

**Bulk Calculations –
Solution
BCS 3.0**

Release Notes

Maintenance Level 00

Listing of Delivery Content
shipped with BCS 3.0

Notes

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Introduction

In 2006 QuantityWare GmbH was officially founded. Ten years after the initial release of BCP 1.0A (Bulk Calculations - Petroleum) in 2006, **BCS 3.0** (Bulk Calculations - Solution) is made available to a constantly growing global customer base.

Bulk Calculations - Solution (BCS) contains four products:

- Bulk Calculations - Petroleum (BCP)
- Bulk Calculations - Gas (BCG)
- Compliance and Transparency - Petroleum (CTP)
- Compliance and Transparency - Gas (CTG)

This document describes the functional and usability enhancements that are delivered with BCS 3.0 - maintenance level 00 - for the four products listed above.

Planned delivery of BCS 3.0 on SAP ERP 6.0 is Q3 2016.

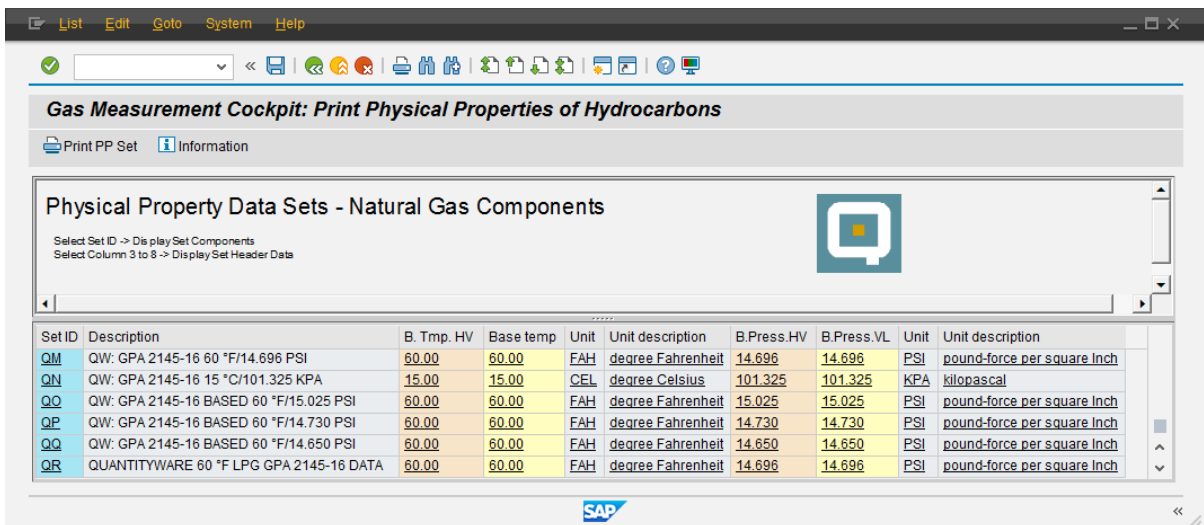
Petroleum and Gas Measurement Standards

Support of GPA Midstream Standard 2145-16 - Natural Gas & NGL

This important standard becomes effective on January 1st, 2017. QuantityWare delivers 6 new physical property data sets - based on the data delivered with this standard. Important: In each customer project, it is the responsibility of the project team to independently validate that data with an own copy of GPA 2145-16.

GPA 2145-16 delivers additional component data that had been delivered with GPA TP-17 before. The 6 new data sets contain the data for components defined in GPA 2145-09 as well as the data for hydrogen and carbon monoxide defined therein.

For consistency reasons, the summation factors are maintained as in GPA 2145-09 data sets. The property data for air has been adjusted as defined in GPA 2145-16 in these new data sets and the summation factor has been calculated from the unitless summation factor given therein.



Gas Measurement Cockpit: Print Physical Properties of Hydrocarbons

Print PP Set | Information

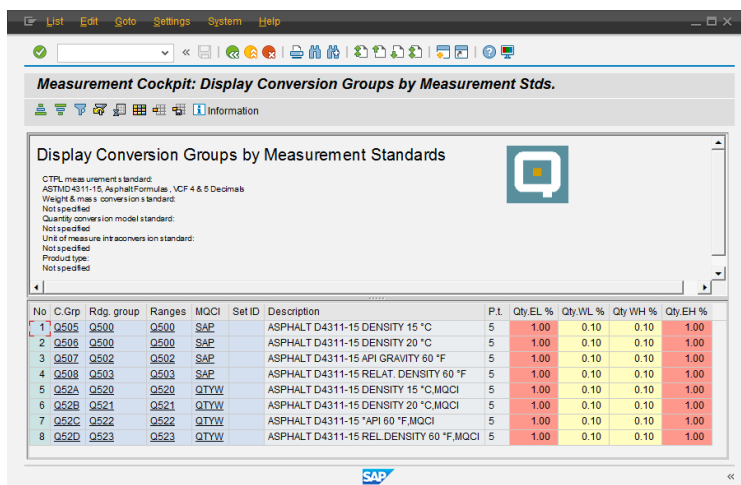
Physical Property Data Sets - Natural Gas Components

Select Set ID -> Display Set Components
Select Column 3 to 8 -> Display Set Header Data

Set ID	Description	B. Tmp. HV	Base temp	Unit	Unit description	B.Press.HV	B.Press.VL	Unit	Unit description
QM	QW: GPA 2145-16 60 °F/14.696 PSI	60.00	60.00	FAH	degree Fahrenheit	14.696	14.696	PSI	pound-force per square Inch
QN	QW: GPA 2145-16 15 °C/101.325 KPA	15.00	15.00	CEL	degree Celsius	101.325	101.325	KPA	kilopascal
QO	QW: GPA 2145-16 BASED 60 °F/15.025 PSI	60.00	60.00	FAH	degree Fahrenheit	15.025	15.025	PSI	pound-force per square Inch
QP	QW: GPA 2145-16 BASED 60 °F/14.730 PSI	60.00	60.00	FAH	degree Fahrenheit	14.730	14.730	PSI	pound-force per square Inch
QQ	QW: GPA 2145-16 BASED 60 °F/14.650 PSI	60.00	60.00	FAH	degree Fahrenheit	14.650	14.650	PSI	pound-force per square Inch
QR	QUANTITYWARE 60 °F LPG GPA 2145-16 DATA	60.00	60.00	FAH	degree Fahrenheit	14.696	14.696	PSI	pound-force per square Inch

Support of ASTM D4311-15 Calculations - Asphalt

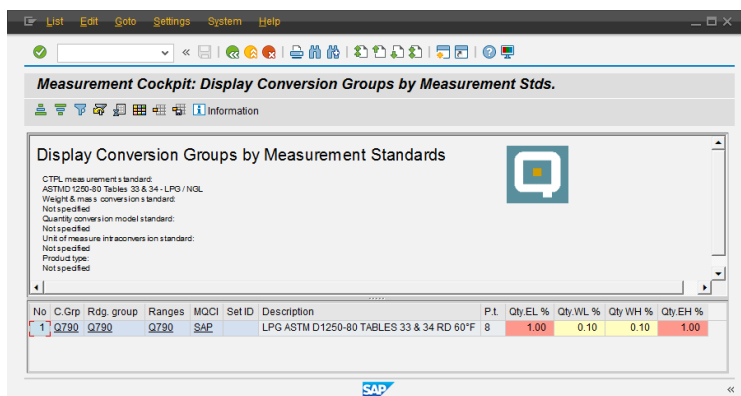
ASTM D4311 has been revised and reissued as ASTM D4311-15. New SAP QCI and QuantityWare MQCI implementations for ASTM D4311-15 are delivered with BCS 3.0. List printing of ASTM D4311-15 is available via the Petroleum Measurement Cockpit. New template conversion groups enable easy usage of this new measurement standard:



No.	C.Grp	Rdg. group	Ranges	MQCI	Set ID	Description	P.t.	Qty.EL %	Qty.WL %	Qty.WH %	Qty.EH %
1	Q505	Q500	Q500	SAP		ASPHALT D4311-15 DENSITY 15 °C	5	1.00	0.10	0.10	1.00
2	Q506	Q500	Q500	SAP		ASPHALT D4311-15 DENSITY 20 °C	5	1.00	0.10	0.10	1.00
3	Q507	Q502	Q502	SAP		ASPHALT D4311-15 API GRAVITY 60 °F	5	1.00	0.10	0.10	1.00
4	Q508	Q503	Q503	SAP		ASPHALT D4311-15 RELAT. DENSITY 60 °F	5	1.00	0.10	0.10	1.00
5	Q52A	Q520	Q520	QTYW		ASPHALT D4311-15 DENSITY 15 °C.MQCI	5	1.00	0.10	0.10	1.00
6	Q52B	Q521	Q521	QTYW		ASPHALT D4311-15 DENSITY 20 °C.MQCI	5	1.00	0.10	0.10	1.00
7	Q52C	Q522	Q522	QTYW		ASPHALT D4311-15 °API 60 °F.MQCI	5	1.00	0.10	0.10	1.00
8	Q52D	Q523	Q523	QTYW		ASPHALT D4311-15 REL DENSITY 60 °F.MQCI	5	1.00	0.10	0.10	1.00

Support of ASTM D1250-80 Table 33 & 34 Calculations - LPG/NGL

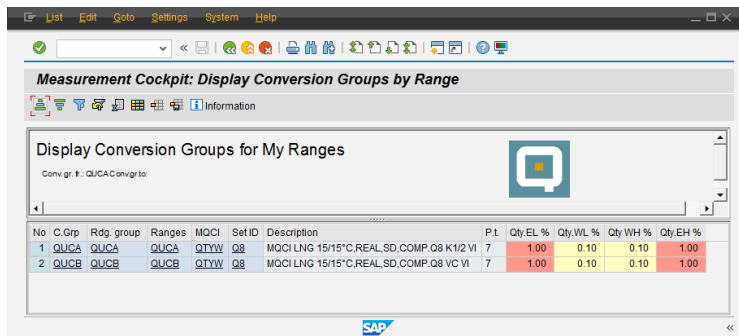
ASTM Tables 33 and 34 are “reduced” Tables of the ASTM D1250-52 Tables 23 and 24 for LPG/NGL. Contractual agreements in some countries still require usage of these historical tables. With BCS 3.0, a SAP QCI implementation of ASTM Tables 33 and 34 is delivered. List printing of ASTM Tables 33 and 34 is available via the Petroleum Measurement Cockpit. A new template conversion group is delivered.



No.	C.Grp	Rdg. group	Ranges	MQCI	Set ID	Description	P.t.	Qty.EL %	Qty.WL %	Qty.WH %	Qty.EH %
1	Q790	Q790	Q790	SAP		LPG ASTM D1250-80 TABLES 33 & 34 RD 60°F	8	1.00	0.10	0.10	1.00

Support of ISO 6578 - Intermediate Results & Rounding - LNG

With [note 00064](#), an advanced development for LNG density calculations has been made available. The advanced development as well as the associated new template conversion groups described in that note are part of BCS 3.0:



No	C-Grp	Rdg. group	Ranges	MOCI	Set ID	Description	P1	Qty.EL %	Qty.WL %	Qty.WH %	Qty.EH %
1	QUICA	QUICA	QUICA	QTYW	Q8	MOCI LNG 15/15°C.REAL_SD.COMP.Q8 K12 VI	7	1.00	0.10	0.10	1.00
2	QUICB	QUICB	QUICB	QTYW	Q8	MOCI LNG 15/15°C.REAL_SD.COMP.Q8 VC VI	7	1.00	0.10	0.10	1.00

Support of ASTM Table 1 - Base Skipping For All Dimensions - All Products

With [note 00055](#), an advanced development for ASTM Table 1 calculations has been made available. The advanced development as well as the associated three new function modules described in that note are part of the BCS 3.0 BC set table /QTYW/MQCI_FUNC.

Support of ASTM D1250-52 Table 6 Temperature Interpolation - Crude Oil & Products

With [note 00065](#), an advanced development for ASTM D1250-52 Table 6 bilinear temperature interpolations has been made available. The advanced development described in that note is part of BCS 3.0.

Confirmation of ASTM D1250-08(13)^{e1} Compliance - Crude Oil & Products

In October 2015, the adjunct ADJD1250-E-PDF to ASTM D1250-08(13) was corrected editorially.

QuantityWare confirms that existing BCS ASTM D1250-08(13) implementations are compliant with these editorial corrections.

Confirmation of ASTM D1550-94(15) Compliance - Butadiene

ASTM D1550-94 has been reapproved in 2015.

QuantityWare has validated that the BCS 3.0 ASTM D1550 conversion groups are compliant with this latest version.

Confirmation of BS EN 14214:2012+A1:2014 Compliance - Biofuel

BS EN 14214 has been updated and corrected in 2012 and 2014.

With BCS 3.0, QuantityWare has validated that the BCS BS EN 14214 conversion groups are compliant with this latest version.

Errata API MPMS Chapter 11.2.4 - LPG/NGL

In September 2011, the errata corrects the statement that API MPMS Chapter 11.2.4 supersedes API MPMS Chapter 11.2.2(M).

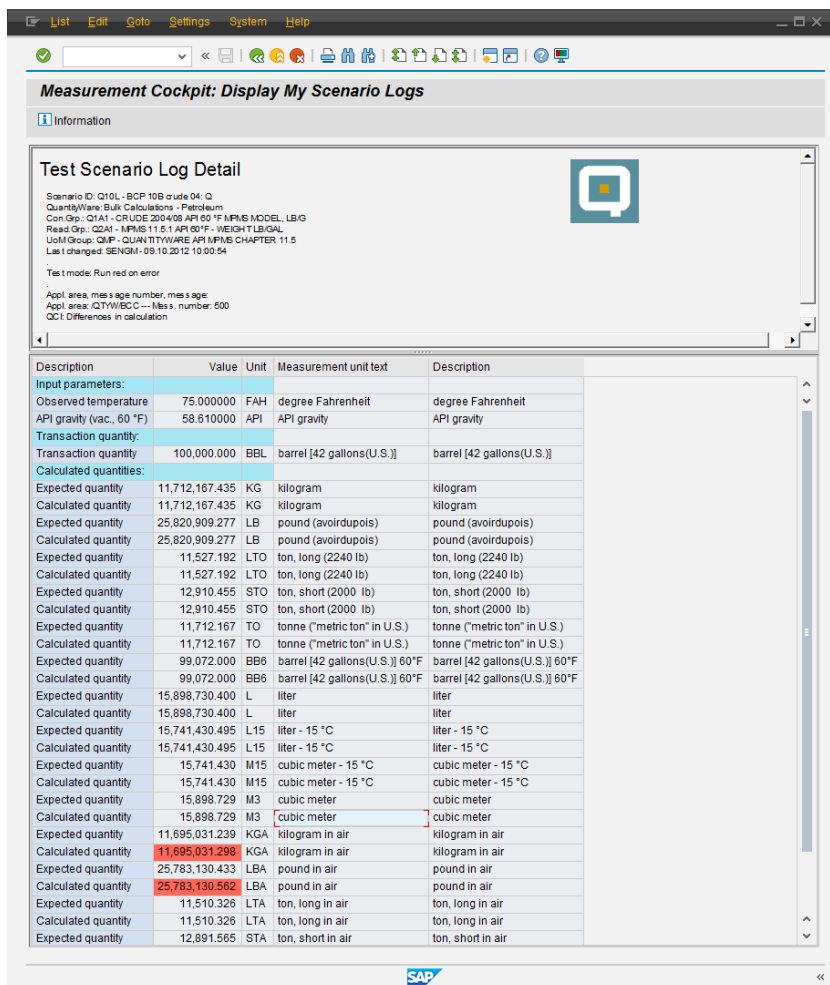
Thus, BCS 3.0 pressure correction calculations for NGL/LPG based on API MPMS 11.2.2(M) are compliant with API MPMS Chapter 11.2.4 – GPA TP-27.

Errata API MPMS Chapter 11.5.1 - All Products

In September 2011 (Updated, September 2013), this errata has been issued. It corrects several lb/gal density/weight/volume intra-conversion formulas - conversions of API gravity at 60 °F to densities in air in pounds per gallons. These corrections have been implemented with BCS 3.0.

▲ *The corrections affect the calculation results for API gravity conversions to density in air in pounds per gallons: The template conversion groups Q1A1, Q2A1, Q3A1, Q4A1 and Q5A1 thus show deviations in the calculation results at the 9th significant digit.*

Example deviation of QuantityWare Test Scenario – after the errata corrections have been implemented in the central QuantityWare development system:



Measurement Cockpit: Display My Scenario Logs

Test Scenario Log Detail

Scenario ID: Q10L - BCP 10B crude 04: Q
 QuantityWare Built Calculations - Petroleum
 Con. Grp.: Q1A1 - CRUDE 2004/09 API 60 °F MPMS MODEL LB/G
 Read. Grp.: Q2A1 - MPMS 11.5.1 API 60 °F - WEIGHT LB/GAL
 UoM Group: QMP - QUANTITYWARE API MPMS CHAPTER 11.5
 Last changed: SEVGMA-09.10.2012 10:00:54

Test mode: Run red on error

Appl. area, mes s age number, mes s age:
 Appl. area: QTYWBCC --- Mes s. number: 500
 CC1: Differences in calculation

Description	Value	Unit	Measurement unit text	Description
Input parameters:				
Observed temperature	75.000000	FAH	degree Fahrenheit	degree Fahrenheit
API gravity (vac., 60 °F)	58.610000	API	API gravity	API gravity
Transaction quantity:				
Transaction quantity	100,000.000	BBL	barrel [42 gallons(U.S.)]	barrel [42 gallons(U.S.)]
Calculated quantities:				
Expected quantity	11,712,167.435	KG	kilogram	kilogram
Calculated quantity	11,712,167.435	KG	kilogram	kilogram
Expected quantity	25,820,909.277	LB	pound (avoirdupois)	pound (avoirdupois)
Calculated quantity	25,820,909.277	LB	pound (avoirdupois)	pound (avoirdupois)
Expected quantity	11,527.192	LTO	ton, long (2240 lb)	ton, long (2240 lb)
Calculated quantity	11,527.192	LTO	ton, long (2240 lb)	ton, long (2240 lb)
Expected quantity	12,910.455	STO	ton, short (2000 lb)	ton, short (2000 lb)
Calculated quantity	12,910.455	STO	ton, short (2000 lb)	ton, short (2000 lb)
Expected quantity	11,712.167	TO	tonne ("metric ton" in U.S.)	tonne ("metric ton" in U.S.)
Calculated quantity	11,712.167	TO	tonne ("metric ton" in U.S.)	tonne ("metric ton" in U.S.)
Expected quantity	99,072.000	BB6	barrel [42 gallons(U.S.)] 60°F	barrel [42 gallons(U.S.)] 60°F
Calculated quantity	99,072.000	BB6	barrel [42 gallons(U.S.)] 60°F	barrel [42 gallons(U.S.)] 60°F
Expected quantity	15,898,730.400	L	liter	liter
Calculated quantity	15,898,730.400	L	liter	liter
Expected quantity	15,741,430.495	L15	liter - 15 °C	liter - 15 °C
Calculated quantity	15,741,430.495	L15	liter - 15 °C	liter - 15 °C
Expected quantity	15,741.430	M15	cubic meter - 15 °C	cubic meter - 15 °C
Calculated quantity	15,741.430	M15	cubic meter - 15 °C	cubic meter - 15 °C
Expected quantity	15,898.729	M3	cubic meter	cubic meter
Calculated quantity	15,898.729	M3	cubic meter	cubic meter
Expected quantity	11,695,031.239	KGA	kilogram in air	kilogram in air
Calculated quantity	11,695,031.298	KGA	kilogram in air	kilogram in air
Expected quantity	25,783,130.433	LBA	pound in air	pound in air
Calculated quantity	25,783,130.562	LBA	pound in air	pound in air
Expected quantity	11,510.326	LTA	ton, long in air	ton, long in air
Calculated quantity	11,510.326	LTA	ton, long in air	ton, long in air
Expected quantity	12,891.565	STA	ton, short in air	ton, short in air

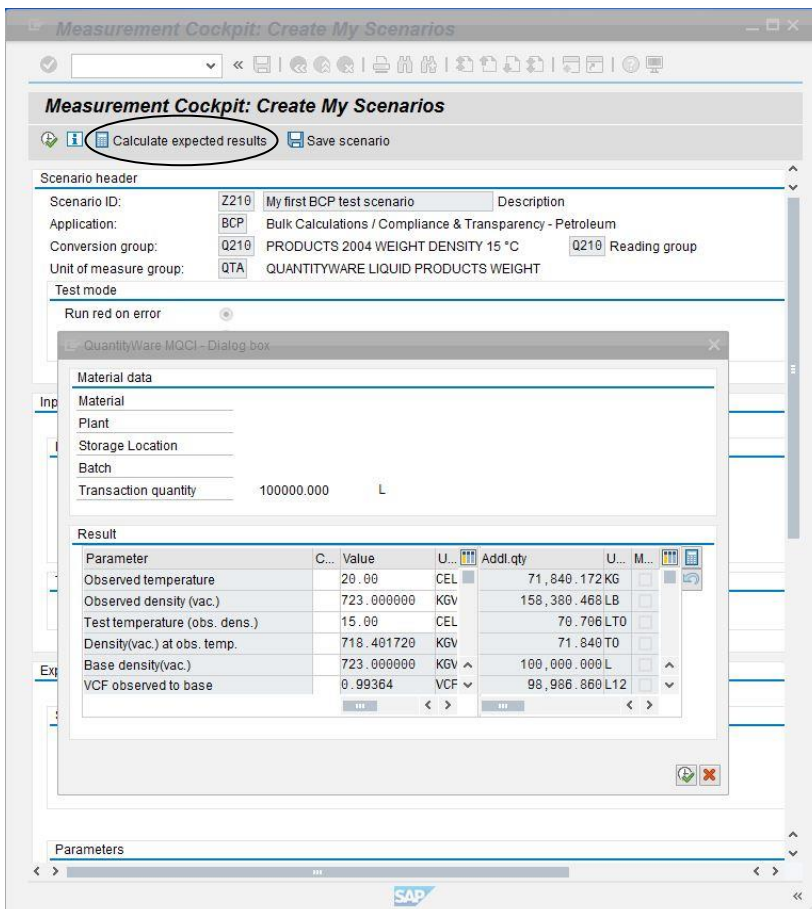
Application and Usage Specific Features

BCP/CTP & BCG/CTG Functionality

The Petroleum Measurement Cockpit (*PMC* for BCP & CTP) and Gas Measurement Cockpit (*GMC* for BCG & CTG) are the single access point to BCP,CTP, BCG and CTG functionality for consultants implementing BCS as well as petroleum and gas measurement experts. The following *PMC* and *GMC* enhancements are delivered with BCS 3.0:

Test Scenario Tool - Calculate Expected Results

Test Scenarios can be created by simply copying the calculated and validated data as expected results. This way, consultants in legacy implementation projects may define several hundred test scenarios within a few days of work in order to validate the migration to QuantityWare BCS conversion groups:



The screenshot shows the 'Measurement Cockpit: Create My Scenarios' window. The 'Calculate expected results' button is highlighted with a red circle. Below it, the 'Scenario header' section contains the following data:

Scenario ID:	Z210	My first BCP test scenario	Description
Application:	BCP	Bulk Calculations / Compliance & Transparency - Petroleum	
Conversion group:	Q210	PRODUCTS 2004 WEIGHT DENSITY 15 °C	Q210 Reading group
Unit of measure group:	QTA	QUANTITYWARE LIQUID PRODUCTS WEIGHT	

The 'Test mode' section has 'Run red on error' selected. A dialog box titled 'QuantityWare MQCI - Dialog box' is open, showing 'Material data' and a 'Result' table.

Material data

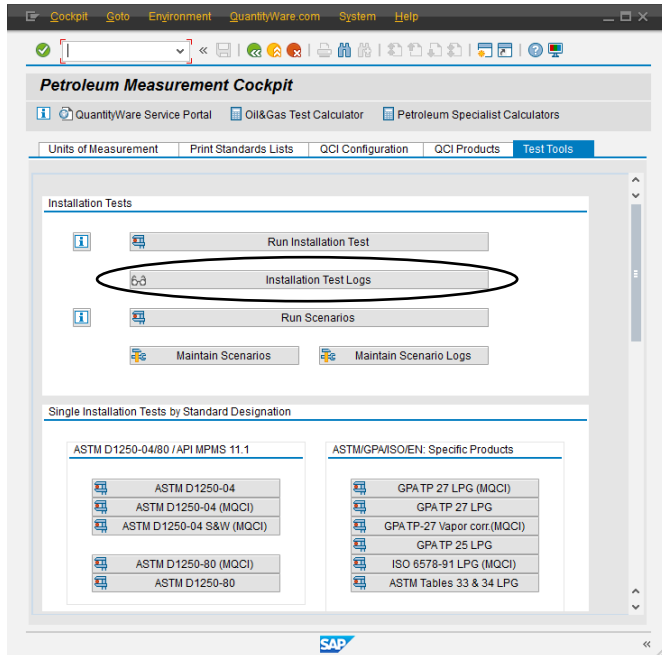
Material	
Plant	
Storage Location	
Batch	
Transaction quantity	100000.000 L

Result

Parameter	C...	Value	U...	Addl. qty	U...	M...
Observed temperature		20.00	CEL	71,840.172	KG	
Observed density (vac.)		723.000000	KGV	158,380.468	LB	
Test temperature (obs. dens.)		15.00	CEL	70.706	LTO	
Density(vac.) at obs. temp.		718.401720	KGV	71.840	TO	
Base density(vac.)		723.000000	KGV	100,000.000	L	
VCF observed to base		0.99364	VCF	98,986.860	L12	

Installation Test Log

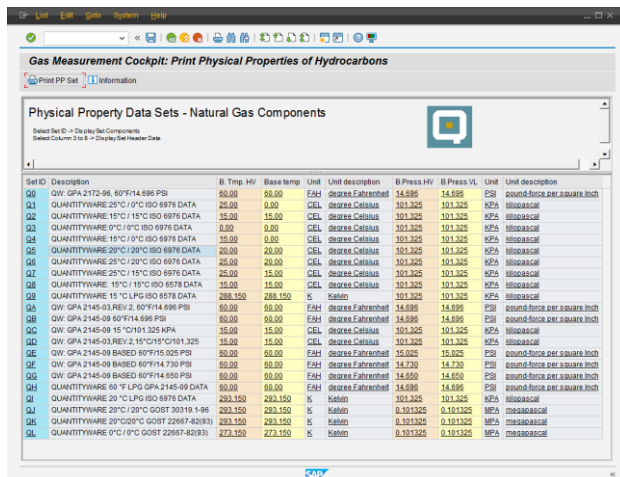
For each run of the installation test, a log is written to the installation test log database.



Additional List Printing Reports

List printing reports are delivered with BCS 3.0 for the following measurement standards:

1. DIN 51757 – Density in Air
2. API MPMS Chapter 11.2.5 – LPG Vapor Pressure
3. Linear VCF Model
4. ISO 6578 – Print Customer Specific Customizing Data
5. Physical Property Data Sets – Print Sets via ALV Lists:

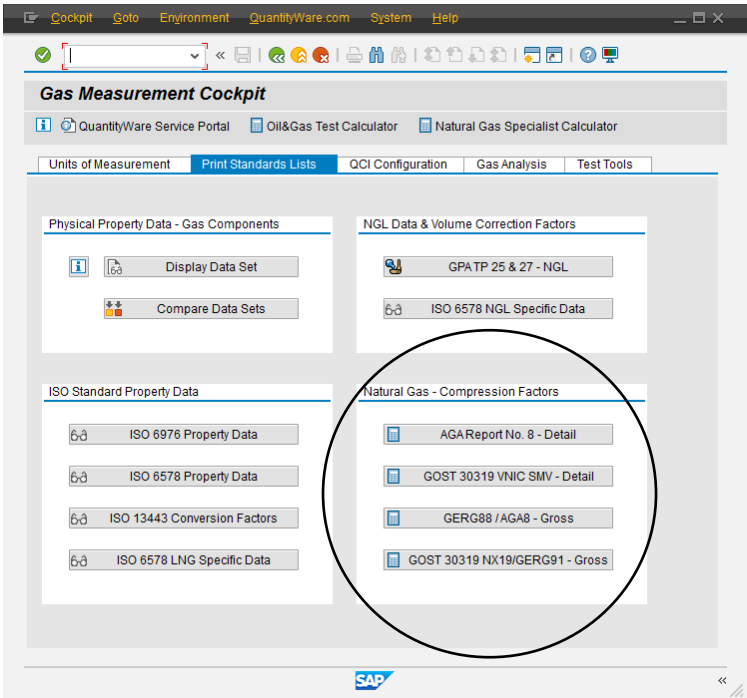


The screenshot shows the SAP 'Gas Measurement Cockpit: Print Physical Properties of Hydrocarbons' interface. It displays a table titled 'Physical Property Data Sets - Natural Gas Components'. The table has columns for Set ID, Description, B. Temp, HV, Base temp, Unit, Unit description, B. Press.HV, B. Press.VL, Unit, and Unit description. The data rows include various measurement standards such as ASTM D1250-04, ISO 6978, and API MPMS 11.2.5, along with their respective units and descriptions.

Set ID	Description	B. Temp	HV	Base temp	Unit	Unit description	B. Press.HV	B. Press.VL	Unit	Unit description
Q0	QW GPA 2172-86, 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q1	QUANTITYWARE 20°C / 15°C ISO 6978 DATA	20.00	0.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q2	QUANTITYWARE 15°C / 15°C ISO 6978 DATA	15.00	15.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q3	QUANTITYWARE 0°C / 0°C ISO 6978 DATA	0.00	0.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q4	QUANTITYWARE 15°C / 15°C ISO 6978 DATA	15.00	0.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q5	QUANTITYWARE 20°C / 20°C ISO 6978 DATA	20.00	20.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q6	QUANTITYWARE 20°C / 20°C ISO 6978 DATA	20.00	20.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q7	QUANTITYWARE 25°C / 15°C ISO 6978 DATA	25.00	15.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q8	QUANTITYWARE 15°C / 15°C ISO 6978 DATA	15.00	15.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q9	QUANTITYWARE 15 °C LPG ISO 6578 DATA	288.150	288.150		K	Kelvin	101.325	101.325	KPa	kilo Pascal
Q0	QW GPA 2145-03 REV 2, 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q1	QW GPA 2145-09 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q2	QW GPA 2145-09 15 °C/101.325 KPa	15.00	15.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q3	QW GPA 2145-03 REV 2, 15°C/101.325 KPa	15.00	15.00		CEL	degrees Celsius	101.325	101.325	KPa	kilo Pascal
Q4	QW GPA 2145-09 BASED 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q5	QW GPA 2145-09 BASED 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q6	QW GPA 2145-09 BASED 60°F/14.699 PSI	60.00	60.00		Fahr	degrees Fahrenheit	14.699	14.699	PSI	pound-force per square inch
Q7	QUANTITYWARE 60 °F LPG GPA 2145-09 DATA	293.150	293.150		K	Kelvin	101.325	101.325	KPa	kilo Pascal
Q8	QUANTITYWARE 20°C / 20°C GOST 30319 1-96	293.150	293.150		K	Kelvin	0.101325	0.101325	MPa	mega Pascal
Q9	QUANTITYWARE 20°C/20°C GOST 22667-82(93)	293.150	293.150		K	Kelvin	0.101325	0.101325	MPa	mega Pascal
Q0	QUANTITYWARE 0°C / 0°C GOST 22667-82(93)	273.150	273.150		K	Kelvin	0.101325	0.101325	MPa	mega Pascal

PDF List Printing For Compression Factor Standards

For all compression factor standards in the Gas Measurement Cockpit, lists can be printed as local PDF files:



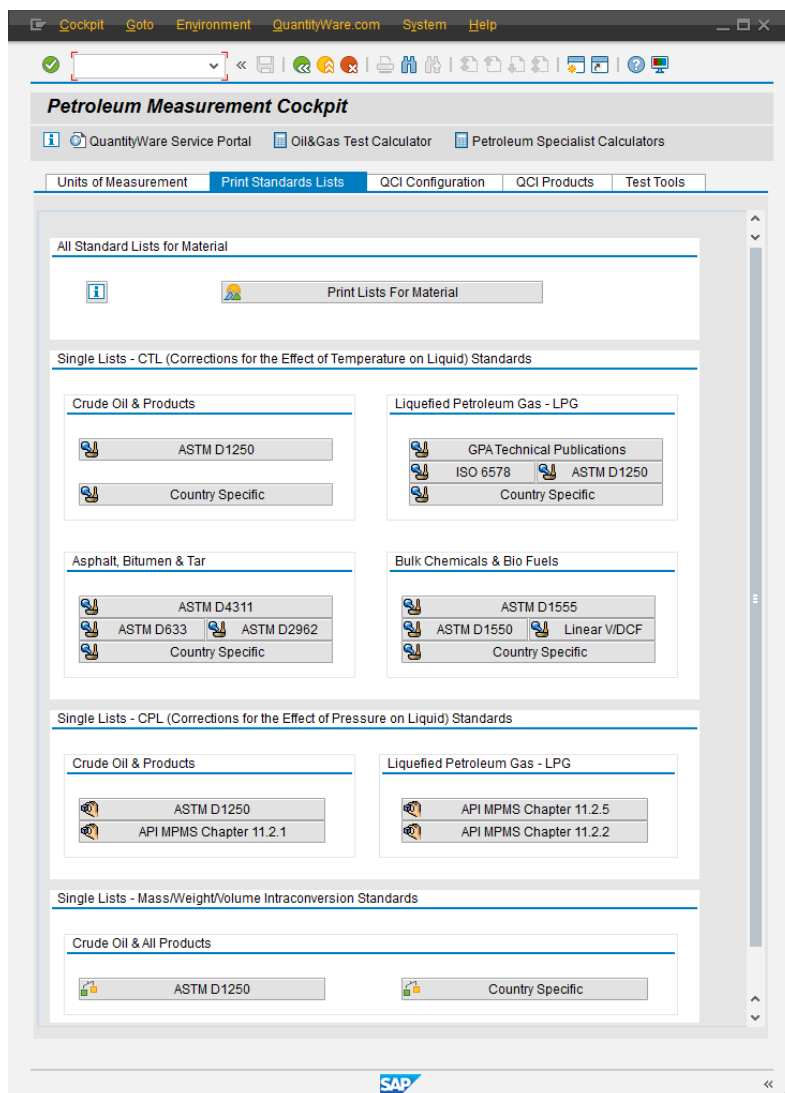
BCP/CTP & BCG/CTG Usability

Reflecting the constructive and important feedback from customers and consultants who work with the Petroleum and Gas Measurement Cockpit, the following PMC and GMC usability enhancements are delivered with BCS 3.0:

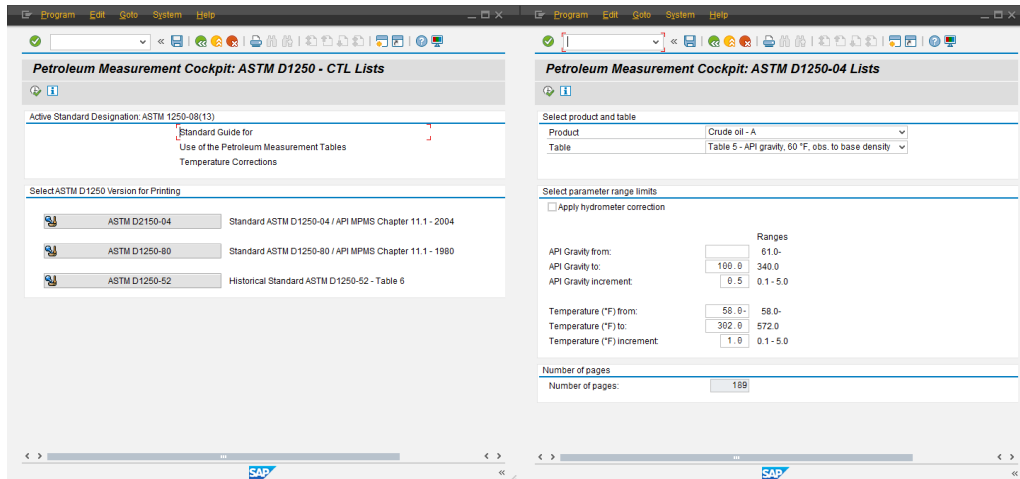
Enhanced Usability - List Printing

The Petroleum Measurement “Print Standards List” Screen has been redesigned. Single Lists can be selected for the three relevant types of measurement standards:

1. CTL Standards
2. CPL Standards
3. Mass/Weight/Volume Intraconversion Standards

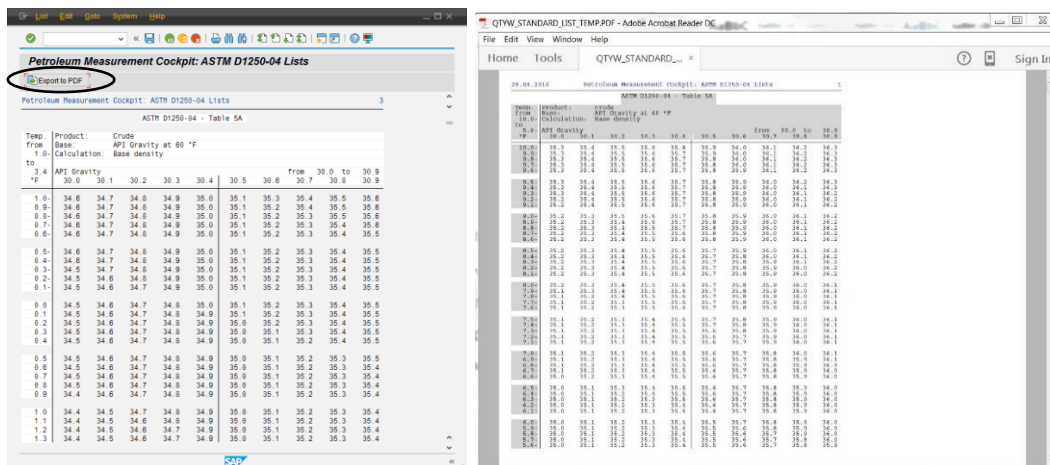


Within each section, the lists are arranged by product groups and measurement standard designation. Upon selection of a standard designation, all available versions are displayed:



For each list, the minimum and maximum allowed ranges are displayed. User input is automatically corrected (e.g. if “from” value is larger than “to” value).

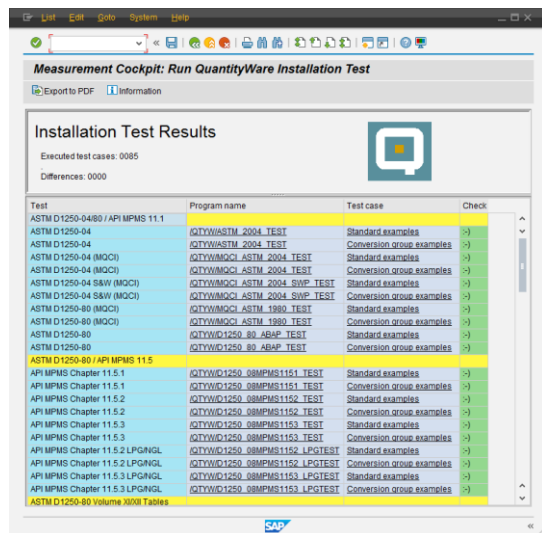
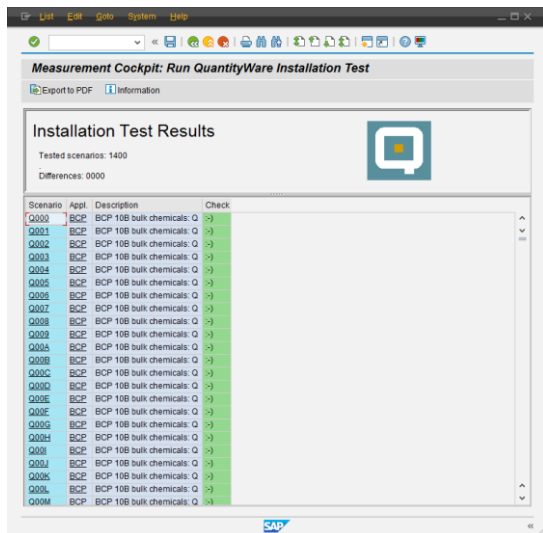
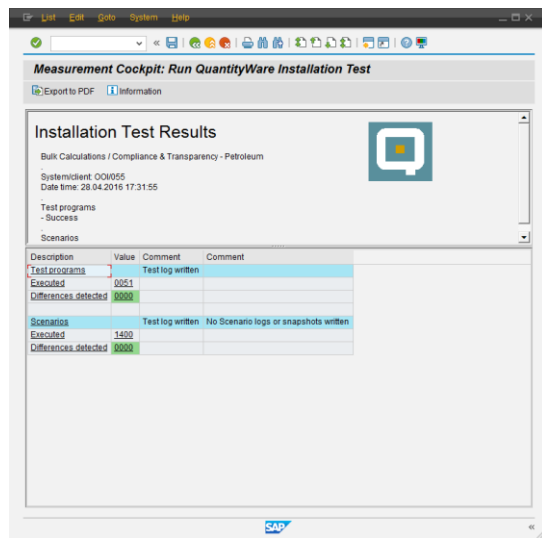
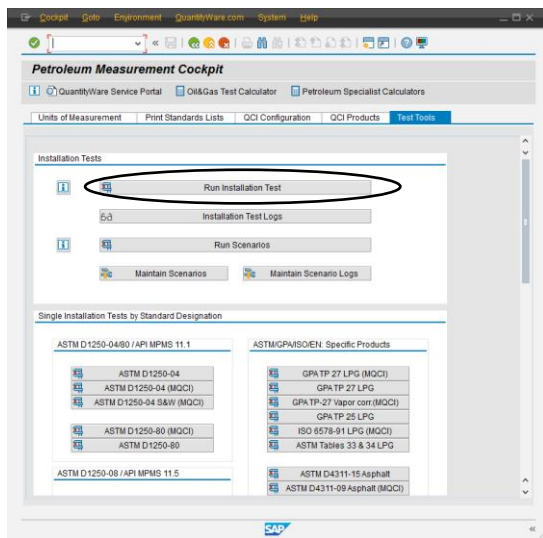
The standard print design is set to a black & white layout (classic list):



The option to print a list to a local PDF file is available in each classic list print out.

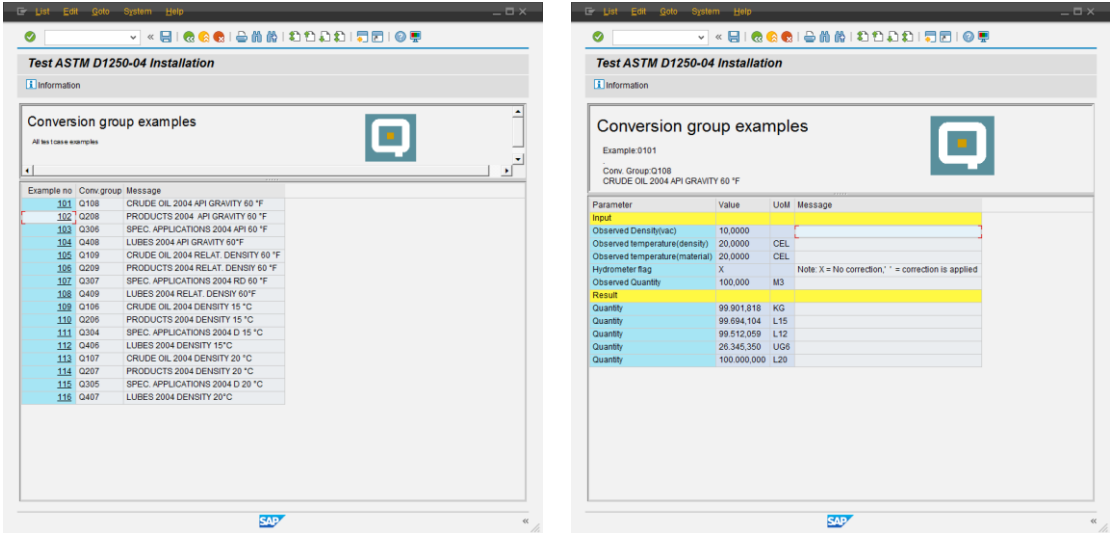
Enhanced Usability - Installation Test

The Installation Test, which is executed in your client 045 in one dedicated system (typically DEV), is now executed with one click. A log is written to the database for each run and the test results are displayed in one ALV list with navigation options to all details:



Enhanced Usability - Single Test Reports

Each single test report is equipped with the common design utilizing ALV lists.

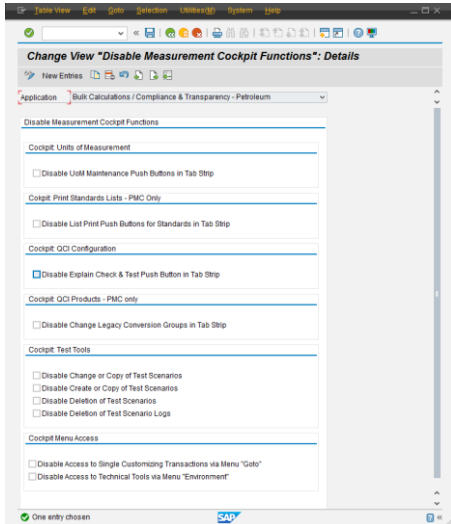


Enhanced Usability - Customizing Data Access

When accessing customizing transactions, the data is available in “Change” mode as defined by the SAP standard.

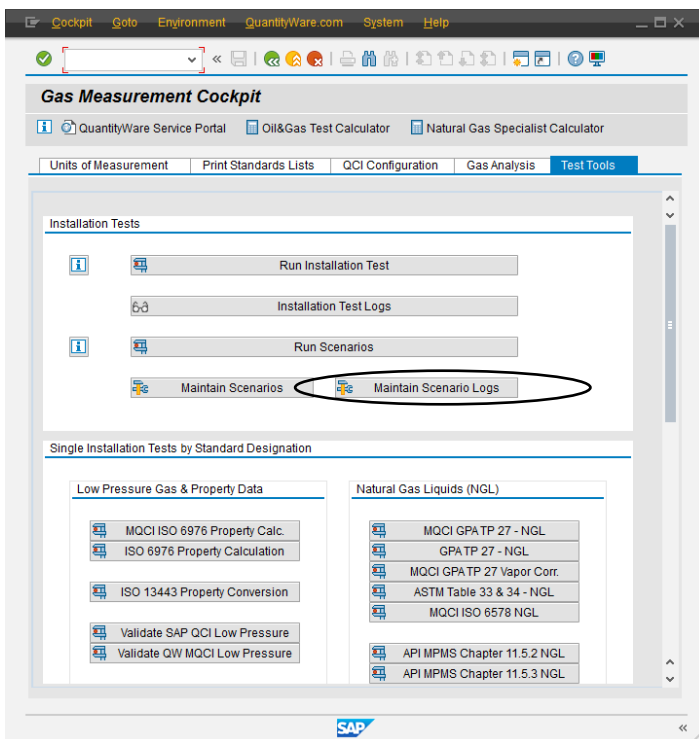
Enhanced Usability - Cockpits

With BCS 1.0B CSP03, access to PMC and GMC functions, which are not relevant in e.g. production clients, can be turned off in such clients, simplifying the user experience. With BCS 3.0, additional functions may be turned off, via one central customizing transaction:



Enhanced Usability - Test Scenario Maintenance

With BCS 3.0, test scenario execution and maintenance has been completely redesigned, such that all scenario log activities are available under one single main activity:



BCP/CTP & BCG/CTG Security

QuantityWare BCS 3.0 will be certified by Virtual Forge.

BCP and BCG Corrections

QuantityWare notes 000055, 000057, 000058, 000060, 000061, 000062, 000064, 000065 and 000066 are contained in BCS 3.0:

Note Number	Short Text	Link
000055	ASTM Table 1 – Base skipping – Calculation model extensions	https://www.quantityware.com/wp-content/uploads/note-000055.pdf
000057	Virtual Forge Certification – Deletion of obsolete reports	https://www.quantityware.com/wp-content/uploads/note-000057.pdf
000058	BCS CSP03 Installation Test – FLTP comparison issue	https://www.quantityware.com/wp-content/uploads/note-000058.pdf
000060	Linear DCF list printing – rounding issue	https://www.quantityware.com/wp-content/uploads/note-000060.pdf
000061	DIN 51757 X Tables Asphalt Correction / Range Extension Dump	https://www.quantityware.com/wp-content/uploads/note-000061.pdf
000062	Message /QTYW/QCI 019 raised erroneously – SAP PRA	https://www.quantityware.com/wp-content/uploads/note-000062.pdf
000064	ISO 6578 – LNG: intermediate parameter rounding & transport	https://www.quantityware.com/wp-content/uploads/note-000064.pdf
000065	ASTM D1250-52 Table 6 – Temperature Interpolation	https://www.quantityware.com/wp-content/uploads/note-000065.pdf
000066	Usage Key installation issue after system copy with SID rename	https://www.quantityware.com/wp-content/uploads/note-000066.pdf

In addition to these corrections and advanced developments - already delivered as individual notes - the following minor enhancements and corrections within the PMC and GMC are provided:

- A warning message is displayed in the conversion group log if the “extend range of standard implementation” flag is set. This way, the importance to define range checks - if ranges are extended - is emphasized.
- The unit conversion calculator results in the PMC and GMC are printed as classic lists if F8 is selected.
- ISO 13443 factors can be maintained with 14 decimals. Conversion factors for molar or mass based heating values between 60 °F and any ISO 13443 temperature (15 °C, 20 °C ...) can be maintained in order to e.g. map contractually defined conversion factors.