

## Note: 000068

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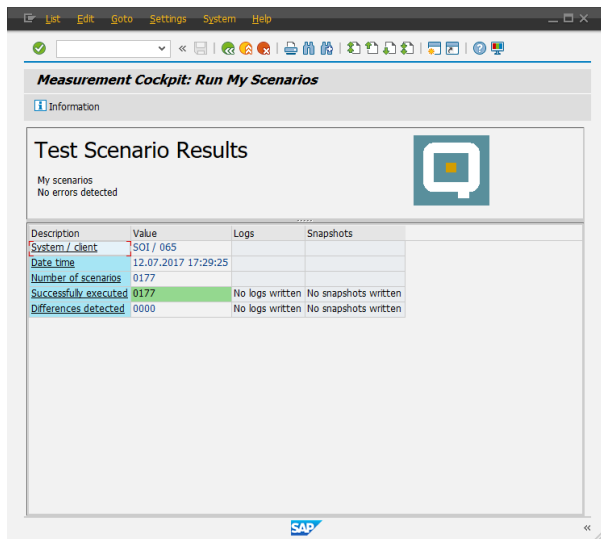
### Overview

Number	000068
Description	Minor Calculation Differences: SAP QCI - API C <> QuantityWare BCS
Version	03 from 19.06.2020
Status	Released to Customer
Language	EN
Responsible	Markus Seng
Product	BCP
Category	Consulting & Configuration

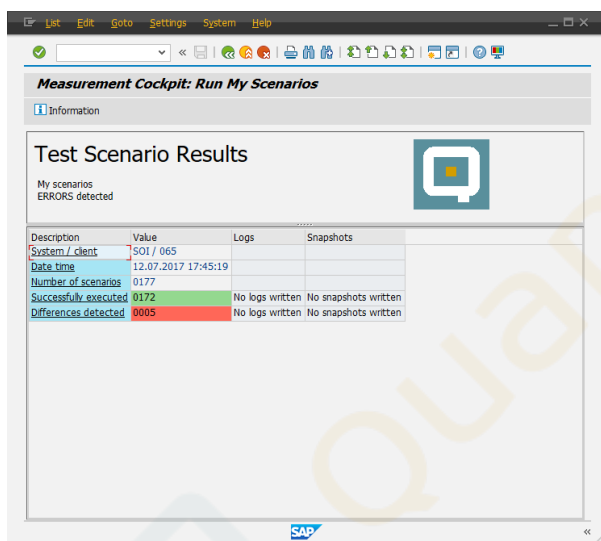
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### Symptom

- You migrate your SAP ECC conversion groups that are configured to run with an ASTM D1250-04 API C code implementation to the corresponding QuantityWare BCS conversion groups (using either the automatic “C to ABAP” conversion tool provided with the Petroleum Measurement Cockpit, or via a manual configuration change process).
- The API C code implementation has been exposed to the SAP QCI (via wrapper routines and compilation) as demonstrated in the theoretical example from SAP note 970603. The C sources & usage key for the QuantityWare internal test case described in this note were officially purchased in 2006 and represent the then available code version.
- Automated Test Scenarios have been created for the API C conversion groups, which all run green:



- In order to ensure that the calculated quantities are identical after the migration to QuantityWare ABAP, you run the automated test scenarios again; there, you observe very small calculation differences for metric conversion groups, where the observed/test temperature (corresponding to the observed/test density) is at base temperature (either 15 °C or 20 °C) and pressure conditions are at 0 Psi/bar:



Example Test Scenario with observed differences:

## QuantityWare BCS implementation:

Measurement Cockpit: Run My Scenarios

Information

Results

Scenario ID: L007 - 15DB Scenario 3  
 QuantityWare: Bulk Calculations - Petroleum  
 Con.Grp.: 15DB - API\_4 15 °C PRODUCTS IN DENSITY  
 Read.Grp.: RDNB - ABSOLUTE DENSITY, PRODUCT TYPE B  
 UoM Group: QTY - QUANTITYWARE 065 TESTS  
 Last changed: SENGH - 07.11.2012 14:06:38

Test mode: Run red on error

Appl. area, message number, message:  
 Appl. area: QTYW/BCC --- Mess. number: 500  
 QCI: Differences in calculation

Description	Value	Unit	Measurement unit text	Parameter descrpt.
<b>Input parameters:</b>				
Material temperature	15.000000	CEL	Celsius	Material temperature
Test temperature	15.000000	CEL	Celsius	Test temperature
Test density	800.000000	KGV	Kilogram/cubic meter	Test density
Air buoyancy indicator	0.000000			Air buoyancy indicator
Hydrometer corr. indicator	X			Hydrometer corr. indicator
Meter correction factor	1.000000			Meter correction factor
<b>Transaction quantity:</b>				
Transaction quantity	100,000,000	M3	Cubic meter	Transaction quantity
<b>Expected parameters:</b>				
Expected parameter	800.000000	KGV	Kilogram/cubic meter	Base density
Calculated parameter	800.000000	KGV	Kilogram/cubic meter	Base density
<b>Calculated quantities:</b>				
Expected quantity	80,000,000.000	KG	Kilogram	
Calculated quantity	80,000,000.022	KG	Kilogram	
Expected quantity	176,369,809.748	LB	US pound	
Calculated quantity	176,369,809.748	LB	US pound	
Expected quantity	88,184,905	STO	Short Ton	
Calculated quantity	88,184,905	STO	Short Ton	
Expected quantity	80,000.000	TO	Tonne	
Calculated quantity	80,000.000	TO	Tonne	
Expected quantity	629,308.317	BB6	Barrel 60°F	
Calculated quantity	629,308.317	BB6	Barrel 60°F	
Expected quantity	100,000,000.000	L15	Liter at 15 C	
Calculated quantity	100,000,000.000	L15	Liter at 15 C	
Expected quantity	100,467,172.351	L20	Liter 20°C	
Calculated quantity	100,467,172.351	L20	Liter 20°C	
Expected quantity	100,000.000	M15	Cubic meter at 15 celsius	
Calculated quantity	100,000.000	M15	Cubic meter at 15 celsius	

## SAP QCI API C implementation:

Measurement Cockpit: Run My Scenarios

Information

Results

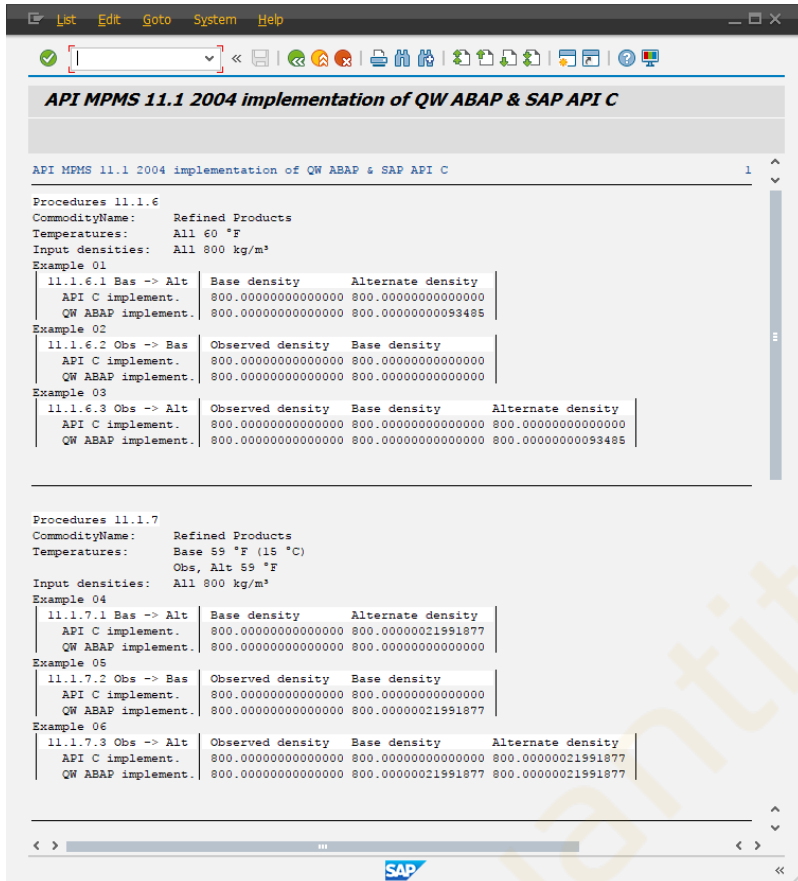
Scenario ID: L007 - 15DB Scenario 3  
 QuantityWare: Bulk Calculations - Petroleum  
 Con.Grp.: 15DB - API\_4 15 °C PRODUCTS IN DENSITY  
 Read.Grp.: RDNB - ABSOLUTE DENSITY, PRODUCT TYPE B  
 UoM Group: QTY - QUANTITYWARE 065 TESTS  
 Last changed: SENGH - 07.11.2012 14:06:38

Test mode: Run red on error

Description	Value	Unit	Measurement unit text	Parameter descrpt.
<b>Input parameters:</b>				
Material temperature	15.000000	CEL	Celsius	Material temperature
Test temperature	15.000000	CEL	Celsius	Test temperature
Test density	800.000000	KGV	Kilogram/cubic meter	Test density
Air buoyancy indicator	0.000000			Air buoyancy indicator
Hydrometer corr. indicator	X			Hydrometer corr. indicator
Meter correction factor	1.000000			Meter correction factor
<b>Transaction quantity:</b>				
Transaction quantity	100,000,000	M3	Cubic meter	Transaction quantity
<b>Expected parameters:</b>				
Expected parameter	800.000000	KGV	Kilogram/cubic meter	Base density
Calculated parameter	800.000000	KGV	Kilogram/cubic meter	Base density
<b>Calculated quantities:</b>				
Expected quantity	80,000,000.000	KG	Kilogram	
Calculated quantity	80,000,000.000	KG	Kilogram	
Expected quantity	176,369,809.748	LB	US pound	
Calculated quantity	176,369,809.748	LB	US pound	
Expected quantity	88,184,905	STO	Short Ton	
Calculated quantity	88,184,905	STO	Short Ton	
Expected quantity	80,000.000	TO	Tonne	
Calculated quantity	80,000.000	TO	Tonne	
Expected quantity	629,308.317	BB6	Barrel 60°F	
Calculated quantity	629,308.317	BB6	Barrel 60°F	
Expected quantity	100,000,000.000	L15	Liter at 15 C	
Calculated quantity	100,000,000.000	L15	Liter at 15 C	
Expected quantity	100,467,172.351	L20	Liter 20°C	
Calculated quantity	100,467,172.351	L20	Liter 20°C	
Expected quantity	100,000.000	M15	Cubic meter at 15 celsius	
Calculated quantity	100,000.000	M15	Cubic meter at 15 celsius	
Expected quantity	26,430,949.329	UG6	US Gallons 60F	
Calculated quantity	26,430,949.329	UG6	US Gallons 60F	

## Cause

A detailed analysis of the two implementations that were compared in this scenario revealed that very small deviations in the calculated base density values for the procedures 11.7.2 and 11.7.3 (where the observed or alternate conditions equal the base conditions) lead to these detectable differences:



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List Edit Goto System Help
API MPMS 11.1 2004 implementation of QW ABAP & SAP API C
API MPMS 11.1 2004 implementation of QW ABAP & SAP API C
Procedures 11.1.6
CommodityName: Refined Products
Temperatures: All 60 °F
Input densities: All 800 kg/m³
Example 01
11.1.6.1 Bas -> Alt | Base density | Alternate density |
API C implement. | 800.0000000000000000 | 800.0000000000000000 |
QW ABAP implement. | 800.0000000000000000 | 800.00000000093485 |
Example 02
11.1.6.2 Obs -> Bas | Observed density | Base density |
API C implement. | 800.0000000000000000 | 800.0000000000000000 |
QW ABAP implement. | 800.0000000000000000 | 800.0000000000000000 |
Example 03
11.1.6.3 Obs -> Alt | Observed density | Base density | Alternate density |
API C implement. | 800.0000000000000000 | 800.0000000000000000 | 800.0000000000000000 |
QW ABAP implement. | 800.0000000000000000 | 800.0000000000000000 | 800.00000000093485 |
Procedures 11.1.7
CommodityName: Refined Products
Temperatures: Base 59 °F (15 °C)
Obs, Alt 59 °F
Input densities: All 800 kg/m³
Example 04
11.1.7.1 Bas -> Alt | Base density | Alternate density |
API C implement. | 800.0000000000000000 | 800.0000021991877 |
QW ABAP implement. | 800.0000000000000000 | 800.0000000000000000 |
Example 05
11.1.7.2 Obs -> Bas | Observed density | Base density |
API C implement. | 800.0000000000000000 | 800.0000000000000000 |
QW ABAP implement. | 800.0000000000000000 | 800.0000021991877 |
Example 06
11.1.7.3 Obs -> Alt | Observed density | Base density | Alternate density |
API C implement. | 800.0000000000000000 | 800.0000000000000000 | 800.0000021991877 |
QW ABAP implement. | 800.0000000000000000 | 800.0000021991877 | 800.0000021991877
  
```

A thorough review and analysis of the API MPMS Chapter 11.1 – 2004 implementation guidelines and detailed ABAP code analysis showed that the small deviations (in this case deviations from the expected exact result of 800.0000000000000000 kg/m<sup>3</sup>) have to be expected and can be readily explained.

- *After consultation with other organizations, the source of the discrepancy observed here was suggested to be due to a discrepancy in the wrapper required to call the API C code from the SAP ECC system. This wrapper must be developed by each SAP customer individually and is used at the customers' own risk.*

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## Solution

Organizations that experience the same discrepancies as described in this note and who wish to be certain that they are using implementations of such complex standards in an SAP ERP S/4HANA environment are recommended to use the QuantityWare solution, a native ABAP implementation with additional functions, owing to:

1. ABAP implementations do not require wrapper functions – seamless integration into the SAP QCI ABAP interface is available
2. QuantityWare implementations are available as transparent source code within the SAP-system (as with all ABAP programs, they are compiled at run-time by the SAP Kernel)
3. QuantityWare provides test scenario tools allowing customers to validate calculations results (and actively encourages customers to do so)
4. QuantityWare provides tools within its base product to allow customers to print their own tables of all standards to ease reconciliation with external regulatory bodies and their representatives through the use of a known, traditional data format

### Current QuantityWare Systems

If customers experience the issue described in this note, owing to the flexibility of the BCS solution, they may simply configure BCS conversion groups with appropriate rounding of base densities for metric conversion groups, effectively removing these differences.

### QuantityWare BCS 3.0, CSP01

BCS 3.0 CSP01 contains a new SAP QCI and MQCI conversion group-compatible function. This function simulates the issue described above. Using this function removes the differences as described earlier in this note.

The automatic QuantityWare “C to ABAP conversion tool” has been delivered in an updated version with BCS 3.0 CSP01 and as advanced development with note 000069, allowing customers to automatically include this new function during the conversion process, if they so choose.

- *All further details are published in the release notes for BCS 3.0 CSP01.*

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## Transport Reference

No SAP-based transport

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## Validity

SAP Release	From SP	To SP	In SP Shipment
ECC600	0	1	BCS 3.0 CSP01
S/4 HANA	0	0	BCS 3.0

