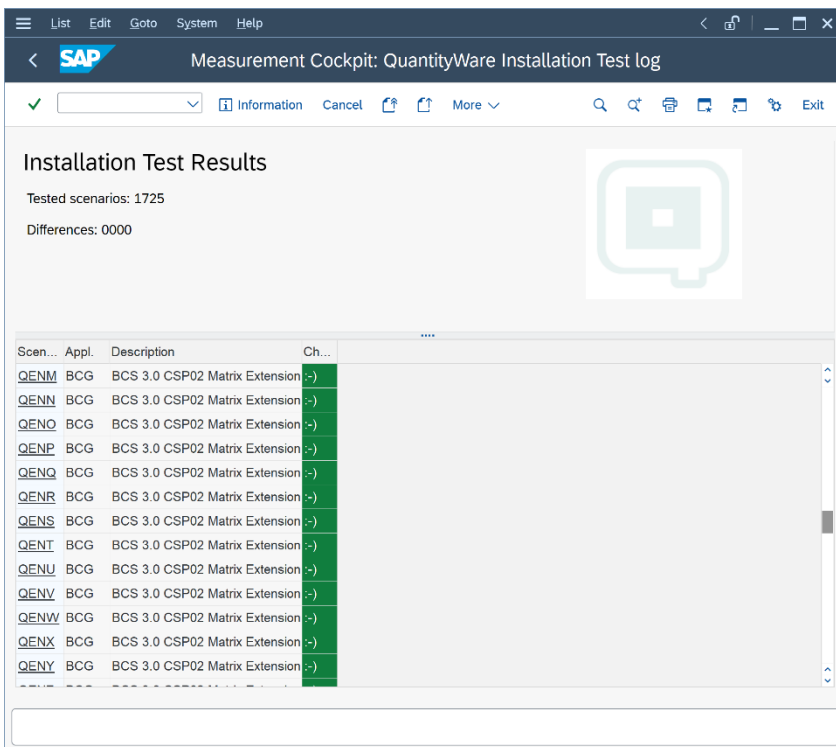
Test	Program name	Test case	Check
Low Pressure Gas & Property Data			
ISO 6976(16) property calculation	/QTYW/ISO6976_16_TEST	Standard examples	-:-)
ISO 6976(05) property calculation	/QTYW/ISO6976_TEST	Standard examples	-:-)
Validate GPA 2145(16) data	/QTYW/VALIDATE_GPA2145_16_DATA	Validate data	-:-)
Validate GPA 2145(09) data	/QTYW/VALIDATE_GPA2145_09_DATA	Validate data	-:-)
Validate GPA 2145(03) data	/QTYW/VALIDATE_GPA2145_DATA	Validate data	-:-)
Validate ISO 6578 data	/QTYW/VALIDATE_ISO6578_DATA	Validate data	-:-)
Validate ISO 6976(05) data	/QTYW/VALIDATE_ISO6976_DATA	Validate data	-:-)
Validate ISO 6976(16) data	/QTYW/VALIDATE_ISO6976_16_DATA	Validate data	-:-)
Validate GOST 22667/30319 data	/QTYW/VAL_GOST30319_22667_DATA	Validate data	-:-)
Liquefied Natural Gas (LNG)			
ISO 6578 LNG - Detail	/QTYW/MQCI_DETAIL_LNG_TEST	Standard examples	-:-)
ISO 6578 LNG - Gross	/QTYW/MQCI_GROSS_LNG_TEST	Standard examples	-:-)
Natural Gas Liquids (NGL)			
ASTM Table 33 & 34 - LPG/NGL	/QTYW/ASTM_T33_T34_TEST	Standard examples	-:-)

The Test Programs typically contain one test cases. Test case “Standard examples” ensures that all measurement standard examples (expected results) for CTG conversion standards that are defined in a measurement standard are exactly reproduced. Test case “Validate Data” ensures that physical property data sets are consistent.

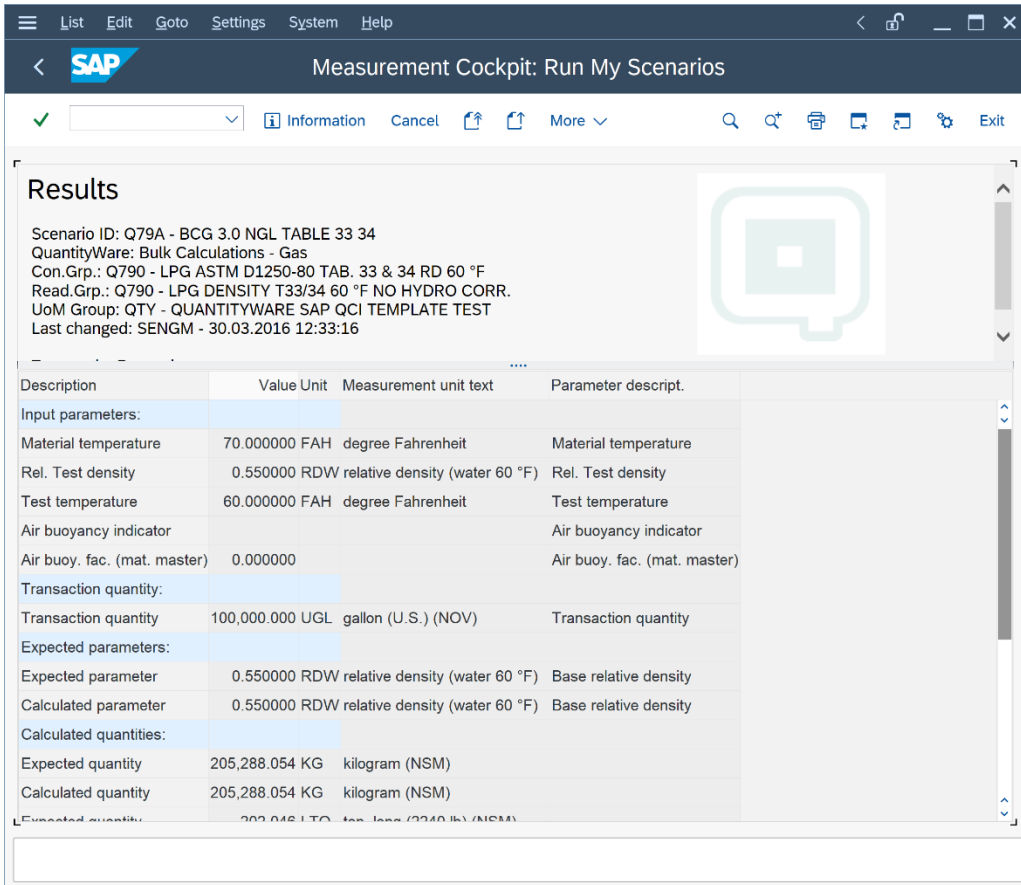
You navigate to all test details from this overview list -test case: "Standard examples":



If you select the test scenarios, a comprehensive list with all executed 1 725 test scenarios is displayed:



By clicking on a scenario ID, you display all test scenario details:



The screenshot shows the SAP Measurement Cockpit interface. The title bar reads "Measurement Cockpit: Run My Scenarios". Below the title bar, there is a search bar and several icons. The main content area is titled "Results" and contains the following information:

Scenario ID: Q79A - BCG 3.0 NGL TABLE 33 34  
QuantityWare: Bulk Calculations - Gas  
Con.Grp.: Q790 - LPG ASTM D1250-80 TAB. 33 & 34 RD 60 °F  
Read.Grp.: Q790 - LPG DENSITY T33/34 60 °F NO HYDRO CORR.  
UoM Group: QTY - QUANTITYWARE SAP QCI TEMPLATE TEST  
Last changed: SENGM - 30.03.2016 12:33:16

Description	Value	Unit	Measurement unit text	Parameter descript.
<b>Input parameters:</b>				
Material temperature	70.000000	FAH	degree Fahrenheit	Material temperature
Rel. Test density	0.550000	RDW	relative density (water 60 °F)	Rel. Test density
Test temperature	60.000000	FAH	degree Fahrenheit	Test temperature
Air buoyancy indicator				Air buoyancy indicator
Air buoy. fac. (mat. master)	0.000000			Air buoy. fac. (mat. master)
<b>Transaction quantity:</b>				
Transaction quantity	100,000.000	UGL	gallon (U.S.) (NOV)	Transaction quantity
<b>Expected parameters:</b>				
Expected parameter	0.550000	RDW	relative density (water 60 °F)	Base relative density
Calculated parameter	0.550000	RDW	relative density (water 60 °F)	Base relative density
<b>Calculated quantities:</b>				
Expected quantity	205,288.054	KG	kilogram (NSM)	
Calculated quantity	205,288.054	KG	kilogram (NSM)	
Expected quantity	202,048.170	LB	lbm (2240 lb) (NSM)	



QuantityWare recommends that you develop your own customer specific test scenarios (Maintain Scenarios) that contain your manually calculated results (cross checked by at least two experts) and check the system calculation against these results, such that your customer specific quantity conversion configuration can always be validated in your clients with one click. This way, a high degree of automation is ensured, as well as system compatibility with your measurement standards during productive usage.

The QuantityWare Test Scenario Tool does not require any programming skills; you simply define your expected results for a chosen conversion group and the defined input parameters.

### 3.5. GMC Documentation

---

Detailed online documentation is available within the GMC, which explains all measurement concepts and all available tools.

### 3.6. Summary

---

The GMC provides an easy-to-use, structured, single point of access to all parties responsible for the configuration, control and development of quantity conversion policy and implementation. The GMCs functionality brings Transparency and enables the definition and realization of GRC-promoting procedures for the “bottom-line” of an energy companies’ business – bulk product movements.

## 4. CTG – Test Scenarios

---

### 4.1. Introduction

---

An important aspect in the definition and configuration of complex quantity conversion calculations is to ensure that the calculation results are reproducible, stable and based on e.g. contractual agreements between business partners, measurement standards and governmental requirements.

After installing CTG in your system, you must test this basic configuration implementation delivered with the BC set in client 045 (recommended client) where you have activated the relevant QuantityWare BC set. You run the implementation and installation from the GMC Test Tool tab with one click. The GMC is part of CTG and provides the central user interface for Gas Measurement Experts and Consultants to CTG.

After renovating your legacy SAP QCI natural gas conversion groups, you need to cross check the calculation results with an independent calculation procedure. Ultimately, this has to be a semi-manual process (typically using a spreadsheet and a pocket calculator, or results from a legacy system).

QuantityWare delivers a test scenario tool which you utilize to define your own test scenarios for your configuration settings (e.g. conversion group and related settings) in your system. This test scenario tool can be accessed via the GMC as well. This chapter describes how to use the test tool.

Typically in your QA system, you define test scenarios based on your company specific conversion group configurations which can then be run at any time in the system. After definition and testing, you simply transport the test scenarios from your QA system to all relevant systems in your landscape including your production system. A log can be written to the database for each test scenario run, providing a protocol of the test results for later auditing. You may also save a snapshot of each test scenario during a scenario run to the database. Such a snapshot can be written to the database if a scenario runs without error. The snapshot contains all relevant configuration data (customizing settings) and the test scenario data. If a scenario runs into an error, you simply compare the snapshot data with the then current system data in order to determine if a change of the scenario or the related configuration has caused the error.



For one scenario you may create exactly one snapshot. Once you have created your own test scenarios, you should run these tests and write the results including a snapshot to the log tables at least after:

- You install a new CTG support package (CSP) or note
- You install an SAP Oil, Gas, & Energy ERP related note or package

Tests can also be scheduled regularly or executed irregularly to ensure that configuration is consistent.

## 4.2. Test Scenario – Delivery with BC Set



With CTG, QuantityWare delivers **1 725** test scenarios as part of the BC set template, which you access in your CTG template client 045 where the BC set has been activated

These test scenarios are delivered for two reasons:

- To provide an additional high precision test matrix which extends the standard QuantityWare CTG installation test. All scenarios are designed to run without errors within the QuantityWare BCG client 045, where the BC set has been activated
- Provide realistic examples for consultants implementing CTG to ease definition of customer specific test scenarios

## 4.3. Test Scenario – Definition

A QuantityWare test scenario is an automated, conversion group based calculation, where the calculation parameters (Scenario ID, conversion group with reading group and unit of measure (UoM) group) and the expected calculation results (quantity values and parameters) are defined in the system.

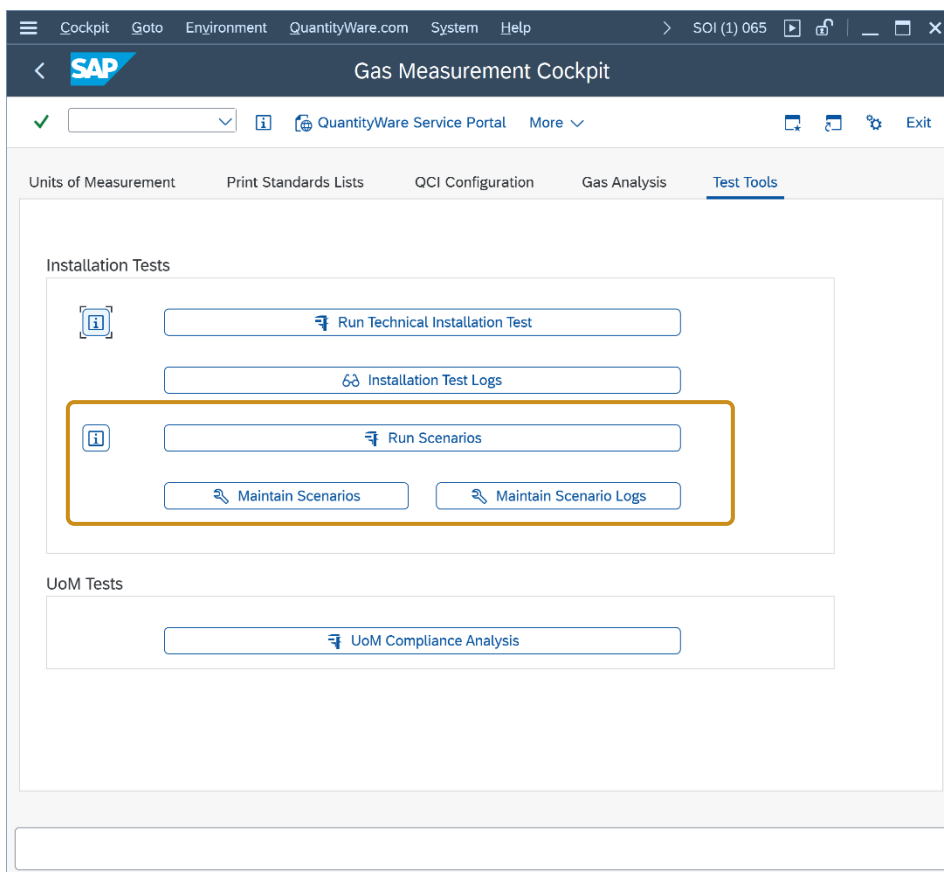
During a test scenario run, which you may start at any point in time, the system calculates the actual results (quantity values and parameters) and compares these actual results with your expected results defined in the test scenario. If all expected and actual results match, the scenario has been executed without error and reports the status “green - o.k.”; otherwise the differences are reported as “red - not o.k.” and marked as such in the details list which is printed for each scenario.



You also have the option to define a test scenario such that it runs “green – o.k.” **if a pre-defined error message is encountered.** This way, you e.g. automatically test that parameter range limits are correctly defined or that quantity deviations are within the specified limits.

## 4.4. Access to the Test Scenario Tool

The Test Scenario Tool is accessed via the GMC, tab strip “Test Tools”:



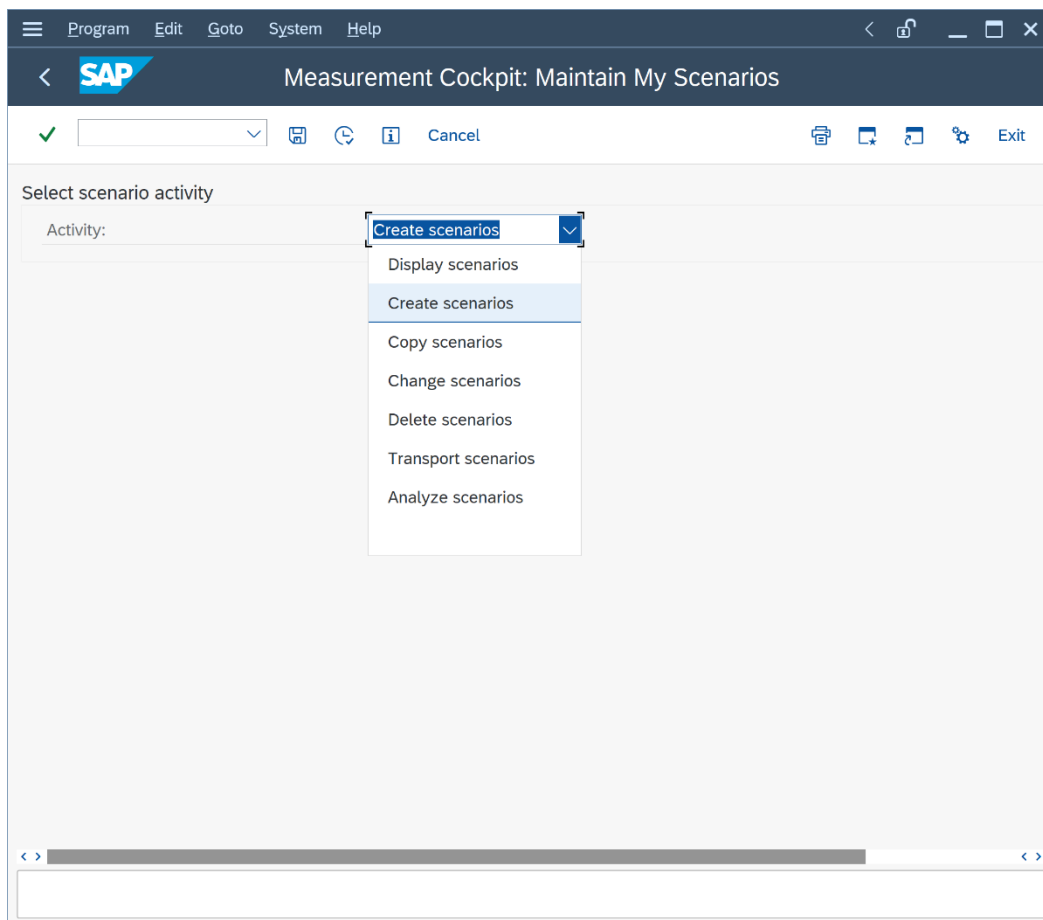
Three push buttons are available. “Run Scenarios”, “Maintain Scenarios” and “Maintain Scenario Logs”.

## 4.5. Test Scenario Tool Activities

All test scenarios can be transported to any required system and client within your system landscape. Test scenario definition typically takes place in your quality assurance system, after all conversion groups have been configured as required and manual calculations are in accordance with the expected results. Test Scenario execution and log analysis typically takes place in your quality assurance and production system.

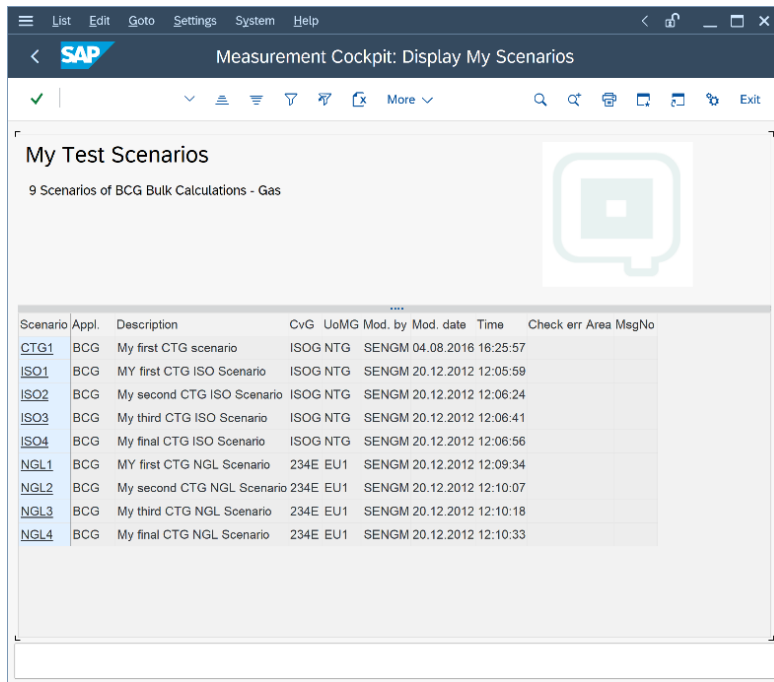
### 4.5.1. Maintaining Test Scenarios

If you select the “Maintain Scenarios” push button, you have the following options in the field “Activity”:

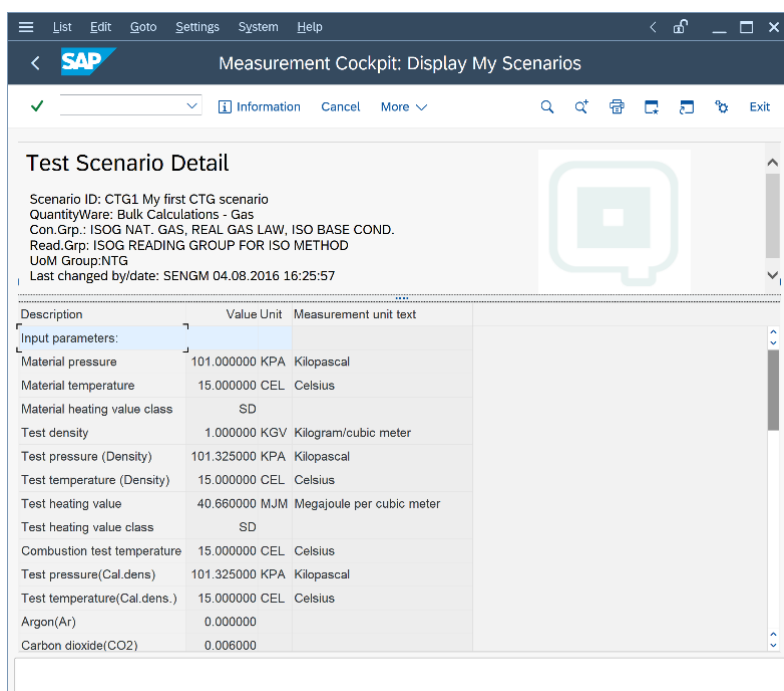


### 4.5.1.1. Display Scenarios

If you select this activity, you select a range of scenarios that will be displayed or display all scenarios for a conversion group:

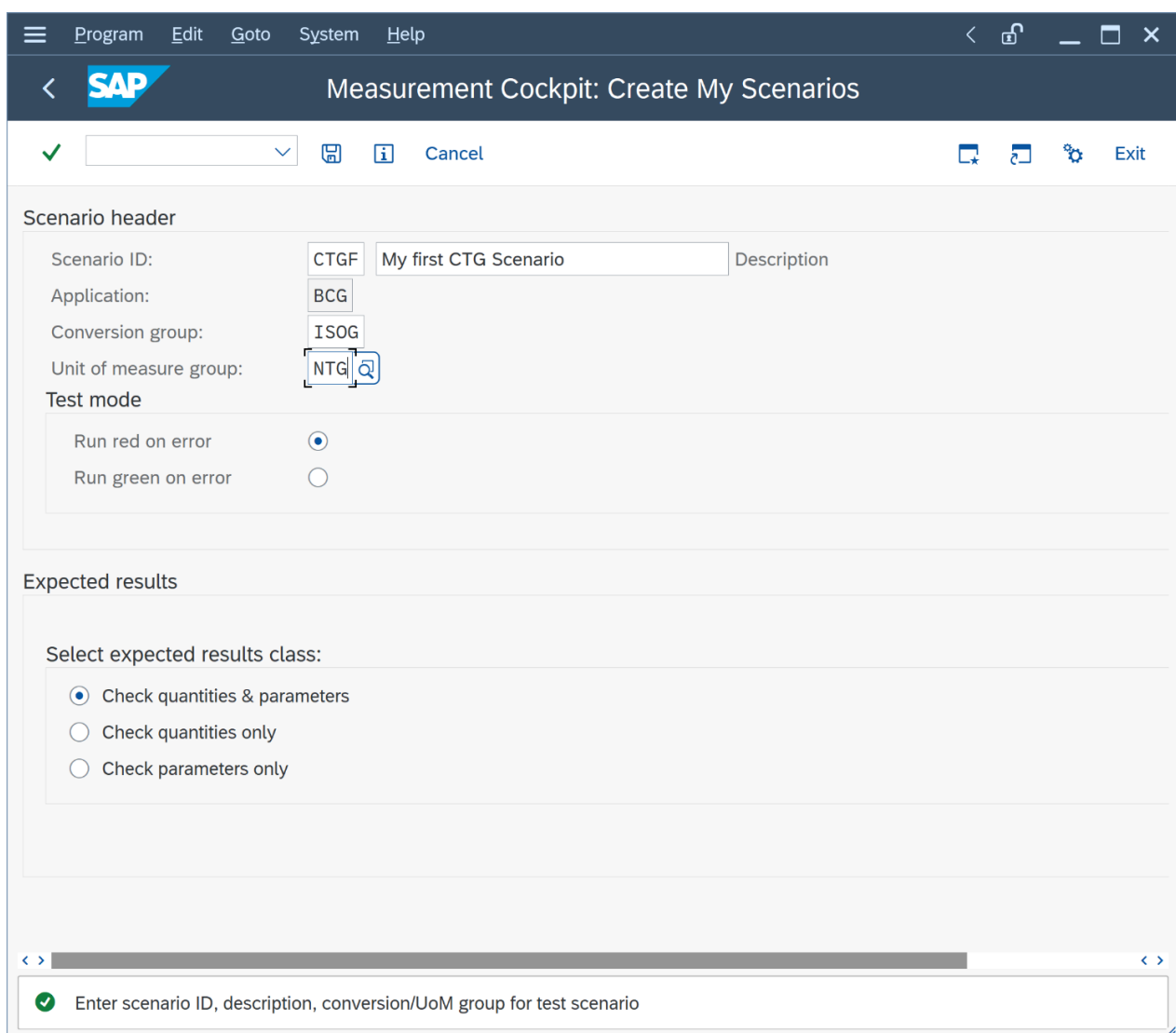


You inspect the scenario details by clicking on a single scenario ID or application ID:



#### 4.5.1.2. Create Scenarios

Enter the Scenario ID (four character field), a description and the conversion group for the test scenario, as well as a unit of measure group that contains the UoM for which the quantity conversion is executed:



The screenshot shows the 'Measurement Cockpit: Create My Scenarios' dialog box in SAP. The window title is 'SAP Measurement Cockpit: Create My Scenarios'. The menu bar includes 'Program', 'Edit', 'Goto', 'System', and 'Help'. The toolbar contains a checkmark, a dropdown arrow, a save icon, an information icon, a 'Cancel' button, a window icon, a refresh icon, a settings icon, and an 'Exit' button.

**Scenario header**

Scenario ID: CTGF My first CTG Scenario Description

Application: BCG

Conversion group: ISOG

Unit of measure group: NTG

**Test mode**

Run red on error

Run green on error

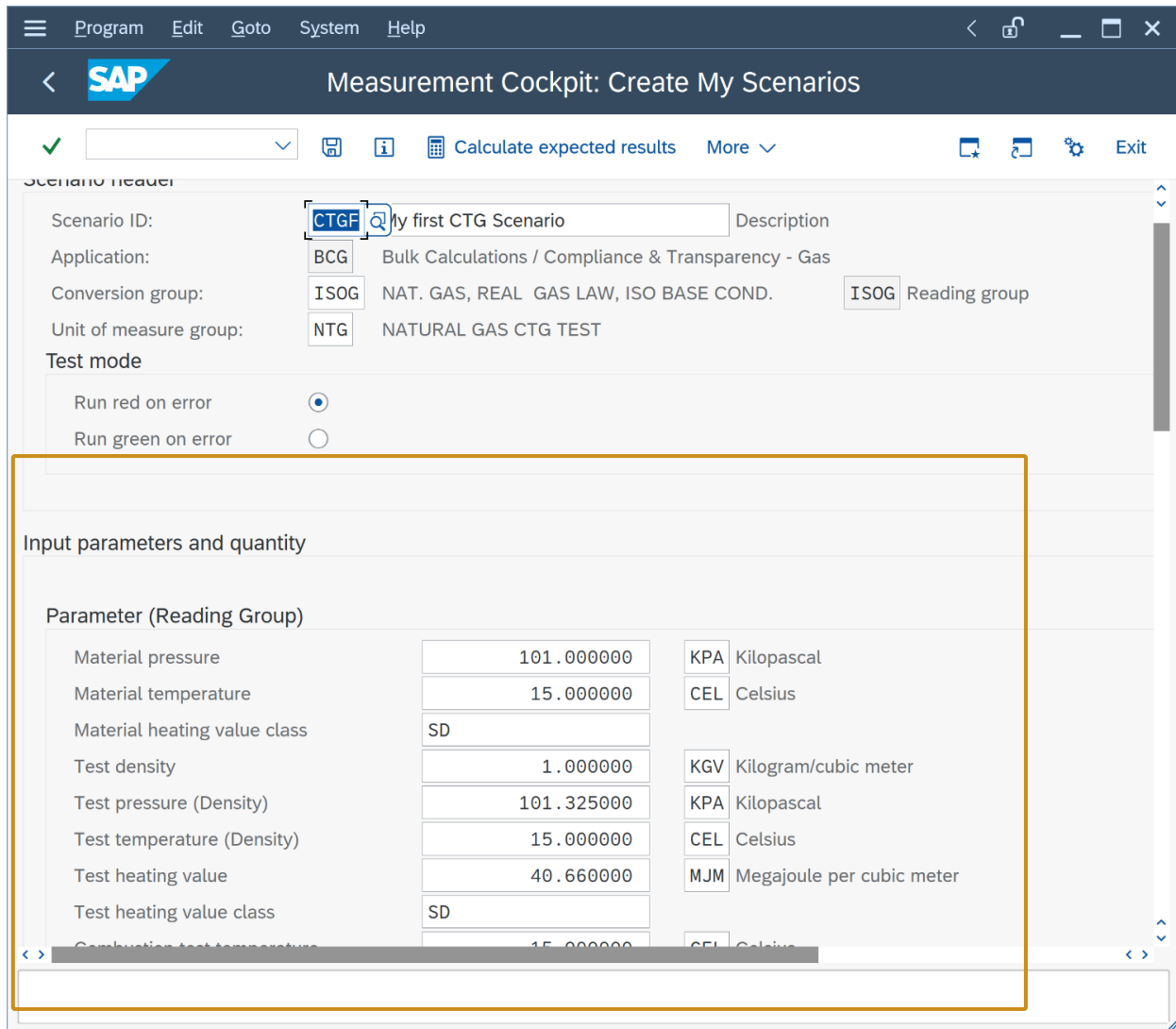
**Expected results**

Select expected results class:

- Check quantities & parameters
- Check quantities only
- Check parameters only

At the bottom, a status bar displays a green checkmark and the text: 'Enter scenario ID, description, conversion/UoM group for test scenario'.

After you press return, the system displays the relevant parameters from the reading group that is linked to the conversion group:



**Scenario header**

Scenario ID: **CTGF** my first CTG Scenario Description

Application: **BCG** Bulk Calculations / Compliance & Transparency - Gas

Conversion group: **ISOG** NAT. GAS, REAL GAS LAW, ISO BASE COND. **ISOG** Reading group

Unit of measure group: **NTG** NATURAL GAS CTG TEST

**Test mode**

Run red on error

Run green on error

---

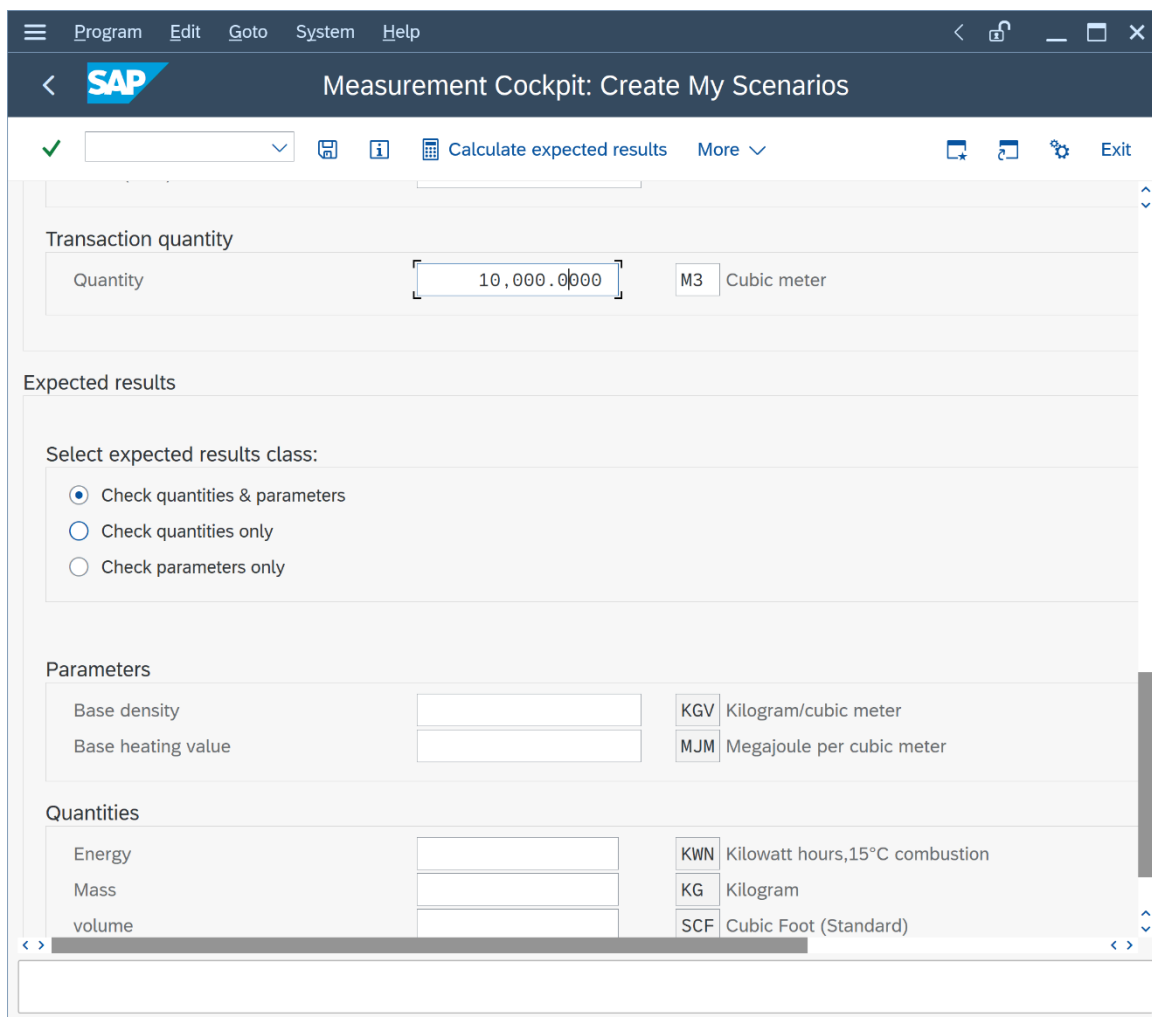
**Input parameters and quantity**

**Parameter (Reading Group)**

Material pressure	101.000000	KPA	Kilopascal
Material temperature	15.000000	CEL	Celsius
Material heating value class	SD		
Test density	1.000000	KGV	Kilogram/cubic meter
Test pressure (Density)	101.325000	KPA	Kilopascal
Test temperature (Density)	15.000000	CEL	Celsius
Test heating value	40.660000	MJM	Megajoule per cubic meter
Test heating value class	SD		
Combustion test temperature	15.000000	CEL	Celsius

For your scenario, you may select whether you want to compare the results for:

- Parameters and quantities
- Quantities only
- Parameters only



Then you enter the transaction quantity and UoM and either manually enter the parameter results and/or quantity results, or you select “Calculate expected results” (if you have already validated the correctness of the calculation) and save the test scenario by selecting the “Save scenario” (CTRL + F5) push button.

#### 4.5.1.3. Change Scenarios:

---

Here you change an existing scenario.

#### 4.5.1.4. Copy Scenarios

---

Allows you to copy an existing scenario to a new scenario ID.

#### 4.5.1.5. Delete Scenarios

---

Allows you to list a range of scenarios from which you can then select individual, or multiple scenarios for deletion.

#### 4.5.1.6. Transport Scenarios

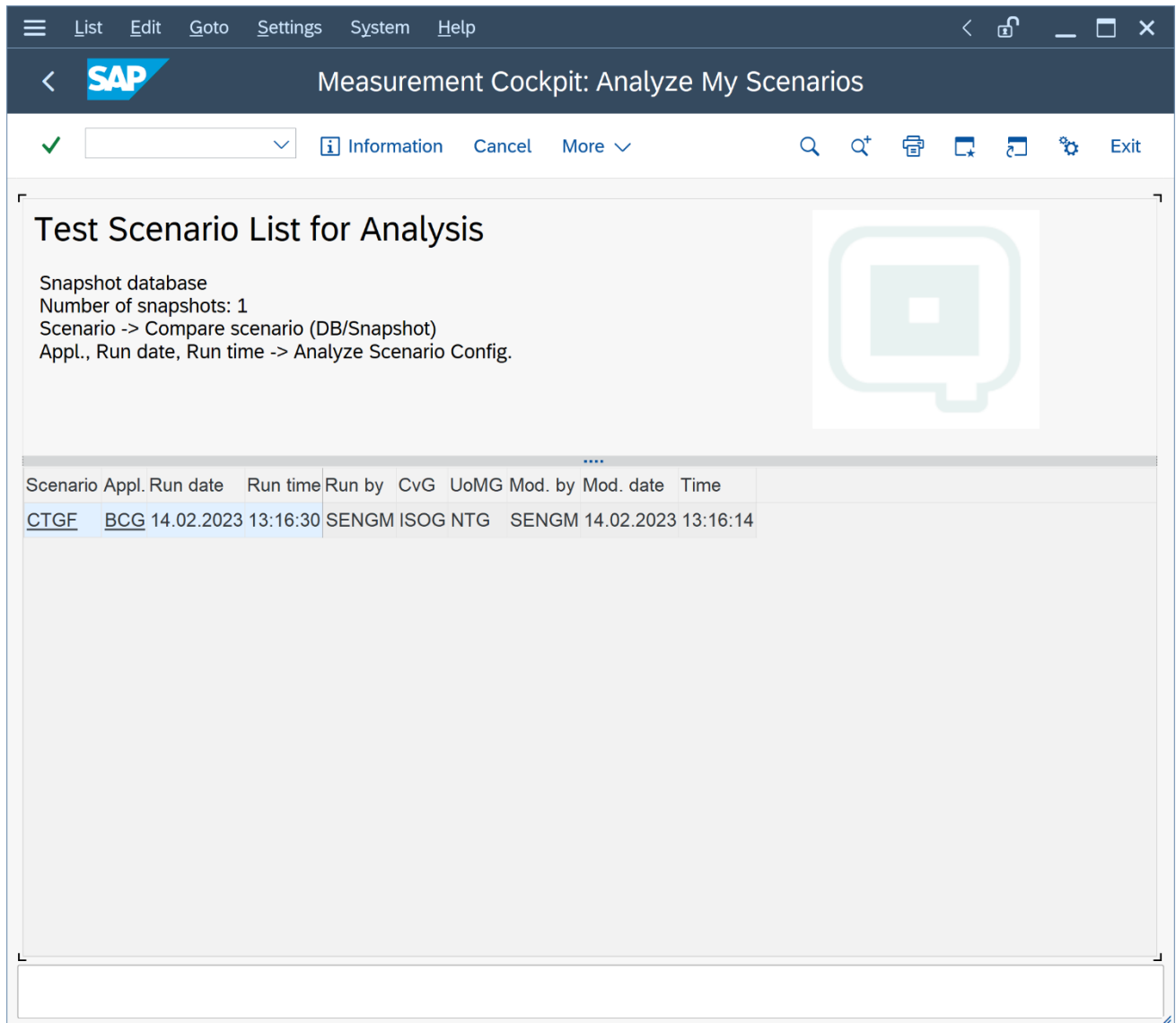
---

Allows you to list a range of scenarios from which you can then select individual, or multiple scenarios for inclusion into a customizing transport. This transport can be moved into another client or system within your system landscape.



#### 4.5.1.7. Analyze Scenarios

Allows you to list a range of scenarios from which you can then select individual, or multiple scenarios for error analysis. Requires that a snapshot for the scenario is available on the snapshot database:



Test Scenario List for Analysis

Snapshot database  
 Number of snapshots: 1  
 Scenario -> Compare scenario (DB/Snapshot)  
 Appl., Run date, Run time -> Analyze Scenario Config.

Scenario	Appl.	Run date	Run time	Run by	CvG	UoMG	Mod. by	Mod. date	Time
<a href="#">CTGF</a>	<a href="#">BCG</a>	14.02.2023	13:16:30	SENGM	ISOG	NTG	SENGM	14.02.2023	13:16:14

If you click the Scenario ID for the scenario which reported an error, you compare the current scenario definition with the definition stored in the snapshot database:

Measurement Cockpit: Analyze My Scenarios - Compare Definition

### Test Scenario Detail: Comparison Snapshot versus Database da

Scenario ID - Description:  
 CTGF - My first CTG Scenario  
 CTGF - My first CTG Scenario

Application - Description:  
 BCG - QuantityWare: Bulk Calculations - Gas  
 BCG - QuantityWare: Bulk Calculations - Gas

Description	Value	Unit	Measurement unit text	Description	Value	Unit	Measurement unit text
Input parameters:				Input parameters:			
Material pressure	101.000000	KPA	Kilopascal	Material pressure	101.000000	KPA	Kilopascal
Material temperature	15.000000	CEL	Celsius	Material temperature	15.000000	CEL	Celsius
Material heating value class		SD		Material heating value class		SD	
Test density	1.000000	KGV	Kilogram/cubic meter	Test density	1.000000	KGV	Kilogram/cubic meter
Test pressure (Density)	101.325000	KPA	Kilopascal	Test pressure (Density)	101.325000	KPA	Kilopascal
Test temperature (Density)	15.000000	CEL	Celsius	Test temperature (Density)	15.000000	CEL	Celsius
Test heating value	40.660000	MJM	Megajoule per cubic meter	Test heating value	40.660000	MJM	Megajoule per cubic meter
Test heating value class		SD		Test heating value class		SD	
Combustion test temperature	15.000000	CEL	Celsius	Combustion test temperature	15.000000	CEL	Celsius
Test pressure(Cal.dens)	101.325000	KPA	Kilopascal	Test pressure(Cal.dens)	101.325000	KPA	Kilopascal
Test temperature(Cal.dens.)	15.000000	CEL	Celsius	Test temperature(Cal.dens.)	15.000000	CEL	Celsius
Argon(Ar)	0.000000			Argon(Ar)	0.000000		

If you click on Application, you compare the actual configuration settings with the settings stored in the snapshot database. If differences are found, the different entries will be shown in the detailed analysis screen:

Measurement Cockpit: Analyze My Scenario - Configuration Tables

### Analyze Scenario

Scenario CTGF - My first CTG Scenario  
 Application - QuantityWare: Bulk Calculations - Gas  
 Con.Grp.: ISOG -NAT. GAS, REAL GAS LAW, ISO BASE COND.  
 Status:  
 Number of tables: 29  
 Tables with differences: 0

Description	Table Name	Status	Equal	Different	Snapshot	DB only
Range group data - Input parameters of reading group	/QTYW/READINGCCK	->	1			
Description of range group parameters	/QTYW/READINGCKT	->	1			
Conversion group maintenance (natural gas & LNG)						
Definition of Conversion Groups	OIB01	->	1			
Conversion Group Text	OIB01I	->	1			
Function module definition (API/AGA/Customer functions)	OIB04	->	1			
Table for classification Conversiongrp - Readinggrp	OIB_CONV_RDGRP	->	1			
Product & Standard Specific Settings						
Maintain physical property data for natural gas, LNG & LPG						
Header data: physical properties of hydrocarbons	OIB_PPP_HEADER	->	1			
Header table: phys. properties of hydrocarb.: Description	OIB_PPP_HEADERT	->	1			
Physical properties data table	OIB_PPP_DATA	->	57			

If an error is reported, you click on the error line to display the setting which is different.

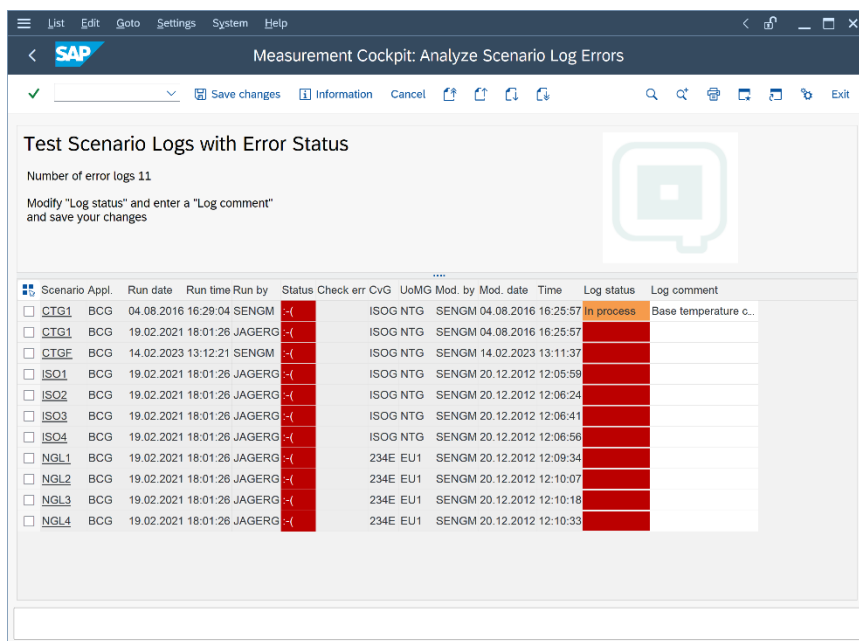
If a scenario runs into an unexpected error and neither the scenario nor the configuration are showing any differences, the ABAP code base is the only remaining source of error. Then you should run the installation test in client 045 to ensure a validated code base in that system and check that the code base is consistent through all systems in your system landscape.

## 4.5.2. Maintain Scenario Logs

If a test scenario runs into an error, you have to analyze the reason for the error. Here you either:

- Display a range of scenario logs – from archive, database, or snapshot
- Analyze a range of scenario logs
- Delete a range of scenario logs
- Archive a range of scenario logs

In the analysis activity, you may set the log error status (none – in process – complete – confirmed) and write a comment line into the log:

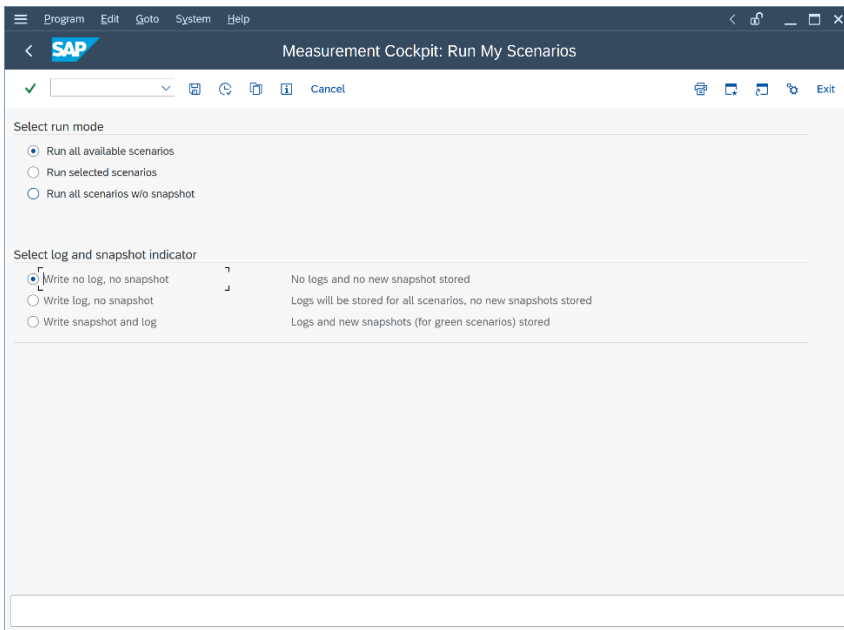


Scenario Appl.	Run date	Run time	Run by	Status	Check err	CvG	UoMG	Mod. by	Mod. date	Time	Log status	Log comment
<input type="checkbox"/> CTG1	BCG	04.08.2016 16:29:04	SENGM	-(-			ISO	NTG	SENGM	04.08.2016 16:25:57	In process	Base temperature c...
<input type="checkbox"/> CTG1	BCG	19.02.2021 18:01:26	JAGERG	-(-			ISO	NTG	SENGM	04.08.2016 16:25:57		
<input type="checkbox"/> CTGF	BCG	14.02.2023 13:12:21	SENGM	-(-			ISO	NTG	SENGM	14.02.2023 13:11:37		
<input type="checkbox"/> ISO1	BCG	19.02.2021 18:01:26	JAGERG	-(-			ISO	NTG	SENGM	20.12.2012 12:05:59		
<input type="checkbox"/> ISO2	BCG	19.02.2021 18:01:26	JAGERG	-(-			ISO	NTG	SENGM	20.12.2012 12:06:24		
<input type="checkbox"/> ISO3	BCG	19.02.2021 18:01:26	JAGERG	-(-			ISO	NTG	SENGM	20.12.2012 12:06:41		
<input type="checkbox"/> ISO4	BCG	19.02.2021 18:01:26	JAGERG	-(-			ISO	NTG	SENGM	20.12.2012 12:06:56		
<input type="checkbox"/> NGL1	BCG	19.02.2021 18:01:26	JAGERG	-(-			234E	EU1	SENGM	20.12.2012 12:09:34		
<input type="checkbox"/> NGL2	BCG	19.02.2021 18:01:26	JAGERG	-(-			234E	EU1	SENGM	20.12.2012 12:10:07		
<input type="checkbox"/> NGL3	BCG	19.02.2021 18:01:26	JAGERG	-(-			234E	EU1	SENGM	20.12.2012 12:10:18		
<input type="checkbox"/> NGL4	BCG	19.02.2021 18:01:26	JAGERG	-(-			234E	EU1	SENGM	20.12.2012 12:10:33		

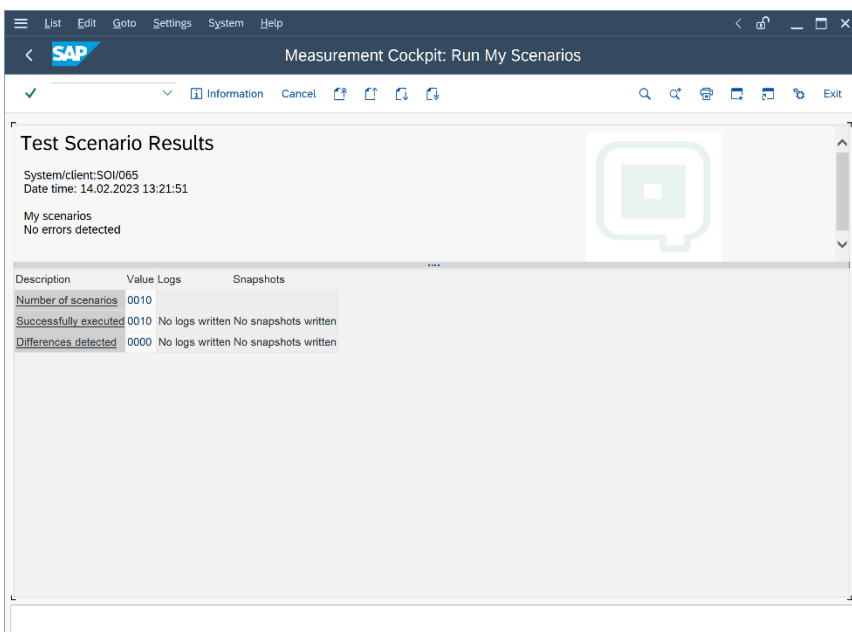
Note that error logs may only be archived if the log status is set to “confirmed”.

### 4.5.3. Running Test Scenarios

If you select the “Run Scenarios” push button, you have the option to run all test scenarios, or one set of user specified scenarios. Here you set an indicator that writes a log protocol and/or snapshot for the scenario execution results.



The results of each scenario run are listed as shown in the next screen print, which is identical with the list for the CTG installation test scenario results.





**Note:** all these activities require a careful semi-manual procedure where you calculate your expected results independently from the system results and use at least a four eyes principle to validate your results.

## 4.6. Summary

---

The QuantityWare Test Scenario Tool provides easy-to-use management functions for all of your important quantity conversion test scenarios. With these scenarios, you can continuously monitor and check the correctness of your productive BCG implementations, thus providing maximum security and stability for all logistics processes, which rely on accurate and well defined quantity conversion data for bulk products. Governance, Risk Management and Control procedures should always include such a state-of-the-art test procedure for bulk quantity values.

## 5. CTG - Configuration Template

---

### 5.1. Introduction

---

This chapter describes the CTG configuration template that is delivered with CTG within one BC set.

QuantityWare delivers only **client dependent** customizing configuration data (template data) as part of the BC set, "/QTYW/BCG\_30X" (where "30X" is the current valid installed QuantityWare BCS release – e.g. "30A") which CTG customers have to activate in one new test client (045) in order to run the QuantityWare CTG installation test and validate the CTG installation.

QuantityWare delivers language-dependent entries in English (EN), French (FR), Spanish (ES) and Portuguese (PT) for all customizing template data which is visible to the business user.



All customizing data can be accessed via the QuantityWare Gas Measurement Cockpit (PMC) via transaction /n/qtyw/cockpit\_gas, menu path:

Goto -> QuantityWare IMG

If you require detailed information as to how to access all CTG customizing data, see Chapter 7 CTG - Customizing Transactions.

The template configuration data can be divided into three parts:

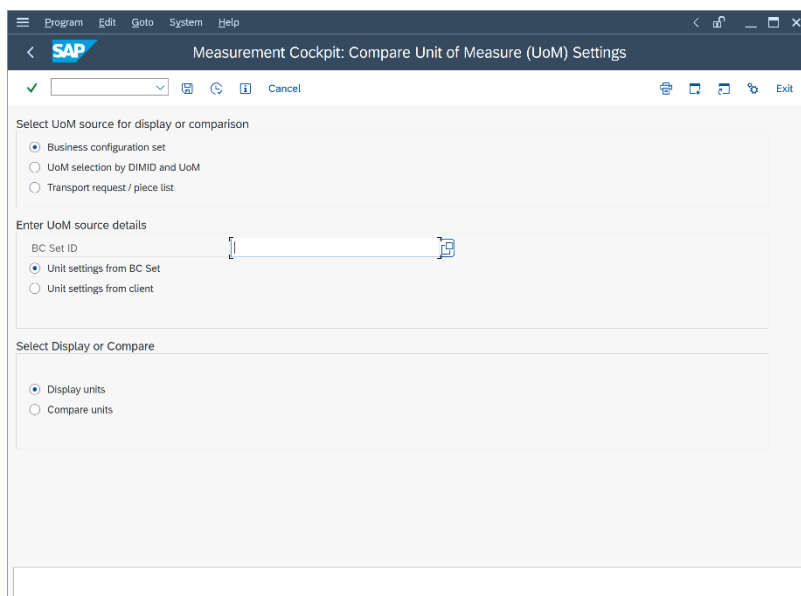
- Unit of measure (UoM) definitions – SAP customizing tables
- Quantity conversion configuration – SAP customizing tables
- Quantity conversion configuration – QuantityWare customizing tables

## 5.2. Unit of Measure Definitions

QuantityWare delivers Unit of Measure (UoM) definitions and dimension ID as part of the template. These definitions have been carefully checked via the CTG UoM compliance analysis. In addition ISO/UNECE code definitions are delivered. The UoM definitions fall into three categories:

- UoM definitions which are part of the SAP client 000 template, and which are not adjusted/corrected by QuantityWare with respect to quantity conversions – SAP UoM
- UoM definitions which are part of the SAP client 000 template, and which are corrected by QuantityWare with respect to quantity conversion – SAP UoM corrected
- New QuantityWare UoM definitions which are not part of the SAP client 000 template – QuantityWare UoM

You access and check all UoM configuration data directly from the GMC, via tab strip “Units of Measurement”; here you navigate to the UoM maintenance transaction CUNI “SAP Units -> Maintain” or display lists of UoM in your logon client “SAP Units -> Display” for various selection criteria. If you select “Unit Tools -> Comparison”, you may analyze the QuantityWare CTG BC set and compare UoM delivered within that BC set with UoM definitions in any client in your system:





### 5.3. Conversion Group Configuration

QuantityWare delivers a complete quantity conversion configuration for high and low pressure dry natural gas, LNG and NGL as part of the BCG template. These definitions are maintained in SAP and QuantityWare customizing tables. More than 300 conversion groups and associated reading groups, range check groups etc. are delivered with the BC set template. QuantityWare BCS conversion groups (and the associated reading groups and range groups) follow the QuantityWare naming convention as described in the table below:

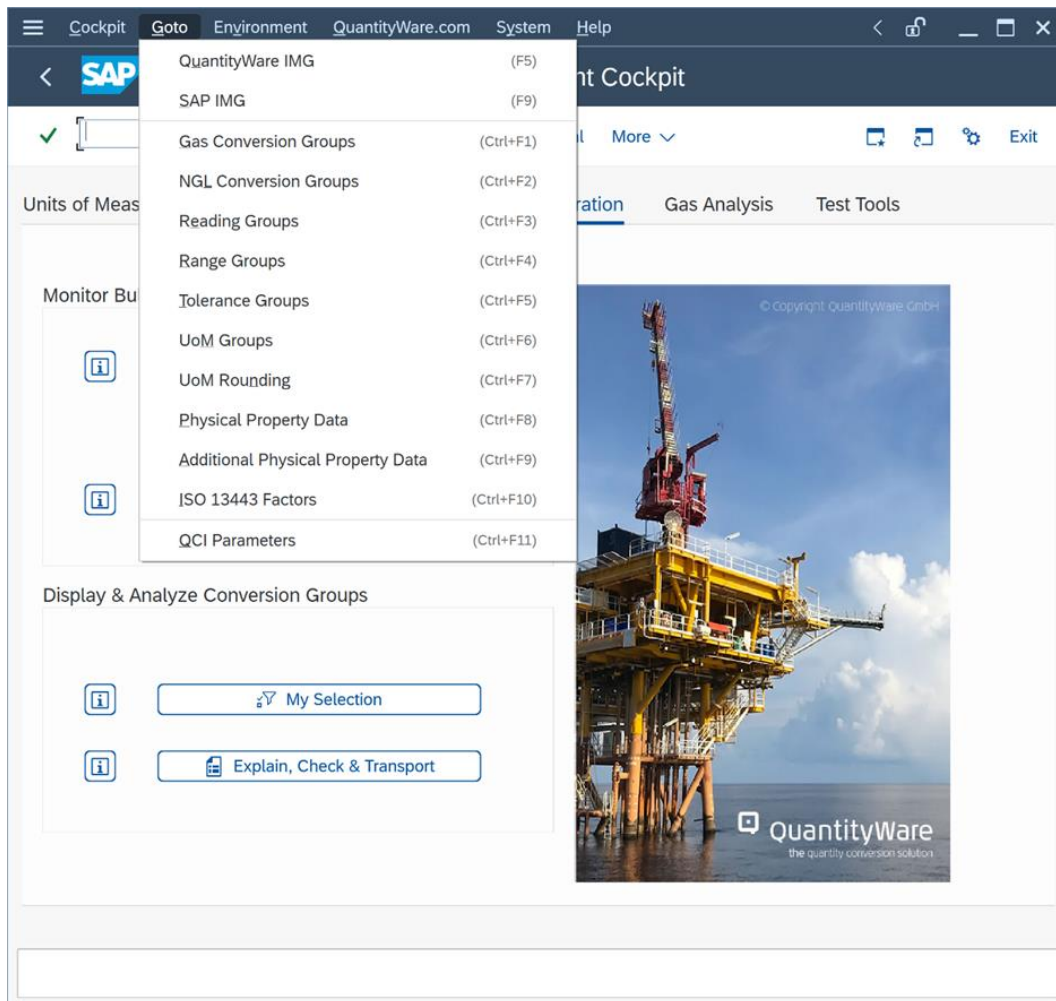
Conversion group	Product group
Q00* - Q0U*	Products handled by industry practice formula (e.g. linear density correction)
<b>Crude Oil &amp; Products – not part of BCG</b>	
	<b>ASTM D 1250</b>
Q0V* - Q0Z*	ASTM D 1250-52 products
Q1*	Crude Oil
Q2*	Refined Products
Q3*	Special Applications “Chemicals”
Q4*	Lubricating Oils
	<b>Other Standards – NGL/LPG part of BCG</b>
Q5*	Asphalt, Bitumen, Road Tar
Q7*	LPG – Liquefied Petroleum Gas
Q9*	Industrial Aromatic Hydrocarbons & Bulk Chemicals
QI*	Renewable Fuels & similar products
QS*	Solids (e.g. sulfur)
<b>Natural Gas, Hydrogen &amp; LNG</b>	
QT*	100% hydrogen
QU*	LNG – Liquefied Natural Gas – BCG
QV*	Natural gas – high and low pressure pipeline – BCG
QWWW	MQCI zero model conversion group - technical



For CTG usage, these template conversion groups are not released and are solely utilized for the CTG installation test.

## 5.4. QuantityWare IMG Access

You access all configuration data of your legacy SAP QCI conversion group configuration from the GMC via the QuantityWare IMG:



## 5.5. Summary

A clearly-defined template of values describing calculations parameters, as well as the background knowledge as to where the values can be found within SAP DDIC forms the basis of a reliable quantity calculations environment. Without such an extensive framework, true transparency and accurate representation of the calculations required by business processes and their regulatory bodies cannot be practically validated. QuantityWare presents such a clearly-defined reference configuration template to meet customer's needs.

## 6. CTG - SAP QCI Enhancements of Legacy Configurations

---

### 6.1. Introduction

---

There are several ways in which quantity conversion calculations can be approached, all of which are comprised of distinct “calculation steps”. A sequence of calculation steps, typically including calculation procedures of measurement parameters, the conversion of different kinds of quantities (“dimensions” in SAP terminology), as well as rounding procedures, comprise the basic definition of the conversion model.

Different conversion models are defined in national and international measurement standards and are in use within the oil & gas and chemicals industries.

Technically, the implementation of a specific model should be independent of the interface by which the model-based conversion algorithms are accessed.

The standard SAP QCI (Quantity Conversion Interface) provides one calculation model which is integrated within the technical interface. This model can be enhanced via BAdI (Business Add In) implementations to a certain extent, but does not allow for deviation from the hard coded SAP QCI calculation model. In addition to this, extension of the standard SAP model to include weight and mass calculations in parallel is cumbersome and requires code modifications.

Using the CTG PMC capabilities, your SAP QCI legacy conversion group configuration can be enhanced considerably without changing your validated calculation logic.

## 6.2. Parameter Range Check Settings

Within the SAP QCI, you cannot define that certain measurement parameters have to lie within a specified range of values.

An example would be the natural gas heating value. In the standard SAP Oil, Gas, & Energy system, you can enter any value between 0.000 01 and 1 000 000.000 MJM (Mega joule per cubic meter), and the system calculates volume and energy quantity values for any heating value. Typically several parameters are required for the quantity conversion and data entry can be cumbersome and, if not checked, lead to erroneous results which may have considerable financial impact on your business. This is true for automated data input via SAP BAPI as well as manual user data entry.

To provide this important requirement, QuantityWare delivers customizing tables (maintainable via transaction /QTYW/RANGES or directly from the GMC, which can be defined to contain for all your legacy reading groups the relevant parameter reading group range data range sets.

If you select one specific reading group, you can select all available parameters for which the following data can be maintained:

- High level error limit: Any number with up to 6 decimal places
- Low level error limit: Any number with up to 6 decimal places
- High level warning limit: Any number with up to 6 decimal places
- Low level warning limit: Any number with up to 6 decimal places
- The unit of measure (UoM) for each parameter

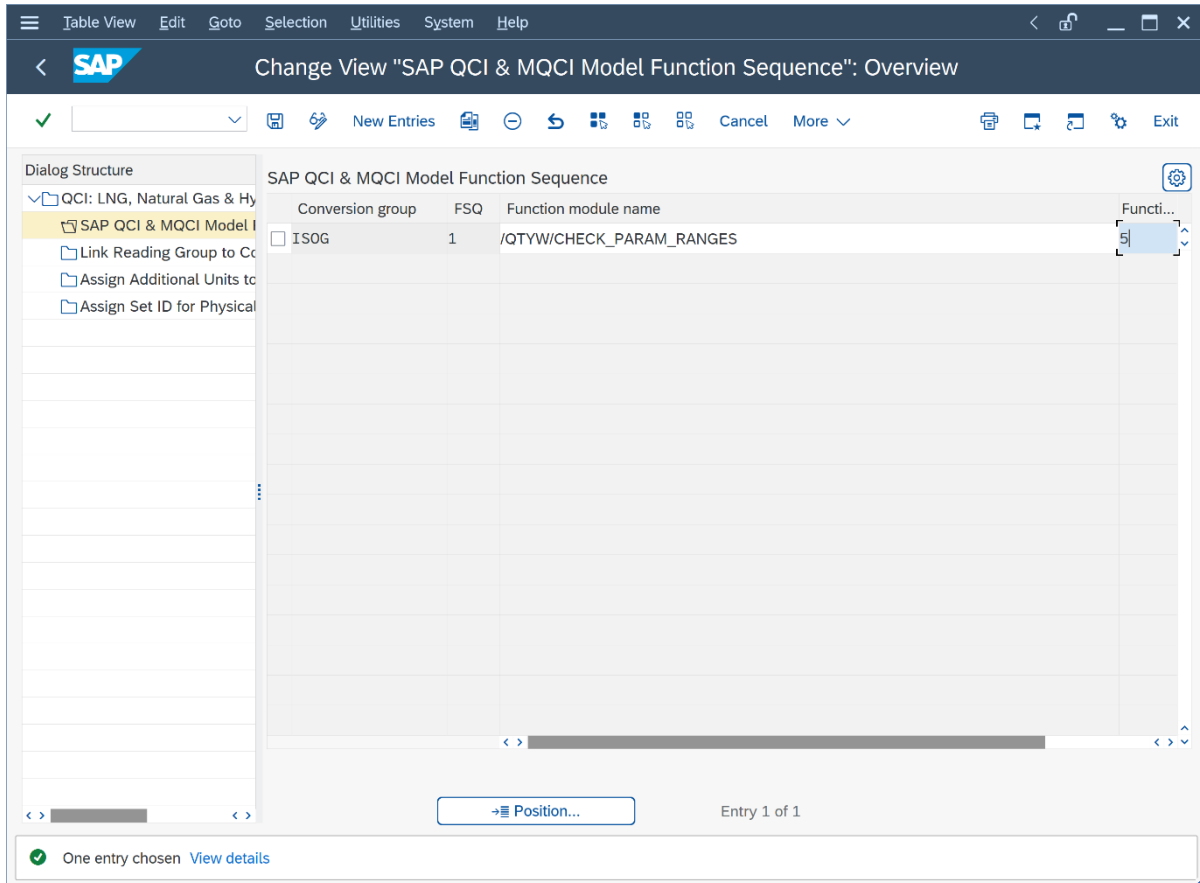
For character format parameters, you can define an exact match or if a value needs to be excluded. The CTG range check function can be activated for your SAP QCI legacy conversion groups.



It is not required to maintain all data for all parameters. You can for example just maintain lower limits (E and W), or just Warning limits.

Technically, the range checks are executed if function /QTYW/CHECK\_PARAM\_RANGES is included within the conversion group. As soon as range data is maintained, the checks are performed for each quantity conversion calculation.

Example: SAP QCI legacy conversion group ISOG extension with range check function:



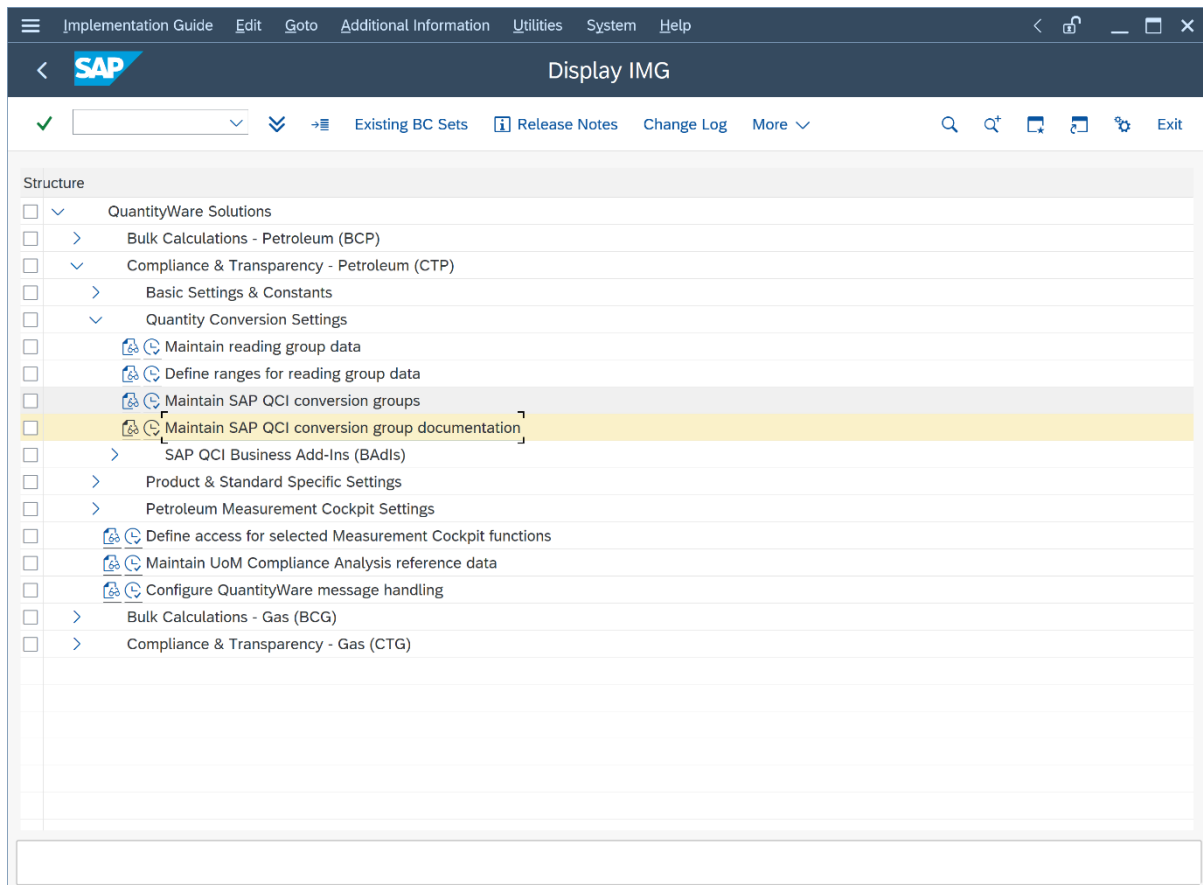
The screenshot shows the SAP S/4HANA 'Change View' dialog for 'SAP QCI & MQCI Model Function Sequence'. The dialog is titled 'Change View "SAP QCI & MQCI Model Function Sequence": Overview'. The main area displays a table with the following data:

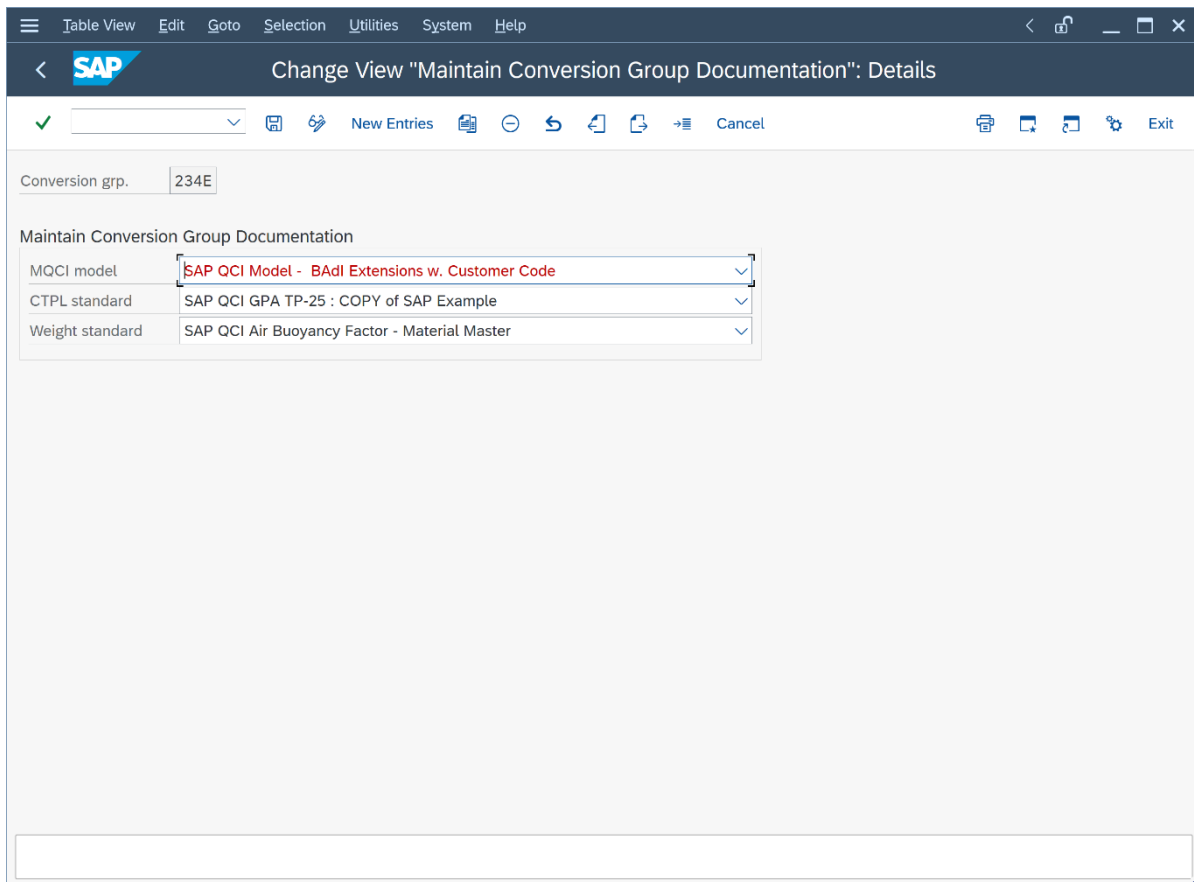
Conversion group	FSQ	Function module name	Function...
ISOG	1	/QTYW/CHECK_PARAM_RANGES	[5]

The 'Function...' column contains a small blue box with the number '5' inside, indicating a range check function. The dialog also shows a 'Dialog Structure' pane on the left with a tree view containing 'QCI: LNG, Natural Gas & Hy...', 'SAP QCI & MQCI Model I...', 'Link Reading Group to C...', 'Assign Additional Units to...', and 'Assign Set ID for Physical...'. At the bottom, there is a 'Position...' button and 'Entry 1 of 1' text. A status bar at the very bottom indicates 'One entry chosen View details'.

### 6.3. Conversion Group Documentation

Via CTP customizing, you document the SAP QCI legacy conversion groups for **NGL/LPG** conversion groups.





The conversion model is the SAP QCI model (or customer specific), the weight standard is typically the SAP QCI air buoyancy factor model (or customer specific). As CTPL standard the SAP Template supports the GPA TP-25 – COPY of SAP example standard.



This documentation is mandatory if you wish to utilize all GMC tools for your SAP QCI NGL legacy conversion groups.

Example: Conversion group documentation for SAP QCI legacy conversion group 234E:



☰ List Edit Goto System Help < 🔒 \_ □ ×

---

< **SAP** Petroleum Measurement Cockpit: Explain, Check & Transport - ECT

---

✓  📄 Export to PDF Cancel 📄 📄 📄 📄 🔍 🔍 📄 📄 ⚙️ Exit

---

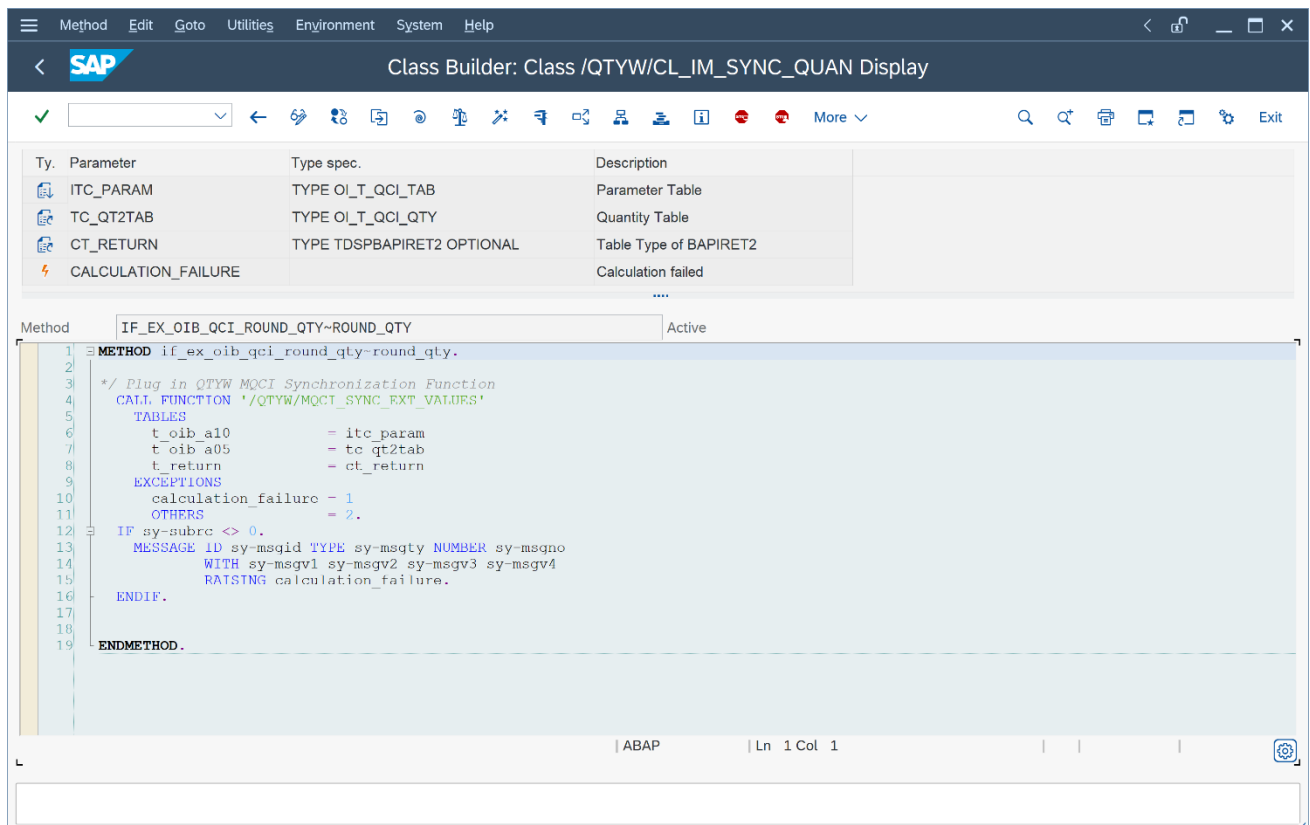
Analysis for conversion group : 234E 23&24E 60 °F LPG REL. DENSITY (GPA TP25)  
 Conversion group is configured to utilize the SAP QCI quantity conversion model without QuantityWare implementations

---

- 1.) The product type defined in the conversion group is:  
Liquid petroleum gas (LPG/NGL)
- 2.) The calculation model assigned to the conversion group is :  
SAP QCI Model - BAdI Extensions w. Customer Code
- 3.) The mass to weight standard assigned to the conversion group is:  
SAP QCI Air Buoyancy Factor - Material Master
- 4.) The CT(P)L standard (volume correction) assigned to the conversion group is:  
SAP QCI GPA TP-25 : COPY of SAP Example
- 5.) The base temperature of the conversion group is:  
60.00 Fahrenheit
- 5b.) The base pressure of the conversion group is:  
Not defined
- 6.) The density type of the conversion group is:  
Relative Density (relative to water at standard conditions)
- 7.) The -base density - unit of measure is:  
Not defined
- 8.) Conversion group utilizes ASTM D1250-80 density of water @ 60 °F: 999.012 kg/m<sup>3</sup>  
This value is utilized to convert API gravity or relative density to an absolute density value

## 6.4. Quantity Value Synchronization

For CTG usage, QuantityWare has released the MQCI function /QTYW/MQCI\_SYNC\_EXT\_VALUES. You may implement this function in your SAP QCI BAdI OIB\_QCI\_ROUND\_QTY, to ensure that external quantity values are always synchronized with internally calculated values. Read the [Synchronization FAQ](#) for details.



```

Method: IF_EX_OIB_QCI_ROUND_QTY~ROUND_QTY Active

1 METHOD if_ex_oib_qci_round_qty~round_qty.
2
3  */ Plug in QTYW MQCI Synchronization Function
4  CALL FUNCTION '/QTYW/MQCI_SYNC_EXT_VALUES'
5
6  TABLES
7    t_oib_a10      - itc_param
8    t_oib_a05      - tc qt2tab
9    t_return       - ct_return
10
11  EXCEPTIONS
12    calculation_failure - 1
13    OTHERS             - 2.
14
15  IF sy-subrc <> 0.
16    MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno
17    WITH sy-msgv1 sy-msgv2 sy-msgv3 sy-msgv4
18    RAISING calculation_failure.
19  ENDIF.
20
21 ENDMETHOD.
  
```

## 6.5. Summary

Leveraging the flexibility of SAPs Oil & Gas solution technical design, you considerably enhance existing SAP QCI functionality, allowing to represent business- and regulatory-driven calculation requirements accurately and transparently in a single, controlled environment, on demand.

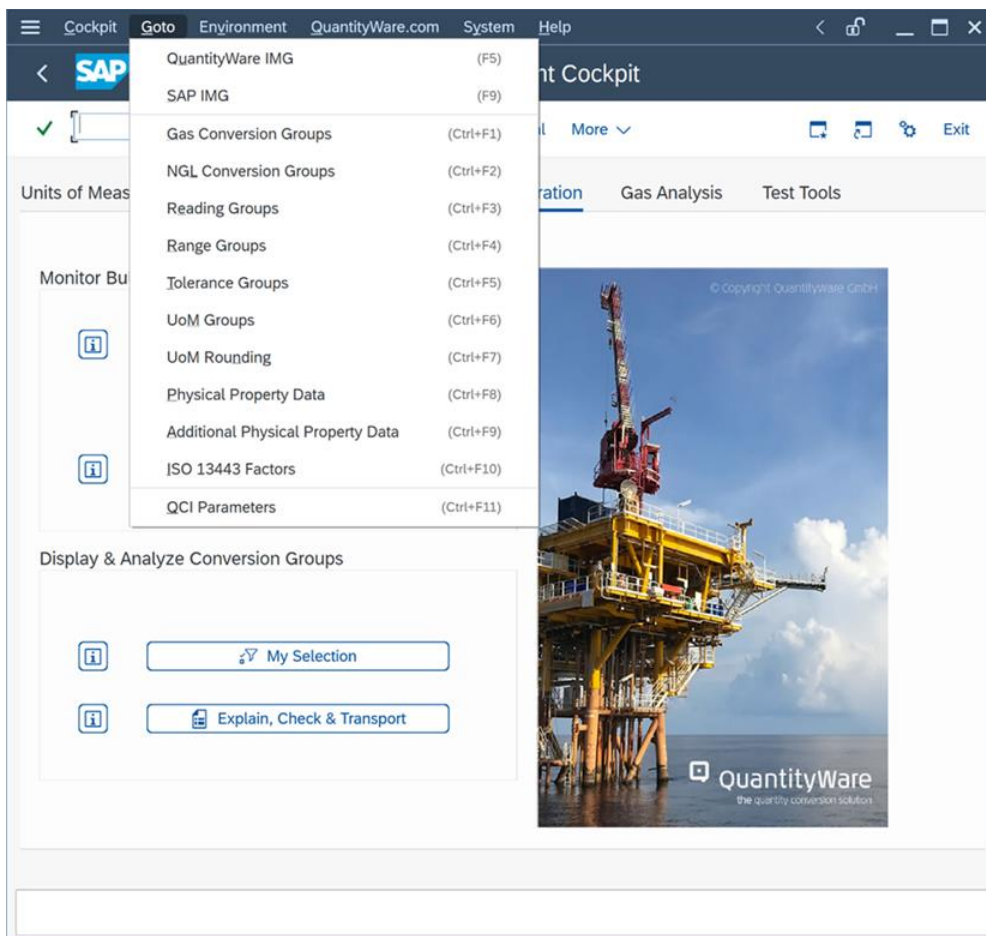
## 7. CTG - Customizing Transactions

### 7.1. Introduction

Within this chapter, we provide an overview of CTG customizing transaction access, as well as some basic documentation on the configuration options provided via customizing options.

### 7.2. QuantityWare Customizing Transactions

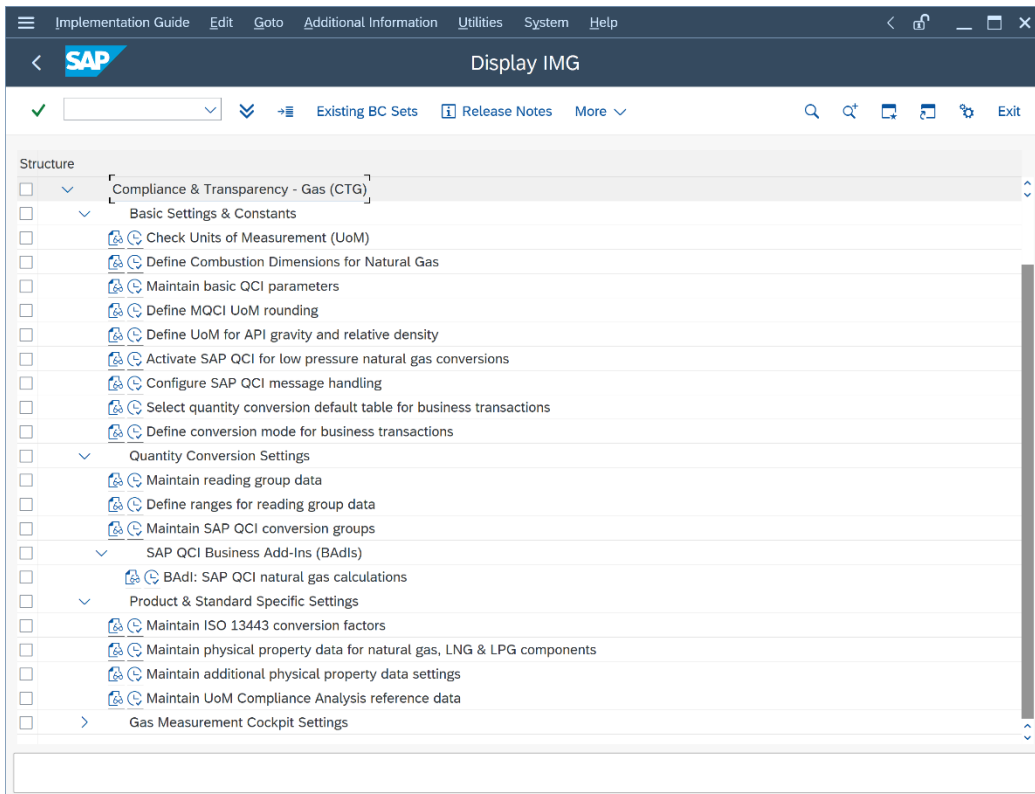
QuantityWare delivers customizing data for CTG that are maintainable via transactions for all SAP QCI legacy conversion groups. All relevant customizing transactions for bulk quantity conversion configuration can be accessed via the QuantityWare Gas Measurement Cockpit (GMC - transaction /n/QTYW/COCKPIT\_GAS):



Under menu path GOTO you can navigate to the QuantityWare IMG, as well as to the complete SAP IMG. For fast access, the following transactions can be called directly from the menu:

- Gas Conversion Groups - SAP QCI conversion group maintenance
- NGL Conversion Groups - SAP QCI conversion group maintenance
- Reading Groups - SAP QCI reading group maintenance
- Range Groups - /n/QTYW/RANGES
- Tolerance Groups - SAP QCI BAdI implementations
- UoM Groups - SAP QCI UoM group definition
- UoM Rounding - SAP QCI BAdI implementations
- Physical Property Data - /n/QTYW/PPP\_DATA
- Additional Physical Property Data - /n/QTYW/PPP\_SUMMATION
- ISO 13443 Factors - /n//QTYW/ISO13443
- QCI parameters - /n/QTYW/QCI

In order to provide a structured implementation guide (IMG) for all relevant customizing transactions for bulk quantity conversions, these transactions are collected within the QuantityWare customizing IMG structure which you access via the CTG IMG - Gas Measurement Cockpit, Menu: Goto - QuantityWare IMG and expand the “Compliance & transparency - Gas (CTG)” node:



In detail, the following configuration data is translated within the CTG template:

- All UoM definitions (dimensions, ISO/UNECE codes, UoM short and long texts)

### 7.3. Summary

Via a comprehensive IMG structure, the complex and detailed customizing required for modern quantity conversions can be accessed and governed in an efficient and transparent manner.

## 8. CTG – Gas Measurement Cockpit - Security

With BCS, additional authority profiles, single roles and example composite roles for PMC and GMC access and usage (including SAP QCI legacy RFC and “call system” test reports) are defined, implemented and shipped.

13 technical authorization objects are the basis for all single roles, 20 single roles are available:

Role Name (2) 20 Entries found	
Single Roles	Composite Roles Roles
Single Role	Short Role Description
Y_QTYW_BUSINESS_OBJ_DISPLAY	QTYW single role - display business objects
Y_QTYW_CALCULATIONS	QTYW single Role - execute calculations
Y_QTYW_CALL_SYSTEM	QTYW single role - CALL SYSTEM by QTYW
Y_QTYW_COCKPIT	QTYW single role - Cockpit authorization
Y_QTYW_CROSS_CLIENT	QTYW single role - Cross client reading of customizing data
Y_QTYW_CUSTOMIZING	QTYW single role - create, maintain and delete customizing
Y_QTYW_LICENSE_MAINTAIN	QTYW single role - install and update QW licenses
Y_QTYW_LIST	QTYW single role - generate and print lists of standards
Y_QTYW_RFC	QTYW single role - authorization to use the QTYW RFC modules
Y_QTYW_TABU_DISPLAY	QTYW single role - Display QTYW customizing tables
Y_QTYW_TABU_MAINTAIN	QTYW single role - Maintain QTYW customizing tables
Y_QTYW_TABU_SAP_DISPLAY	QTYW single role - Display SAP customizing tables
Y_QTYW_TABU_SAP_MAINTAIN	QTYW single role - Maintain SAP customizing tables
Y_QTYW_TCD_CUS_MAINTAIN	QTYW single role - create, maintain and delete customizing
Y_QTYW_TCD_SAP_BUS_OBJ_DIS...	QTYW single role - display business objects of SAP
Y_QTYW_TCD_SAP_CUS_MAINTAIN	QTYW single role - create, maintain and delete customizing of SAP
Y_QTYW_TEST_EXECUTE	QTYW single role - execute test programs
Y_QTYW_TEST_MAINT_LOGS	QTYW single role - maintain the scenario log database
Y_QTYW_TEST_MAINT_SCENARIOS	QTYW single role - Crate, change and delete test scenarios
Y_QTYW_TEST_MAINT_SNAPSHOTS	QTYW single role - maintain the scenario snapshot database

These single roles encompass all Petroleum and Gas Measurement capabilities for which a user may be granted authority.



No additional QuantityWare authority check is performed during actual quantity conversion calculations in business transactions - all QuantityWare implementations are ABAP based calculations which are already secured via the standard SAP-suggested security concepts implemented in these transactions.

3 composite roles are delivered as examples:

Role Name (2) 3 Entries found	
Single Roles	Composite Roles
Y_QTYW_CERTIFIED_CONSULTANT	QTYW composite role - Certified BCS Consultant
Y_QTYW_EXPERT_BUSINESS_USER	QTYW composite role - Expert Business User
Y_QTYW_MEASUREMENT_SPECIALIST	QTYW composite role - Measurement Specialist

All roles are documented and accessible via standard SAP role maintenance. Role Y\_QTYW\_CERTIFIED\_CONSULTANT must be assigned to the user ID which is used to run the QuantityWare implementation and installation test in client 045.

## 9. CTG - Protection of Intellectual Property

---

With QuantityWare BCS, QuantityWare delivers a powerful and unique quantity conversion solution to the oil & gas industries. Technically, the solution is delivered as a certified SAP Add-On to the Oil & Gas solution. In order to enhance customer security and protect QuantityWare GmbH's intellectual property (IP), three protection measures have been defined as an integral part of the technical ABAP solution:

- Every BCS customer requires a valid software license key in order to execute the installation test and subsequent quantity conversions. CTG customers have decided not to utilize QuantityWare implementations and do not require such a license key after the installation test has been performed successfully.
- The ABAP source code that implements the license check logic, the QuantityWare MQCI and all central ABAP implementations of CTPL / CTPG standards are technically defined – using standard SAP methods – to be SAP system programs and thus *cannot* be debugged
- All code comments marked internally with *\*/* and empty lines are removed from all BCS ABAP sources before shipment of BCS

Software license installation is documented in the BCS Technical Installation Guide.



## 10. Abbreviations

---

In this section we provide a list of abbreviations used in the CTG documentation documents. For detailed explanations of the terms, refer to the individual CTG documentation documents:

ABNT Associação Brasileira de Normas Técnicas (Brazilian National Standards Organization)

AGA American Gas Association

API (1) American Petroleum Institute

API (2) SAP commercial key for API gravity unit

ASTM ASTM International (originally, "American Society for Testing and Materials")

BAdI Business Add In (SAP term)

BCG Bulk Calculations - Gas

BCP Bulk Calculations - Petroleum

BCS Bulk Calculations Solution

BCU Base Conversion Unit

BTI BaTch Input (SAP term)

CSP Component Support Package

CTG Compliance & Transparency – Gas

CTP Compliance & Transparency – Petroleum

CTPL Correction factor for the effects of Temperature and Pressure on the Liquid

DIN Deutsches Institut für Normung e.V.

GERG Groupe Européen de Recherches Gazières

GMC	Gas Measurement Cockpit
GOST	Gossudarstwenny Standard – Russian standard organization
GPA	Gas Processors Association
GRC	Governance, Risk management & Control
HPM	Hydrocarbon Product Management (SAP term)
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MQCI	Model based Quantity Conversion Interface
MPMS	Manual of Petroleum Measurement Standards (API term)
NGL	Natural Gas Liquids
NIST	National Institute of Standards and Technology
PAIG	Project Assessment and Implementation Guidelines
PMC	Petroleum Measurement Cockpit
QCI	Quantity Conversion Interface (SAP term)
ROI	Return On Investment
SI	Système International d'unités

TD	Transportation and Distribution (SAP term)
TSW	Traders and Schedulers Workbench (SAP term)
UoM	Unit of Measure or Unit of Measurement
VCF	Volume Correction Factor

## 11. CTG - Documentation Rules

---



The decimal point and thousand separators for numbers and quantity values for CTG documentation documents are defined as follows: The decimal point is a dot '.', the thousand separator is a comma ',' or a space ' '. Example: 123,456.987 or 123 456.987. Owing to the definition of business-relevant scenarios in our systems, numbers in screen prints may display differing formats.



For unit of measure symbols and spelling of unit names, NIST special publication 811 (latest version) is relevant – see the document “CTG 3.0 Supported Standards Manual” for details

## Legal Notices

---

© Copyright 2023 QuantityWare GmbH. All rights reserved.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned are the trademarks of their respective companies.

Microsoft, Windows, SQL-Server, PowerPoint and Outlook are registered trademarks of Microsoft Corporation.

These materials and the information therein are subject to change without notice. These materials are provided by the company QuantityWare GmbH for informational purposes only. There is no implied representation or warranty of any kind, and QuantityWare GmbH shall not be liable for errors or omissions with respect to the materials provided. The only warranties for the products and services of QuantityWare GmbH are those set forth in the express warranty statements accompanying such products and services, if any. No statement within this document should be construed as constituting an additional warranty.