



# Bulk Calculations Solution

## QuantityWare Interface – PRA Measurement System

A Working Paper describing principles and configuration steps required for the use of QuantityWare Calculations with the PRA Measurement System

## Version History

---

| Version | Date       | Description                       |
|---------|------------|-----------------------------------|
| 00      | 2015-03-27 | Initial Version                   |
| 00_01   | 2017-08-02 | Editorially revised and confirmed |
| 00_02   | 2020-07-17 | Editorial revision                |
| 02      | 2021-09-24 | Modern QW document style applied  |

# Contents

|  |   |
|--|---|
| <b>1. PRA Measurement System .....</b>                 | <b>4</b>                                  |
| 1.1. Types of Calculations .....                       | 5   |
| 1.2. Main objects of the Measurement System .....      | 6   |
| 1.3. Controlling the Measurement Process.....          | 7   |
| 1.4. Measurement System Flexibility .....              | 9   |
| <b>2. Standards Support Examples .....</b>             | <b>10</b>                                 |
| 2.1. SAP Settings for ASTM D1250-80 .....              | 10  |
| 2.2. ASTM D1250-04 without Pressure .....              | 11  |
| 2.3. ASTM D1250-04 with Pressure .....                 | 11  |
| 2.4. GPA 8217 / TP-27 - LPG .....                      | 12  |
| <b>3. Conclusion .....</b>                             | <b>13</b>                                 |
| <b>Appendix.....</b>                                   | <b>14</b>                                 |
| <b>Appendix A. ASTM D1250-80 .....</b>                 | <b>15</b>                                 |
| A.1. Delivery Network.....                             | 15  |
| A.2. Measurement System .....                          | 19  |
| <b>Appendix B. ASTM D1250-04 without Pressure.....</b> | <b>25</b>                                 |
| <b>Appendix C. ASTM D1250-04 with Pressure .....</b>   | <b>28</b>                                 |
| C.1. PRA settings .....                                | 28  |
| C.2. Measurement System Settings .....                 | 29  |
| <b>Appendix D. GPA 8217 / TP-27 – LPG .....</b>        | <b>34</b>                                 |
| D.1. PRA Settings.....                                 | 34  |
| D.2. Measurement System settings.....                  | 36  |
| <b>Appendix E. Appendix.....</b>                       | <b>Fehler! Textmarke nicht definiert.</b> |
| E.1. Sub section within the Appendix .....             | <b>Fehler! Textmarke nicht definiert.</b> |

## 1. PRA Measurement System

---

The PRA (Production Revenue Accounting) Measurement System provides a flexible method of recording measurement readings for all PRA business objects. It supports and calls the Quantity Conversion Interface (SAP QCI). The PRA Measurement System is called by PRA to:

- Provide a single point of data entry for the observed reading data e.g. from wells or measurement points
- Call the SAP QCI to convert a reading volume into standardized units
- Pass the required data back to the calling PRA transactions

During daily operations PRA will require various values, such as Measurement Point Volumes (MP\_VOLUMES) or Well Completion Volumes (WC\_VOLUMES).

The standardized values required by PRA are dependent on the product type:

- For oil and condensate: Volume and density
- For gas: Volume or energy, or both and heating value

## 1.1. Types of Calculations

---

There are different types of calculations. The QCI is called by the function "OIU\_QCI\_STD\_CONVERSION" for:

- Calculations of oil products and condensates
- Calculations of gas products via BAdI implementation

### 1.1.1. Gas Products

---

The current PRA solution can process gas under low pressure and dry or wet conditions.

The conversion group USGS - NATURAL GAS U.S. BASE CONDITIONS has been developed to support such calculations, via the SAP QCI low pressure conversion routines, and wet to dry conversions being based on an example BAdI implementation OIU\_WET\_DRY\_EXAMPLE, which implements a formula defined by the PRA development team based on legacy calculation logic defined in the PREMAS system. There is currently no need to support any other standard in the United States; therefore the settings provided by SAP can be used after thorough validation.

There is currently no need to support any other standard in the United States; therefore the settings provided by SAP can be used after thorough validation.

### 1.1.2. Oil, Condensate, Liquids

---

The measured quantities of these products have to be converted to standard conditions.

For such conversions, SAP provides an interface supporting the ASTM D1250-80 standard, based on the legacy "C-Code" implementation from the API. The related conversion group and Measurement System customizing settings are also provided.

For various reasons, we recommend usage of the QuantityWare ABAP D1250-80 solution instead of the legacy "C-Codes" or, that customer's use the current standard ASTM D1250-04 – (as required by the CBP - Customs and Border Protection). For business reasons (e.g. existing customer agreements), customers may need to use different versions of ASTM D1250 standard for different materials.

Additional standards may be required to support addition products. E.g. GPA 8217 / TP-27 (legacy version TP-25) is required for the calculation of LPG.

The PRA Measurement System provides the flexibility to handle such cases.

It is possible to customize the use of different standards by different networks and also to change the calculation standard of existing networks.

## 1.2. Main objects of the Measurement System

---

The Measurement System contains objects to select and control measurements, their conversion and transport of the conversions' results.

### 1.2.1. Measurement Classes

---

Are used for the classification of business objects, such as WC\_VOLUMES (Well Completion Volumes), etc. Each Measurement Class has a set of Measurement Types assigned to it. The Measurement Classes are hard coded in the PRA measurement transactions.

### 1.2.2. Measurement Types

---

Are a consistent set of readings to be taken for a business object in a Measurement Class.

These control:

- Input screen fields, their layout and defaults
- The calculation to be used
- Field transport and measurement documents

### 1.3. Controlling the Measurement Process

---

Besides the Measurement Class of the PRA transaction, two more objects control the measurement process:

1. **Material** - with the related Major and Minor Product code assigned

E.g.:

- Material                    EP100
- Major Product code:        0        - Oil
- Minor Product Code:        00       - general oil

The Measurement Type will be selected by:

- Measurement Class        WC\_VOLUMES
- Major Product Type        0
- Minor Product Type        00

E.g.: WC\_VOLUMES, 0, 00 => WCDVLLILOILC

This is the Measurement Type which contains all required settings and controls for the related measurement process. All possible fields, the conversion and the field transport are assigned to the Measurement Type.

The selected Measurement Type is also responsible for the QCI Interface fields' definition.

2. **Measurement Group** with the assigned CONVGR (Conversion Group) and UOMGR (Unit of Measure Group).E.g.: 125004\_60A with the assigned:

CONVGR:        Q108   - ASTM D1250-05, CRUDE OIL 2004 API GRAVITY 60 °F

UOMGR:        USL     - Units BB6, LB

The CONVGR controls the QCI Conversion Group and the UOMGR defines for what Units of Measure the quantities are calculated, and the input screen field defaults.

### 1.3.1. Process Overview

---

1. Selection of Measurement type by:
  - Measurement Class
  - Material with assigned Major and Minor Product Code
  
2. The selected Measurement Type contains:
  - All needed screen input fields and their characteristics
  - The calculation and needed interface fields
  - The required field transports
  
3. The Measurement group with the assigned Conversion Group and Unit of Measure Group determines:
  - The QCI Conversion Group to be used
  - The selected input fields' default values and characteristics.



## 1.4. Measurement System Flexibility

---

As described in Chapter 1.3, the Measurement System can be customized to create and control any required input screen. It can call any assigned existing QCI calculation function by using the standardized QCI interface and it can show the results on the input screen generated.

It passes the results to the PRA application as defined by the field transports.

It fulfils all current productive requirements of the PRA solution, however it is limited by the current PRA solution functional extent.

E.g.: It is possible to configure the Measurement System to calculate the vapour mass of an LPG tank, however that quantity is unknown by the PRA solution and cannot be processed.

The Measurement System can be configured to call multiple standards such as ASTM D1250-80, ASTM D1250-04 (with and without pressure) and GPA TP-25 or GPA 8217 / TP-27 for LPG.

Any quantity conversion “standard” that provides PRA-required calculation results can be customized in the Measurement System, even the parallel use of differing standards by different Networks and for different Materials or Units of Measurements.

## 2. Standards Support Examples

---

The Measurement System's flexibility allows the use of any available standard that supports the SAP QCI interface. All currently available standards are implemented by QuantityWare based on the Standard SAP QCI Interface.

Since the current PRA Gas solution cannot use any standard other than the hard-coded formula (example BAdI), no further explanation is necessary and we shall continue with descriptions for the implementation for Oil, Condensates and Liquids.

SAP provides example settings for the use of ASTM D1250-80 via legacy C-Codes.

The C-Codes and the QuantityWare BCS ABAP implementation of the ASTM D1250-80 standard are using the same SAP QCI interface and have been proven to calculate identically. If both calculations have been licensed and installed, conversion group settings dictate whether legacy C-Codes or the QuantityWare ABAP implementation will be used.

Simply put, by changing the assigned conversion group the system can be switched between using the legacy C-Codes or the QuantityWare ABAP solution. It is also possible to change existing conversion group settings to facilitate the swap between legacy C-Codes or the QuantityWare ABAP solution usage.

### 2.1. SAP Settings for ASTM D1250-80

---

SAP provides, without warranty, examples of configuration required for the use of ASTM D1250-80 calculations.

Owing to their age, the related conversion groups are designed to call the legacy external C-Codes originally provided by the API; we will use a conversion group that calls the QuantityWare ABAP implementation instead.

See [ASTM D1250-80](#) for technical details and an example.

## 2.2. ASTM D1250-04 without Pressure

---

ASTM D1250-04 (revision from 2013) is the current version of ASTM D1250. It also provides more calculation functionalities and includes many improvements registered with and made by the ASTM in the 33 years since the Release of ASTM D1250-80.

More details can be found here: [Comparison of ASTM D1250 standard implementations](#)

ASTM D1250-04 can also be called with the same input parameters as the superseded version ASTM D1250-80. If additional fields such as pressure are not provided with values, they will be considered as “initial” and not included into the calculation. As all input fields are identical, it is possible to use QuantityWare ASTM D1250-04 calculations by replacement or by changing the appropriate conversion group.

No other Measurement System changes are needed.

See ASTM D1250-04 without PressureASTM D1250-04 with PressureASTM D1250-04 with Pressurefor technical details and an example.

## 2.3. ASTM D1250-04 with Pressure

---

If pressure values are provided, ASTM D1250-04 includes these into the “correction factor” calculation. To use pressure values, the related Measurement Type’s fields must be customised to allow such values to be passed to the calculation.

If standard ASTM D1250-80 is also in use via the same Measurement Type, the pressure field will appear on the input screen even although it is not needed. Thus, we recommend the creation of a new Measurement Type for ASTM D1250-04 usage, which can be a copy of an existing D1250-80 measurement type, but with the pressure field added.

See ASTM D1250-04 with Pressurefor technical details and an example.

## 2.4. GPA 8217 / TP-27 - LPG

---

This is an example of quantity conversion standard configuration for a standard currently unknown to PRA. In this instance, the following steps must be completed:

Customizing:

- Create a new Measurement Type and assign the required input fields and field transfers.
- Assign required fields to the calculation (input of GPA 8217 / TP-27)
- Assign the new Measurement Type to the Measurement Classes.

In the PRA application:

- Create a material and assign the proper Major and Minor Product codes
- Assign Measurement Type to the Measurement Class, Major and Minor Product Code
- Create a new Measurement Group with the desired Conversion Group and Unit of Measurement Group.

See GPA 8217 / TP-27 - LPG for technical details.

### 3. Conclusion

---

The SAP PRA application can support a wide variety of quantity conversion standards, including the latest, legally required standards for oil, condensate and liquid products for the United States market.

For gaseous products, standards support is defined by the current architectural limitations of the SAP PRA product.

QuantityWare BCS seamlessly plugs into SAP PRA, however a PRA Measurement System Expert is recommended to be available. This working paper provides guidance how to proceed with such a task.

## Appendix

---

In this section we define the necessary basic settings to allow the use of the standards previously discussed in the document, including examples of the Well Completion Volume Transaction and Measurement Class **WC\_VOLUMES**.

Read and understand ASTM D1250-80 before trying to approach any other listed configuration and customising scenarios. ASTM D1250-80 describes the SAP-provided example settings along with explanations.

QuantityWare has created, tested and validated all configuration in the following appendices in internal QuantityWare systems.

There are no customer namespaces available for the necessary customising.

SAP recommends never to modify or delete SAP standard shipment objects, but create and assign new ones instead.

## Appendix A. ASTM D1250-80

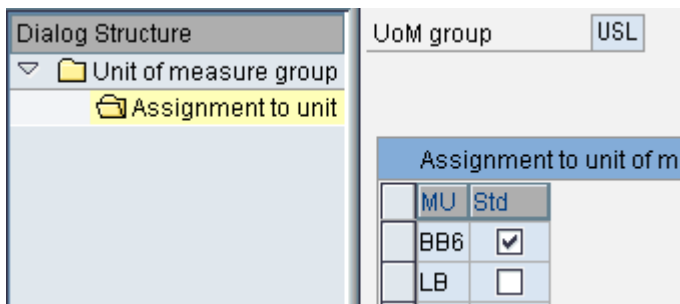
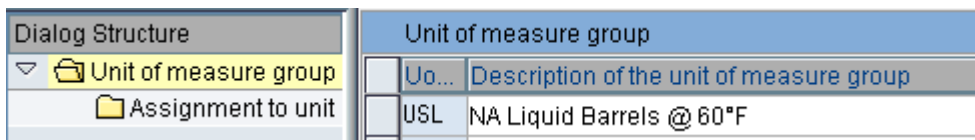
All needed settings of the Measurement System are provided by SAP.

We have to set up a Delivery Network and use the settings of the Measurement System.

### A.1. Delivery Network

#### Unit of Measure Group

It is possible to create a new group or use the existing one:



### Measurement Group

We create a new group:

Unit of Measure Group: 125080\_60A

Major Product Code: Oil (0)

Conversion Group: Q104

Unit of Measure Group: USL with BB6 and LB

If needed, we can add more Major Products to the group. The entry will be selected by the Material.

| Measurement Group | 125080_60A | D1250-80 60 FAH API      |       |                          |  |
|-------------------|------------|--------------------------|-------|--------------------------|--|
| Entries           |            |                          |       |                          |  |
| Major Product     | Uo...      | Description              | Co... | Description              |  |
| Oil               | USL        | NA Liquid Barrels @ 60°F | Q104  | CRUDE OIL 1980 API GR... |  |



**Material and Assignment to the Product Codes:**


The material has to exist in table MARA (Material Master), but only as reference.

It has to be defined in the PRA General Master Date Maintenance.

We use the existing material or create a new one.

Major Product Code: OIL

Minor Product Code: 00

|               |   |
|---------------|---|
| Material      | EP100   |
| Major Product | Oil  |
| Product code  | 00  |

**Minor Product Codes:**

SAP provides a reference set, but we can define additional codes as shown later.

These codes will be used to select the Measurement Type.

|    |                                    |
|----|------------------------------------|
| 00 | OIL                                |
| 01 | DILUENT OIL                        |
| 03 | SKIM/SCRUB/DRIP OIL                |
| 04 | POWER OIL                          |
| 05 | SKIM OIL                           |
| 06 | TANK BOTTOMS-OIL                   |
| 30 | OIL CONDENSATE MIX                 |
| 3Y | OIL PLT CONDENSATE (PRICED AS GAS) |

## Delivery Network

Now we have all we need to create a Delivery Network and Delivery Network Dated.

|                  |            |                              |
|------------------|------------|------------------------------|
| Delivery Network | 2          | Oil ASTM D1250-80 60 FAH API |
| DN type          | Network    |                              |
| Effective From   | 01/01/2015 | Effective To 12/31/9999      |

|                   |                     |           |
|-------------------|---------------------|-----------|
| <b>Production</b> | Contract Allocation | Valuation |
|-------------------|---------------------|-----------|

|   |             |            |                     |
|---|-------------|------------|---------------------|
| <input checked="" type="checkbox"/> Allocated | Meas. Group | 125080_60A | D1250-80 60 FAH API |
| <input type="checkbox"/> Inactive             |             |            |                     |

|   |                              |                            |
|---|------------------------------|----------------------------|
| <b>Gas Allocation Basis</b>             |                              |                            |
| <input checked="" type="radio"/> Volume | <input type="radio"/> Energy | <input type="radio"/> Dual |

This Network has to be completed by creating Wells, Well Completions and Measurement Points and assign them to the network (DN Downstream Nodes), Allocation Profile, etc.

## A.2. Measurement System

### Measurement Type

The assignment of the Measurement Type to the Major and Minor Product Code has already been done and can be used.

The Measurement Type **WCDVLLILOIC** is selected:

| Well Completion Volumes Measurement Type Determinatio |      |             |  |
|---|------|-------------|--|
| Major PD  | P... | M.Type      |  |
| Oil   | 00   | WCDVLLILOIC |  |

The **Field Transport** of Measurement Class and Measurement Type has been already set up and can be used:

| Dialog Structure       |                  | Meas.Class    | WC_VOLUMES     | Well Completion Volumes           |
|------------------------|------------------|---------------|----------------|-----------------------------------|
| Measurement class      |                  | Meas.Type     | WCDVLLILOIC    | WC Volumes Oil Condensate Liquids |
| Measurement type :     |                  |               |                |                                   |
| Field transport        |                  |               |                |                                   |
| <b>Field transport</b> |                  |               |                |                                   |
| M.Rdg                  | Description      | Reading field | Unit field     |                                   |
| CONV                   | conversion group | CONV_GRP      |                |                                   |
| ODN                    | Obs Density      | BASE_DENSITY  | BASE_DENSITY_U |                                   |
| PDAY                   | Producing Days   | DAYS_PROD     |                |                                   |
| PHRS                   | Producing Hours  | PRD_HRS       |                |                                   |
| SDN                    | Std Density      | STD_DENSITY   | STD_DENSITY_U  |                                   |
| SVOL                   | Std Volume       | STD_VOL       | STD_VOL_U      |                                   |

### Measurement Type Settings – Readings

| Dialog Structure |  | Measurement type |   |                     |
|------------------|--|------------------|---|---------------------|
| Measurement type |  | Meas.Type        | Description                             | Label               |
| Reading groups   |  | WCDVLLH20        | WC Volumes Water Liquids                | Water Liquids       |
| Readings         |  | WCDVLLILOIC      | WC Volumes Oil Condensate Liquids       | Oil Cond Liquids    |
|                  |  | WCDVLLILOIC      | WC Volumes Oil Condensate Liquids Press | Oil Cond Liquids Pr |

We do not need to create a Reading Group.

All readings have already been set and can be used.

The selected fields will be generated into the input screen in the order defined in column "Row".

Dialog Structure

- Measurement type
  - Reading groups
  - Readings

Meas.Type WCDVLL0ILC

| Reading ID | Reading Label        | Read Type  | Reading Type Name     | Col | Row | Obs                                 |
|------------|----------------------|------------|-----------------------|-----|-----|-------------------------------------|
| PDAY       | Producing Days       | DAYS       | Days up               |     | 1   | <input checked="" type="checkbox"/> |
| PHRS       | Producing Hours      | HOURS_PROD | Producing Hours       |     | 2   | <input checked="" type="checkbox"/> |
| ODN        | Obs Density          | DENSITY    | Density               |     | 3   | <input checked="" type="checkbox"/> |
| TTMP       | Density Temp         | OBS_VLTMP  | Volumes Temps         |     | 4   | <input checked="" type="checkbox"/> |
| HCOR       | Hydrometer correcti. | FLAG       | Flag indicator        |     | 5   | <input checked="" type="checkbox"/> |
| DTMP       | Obs Temp Vol         | OBS_VLTMP  | Volumes Temps         |     | 6   | <input checked="" type="checkbox"/> |
| DVL        | Obs Volume           | OBS_VOLLIQ | OBS Liquid Volume     |     | 7   | <input checked="" type="checkbox"/> |
| APRE       | Alternate pressure   | ALT_PRES   | Alternate pressure    |     | 8   | <input checked="" type="checkbox"/> |
| SDN        | Std Density          | STD_DENSI  | STD Density           |     | 9   | <input checked="" type="checkbox"/> |
| SVOL       | Std Volume           | STD_C_VOL  | Std Calculated Volume |     | 10  | <input checked="" type="checkbox"/> |

The specifications of each field can be shown/set/changed by double clicking on the line of the reading.  
E.g. Reading ODN:

Dialog Structure

- Measurement type
  - Reading groups
  - Readings

Meas.Type WCDVLL0ILC WC Volumes Oil Condensate Liquids

Reading ID ODN Obs Density  
Observed Density

**Reading**

Reading Type DENSITY Density  
Reading Group

**Status**

Active  
 SAP Active

**Control**

Hidden  
 Display only  
 Required  
 SAP Required

**Position**

Column  
Row 3

**Input**

Derived  
 Observed

**Copy control**

Always copy

For each reading a Reading Type is assigned. In that case above:

Reading ID: ODN

Reading Type: DENSITY

## Reading Types

Reading Types contain the characteristics of the reading field, they are used to define the generation of the input screen field.

Reading Types can be defined for specific Unit of Measure Groups or generically for all assigned Readings.

Here the example of Reading Type DENSITY:

| Dialog Structure   |                             | Read.Type                | DENSITY | Density |     |                                     |                          |
|--|-----------------------------|--------------------------|---------|---------|-----|-------------------------------------|--------------------------|
| <ul style="list-style-type: none"> <li>Reading type           <ul style="list-style-type: none"> <li>Reading type chara</li> </ul> </li> </ul> |                             |                          |         |         |     |                                     |                          |
| Reading type characteristics   |                             |                          |         |         |     |                                     |                          |
| Uo...  | UoM Description             | Neg                      | Lng     | Dec     | UoM | NoC                                 | Rqd                      |
| NA1  | North American Measurements | <input type="checkbox"/> | 9       | 5       |     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| USL  | NA Liquid Barrels @ 60°F    | <input type="checkbox"/> | 9       | 5       |     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| USR  | NA Gallons @ 60°F, RDW      | <input type="checkbox"/> | 9       | 5       | RDW | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

|  |                      |                                   |   |   |
|--|----------------------|-----------------------------------|---|---|
| Read.Type                                      | DENSITY              | Density                           | Format  | N |
| UoM group                                      | USL                  | NA Liquid Barrels @ 60°F          |   |   |
| <b>Unit of measure</b>                         |                      |                                   |   |   |
| Unit of measure                                | <input type="text"/> | <input type="checkbox"/> Required | <input checked="" type="checkbox"/> No change |   |
| <b>Formatting</b>                              |                      |                                   |   |   |
| Output length                                  | 9                    | Display format                    | <input type="text"/>                          |   |
| Output decimals                                | 5                    | Rounding                          | <input type="checkbox"/> 0                    |   |
| <b>Allowed values</b>                          |                      |                                   |   |   |
| <input type="checkbox"/> Allow negative values |                      |                                   |   |   |
| Default  | <input type="text"/> |                                   |   |   |
| Warning  | <input type="text"/> | to                                | <input type="text"/>                          |   |
| Error  | <input type="text"/> | to                                | <input type="text"/>                          |   |
| <b>Data Dictionary</b>                         |                      |                                   |   |   |
| Check table                                    | <input type="text"/> |                                   |   |   |
| Check field                                    | <input type="text"/> |                                   |   |   |
| Reference domain                               | <input type="text"/> |                                   |   |   |
| Search help                                    | <input type="text"/> |                                   |   |   |
| Search parameter                               | <input type="text"/> |                                   |   |   |

## Calculation

The function `OIU_QCI_STD_CONVERSION` is provided by SAP allowing PRA to call the QCI.

All possible parameters for that calculation have been already defined by SAP and can be selected for use in the desired call.

We have to assign this calculation to our Measurement Type and define the necessary parameters.

| Dialog Structure   |  | Measurement type |   |                      |
|--------------------|--|------------------|---|----------------------|
|                    |  | Meas.Type        | Description                             | Label                |
| Measurement type   |  | WCDVLLH20        | WC Volumes Water Liquids                | Water Liquids        |
| Calculation        |  | WCDVLL0ILC       | WC Volumes Oil Condensate Liquids       | Oil Cond Liquids     |
| Observed parameter |  | WCDVLL0ILP       | WC Volumes Oil Condensate Liquids Press | Oil Cond Liquids Pr. |
| Derived parameter  |  |                  |   |                      |

Each calculation contains a calling sequence of ABAP Functions.

The final one (that calls the QCI) is `OIU_QCI_STD_CONVERSION`.

Previous functions are used to validate input data and to transfer fields.

Since QuantityWare offers the possibility to define ranges for each of the input data, input checks should not be done here.

| Dialog Structure   |      | Meas.Type                      | WC Volumes Oil Condensate Liquids | Sequence |
|--------------------|------|--------------------------------|-----------------------------------|----------|
| Measurement type   |      | WCDVLL0ILC                     | WC Volumes Oil Condensate Liquids |          |
| Calculation        |      |                                |                                   |          |
| Observed parameter |      |                                |                                   |          |
| Derived parameter  |      |                                |                                   |          |
| Calculation        |      |                                |                                   |          |
| Calc               | CSeq | Function Module                | Short text for function module    |          |
| UOME               |      | OIU_ME_VERIFY_NO_CONDITION_UOM | Edit check for UOM's on volume    |          |
| 1                  | 1    | OIU_ME_WCDVLH_DAYS_HOURS       | days hours                        |          |
| TTMP               | 2    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another          |          |
| OTMP               | 3    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another          |          |
| ODN                | 9    | OIU_ME_VOLUMES_OIL_DENSITY     | Oil gravity Edits                 |          |
| 2                  | 10   | OIU_ME_WCDVLH_OBS_TEMP         | OBS Temperature                   |          |
| 3                  | 11   | OIU_ME_WCTST_BSW_PERCENT_EDIT  | BSW Percent / Oil Volume edit     |          |
| 4                  | 12   | OIU_ME_WCDVLH_STD_UOM          | Gets STD UOM from UOMG tab        |          |
| 5                  | 13   | OIU_QCI_STD_CONVERSION         | Calculate Gas Volume, Quantit     |          |

All parameters have been set by SAP in their example and no changes are necessary in our case, e.g. function `OIU_QCI_STD_CONVERSION` parameters for the final QCI-call.

It is important to assign the Reading ID to the proper QCI Parameter (column Param) to pass those values to the QCI. In our case, these have been previously set in SAP example.

Dialog Structure

- Measurement type
  - Calculation
    - Observed parameter
    - Derived parameter

Meas.Type: WCDVLL0ILC WC Volumes Oil Condensate Liquids  
 Calculation: 5  
 Function: OIU\_QCI\_STD\_CONVERSION  
 Calculate Gas Volume, Quantity, Energy by QCI

| Observed parameters |            |   |            |
|---------------------|------------|---|------------|
| P.Seq               | Reading ID | Description                             | Param      |
|                     | UOMG       | unit of measure group                   | UOMGR      |
|                     | TTMP       |   | OBSTSTMETT |
|                     | STMP       | STD Temperature                         | STDMETTMP  |
|                     | OVL        | Observed Volume                         | OBSQTY     |
|                     | OTMP       | Observed Temperature                    | OBSMTMETTP |
|                     | ODN        | Observed Density                        | OBSTSTDENS |
|                     | OCOF       | Compressibility factor at observed cond | COMPFCOBSR |
|                     | HCOR       | Hydrometer correction                   | HYDROCORR  |
|                     | CONV       | conversion group                        | CONVGROUP  |
|                     | AQTY       |   | ALTQTY     |
|                     | APRE       |   | ALTMETPRES |
|                     | ACOF       | Compressibility factor at observed cond | COMPFCALT  |

Dialog Structure

- Measurement type
  - Calculation
    - Observed parameter
    - Derived parameter

Meas.Type: WCDVLL0ILC WC Volumes Oil Condensate Liquids  
 Calculation: 5  
 Function: OIU\_QCI\_STD\_CONVERSION  
 Calculate Gas Volume, Quantity, Energy by QCI

| Derived parameters |            |                  |        |   |
|--------------------|------------|------------------|--------|---|
| P.Seq              | Reading ID | Description      | Param  | R |
|                    | SDN        | Standard Density | STDDEN | X |
|                    | SVOL       | Standard Volume  |        | X |

Finished. This is all that we need to call the PRA Volume Transaction to collect measurements, standardize them and pass them back to the calling transaction. The Measurement System creates a Measurement Reading and a Measurement Document.

Here, the generated sub screen with the calculated results.

### WC Volume Transaction

#### Create WC Volumes: Overview

Header
Edits / Calculations

|                  |  |                                |   |
|------------------|--|--------------------------------|---|
| Well Completion  | <input type="text" value="5"/>                 | <input type="text" value="1"/> | Oil Well 5 Completion 1                 |
| Delivery Network | <input type="text" value="2"/>                 |                                | Oil ASTM D1250-80 60 FAH API            |
| Effective From   | <input type="text" value="01/01/2015"/>        | Effective To                   | <input type="text" value="01/01/2015"/> |
| Material         | <input type="text" value="EP100"/>             |                                | Oil                                     |
| Volume Type      | <input type="text" value="ALLOCATION VOLUME"/> |                                |   |

**Allocation Frequency**

Monthly
  Daily

| Reading              | Value      | UoM | Name      |
|----------------------|------------|-----|-----------|
| Producing Days       | 1.000      |     |           |
| Producing Hours      | 24.000     |     |           |
| Obs Density          | 34.00000   |     |           |
| Density Temp         | 70.00      | FAH | °F        |
| Hydrometer correcti. | X          |     | Yes       |
| Obs Temp Vol         | 75.00      | FAH | °F        |
| Obs Volume           | 100,000.00 | BBL | barrel    |
| Std Density          | 33.200     |     |           |
| Std Volume           | 99,304.00  | BB6 | bbl 60 °F |



## Appendix B. ASTM D1250-04 without Pressure

If no field for pressure is passed to the calculation function of ASTM D1250-04, pressure will not be included into the calculation, thus no changes of the input fields are necessary to change between ASTM D1250-80 and ASTM D1250-04.

We can replace the Conversion Group assigned to the Measurement Group or create a new Measurement Group and assign it to the Network.

### Measurement Group

Unit of Measure Group: 125004\_60A

Major Product Code: Oil (0)

Conversion Group: Q108

Unit of Measure Group: USL with BB6 and LB

| Measurement Group | 125004_60A    | D1250-04 60 FAH API |                          |       |                          |
|-------------------|---------------|---------------------|--------------------------|-------|--------------------------|
| Entries           |               |                     |                          |       |                          |
|                   | Major Product | Uo...               | Description              | Co... | Description              |
|                   | Oil           | USL                 | NA Liquid Barrels @ 60°F | Q108  | CRUDE OIL 2004 API GR... |

## Delivery Network

Assign the Measurement Group to the Network.

|                  |            |                              |
|------------------|------------|------------------------------|
| Delivery Network | 1          | Oil ASTM D1250-04 60 FAH API |
| DN type          | Network    |                              |
| Effective From   | 01/01/2015 | Effective To 12/31/9999      |

|                   |                     |           |
|-------------------|---------------------|-----------|
| <b>Production</b> | Contract Allocation | Valuation |
|-------------------|---------------------|-----------|

|   |             |            |                     |
|---|-------------|------------|---------------------|
| <input checked="" type="checkbox"/> Allocated | Meas. Group | 125004_60A | D1250-04 60 FAH API |
| <input type="checkbox"/> Inactive             |             |            |                     |


  

|   |                              |                            |
|---|------------------------------|----------------------------|
| <b>Gas Allocation Basis</b>             |                              |                            |
| <input checked="" type="radio"/> Volume | <input type="radio"/> Energy | <input type="radio"/> Dual |

Now you can call the Well Completion Volumes transaction using standard ASTM D1250-04 without pressure.

Here, the generated sub screen with the calculated results.

### WC Volume Transaction

|                  |   |              |                              |
|------------------|---|--------------|------------------------------|
| Well Completion  | 3   | 1            | Oil Well 3 Completion 1      |
| Delivery Network | 1   |              | Oil ASTM D1250-04 60 FAH API |
| Effective From   | 01/01/2015  | Effective To | 01/01/2015                   |
| Material         | EP100   |              | Oil                          |
| Volume Type      | ALLOCATION VOLUME  |              |                              |

Allocation Frequency

Monthly
  Daily

| Reading              | Value      | UoM | Name      |
|----------------------|------------|-----|-----------|
| Producing Days       | 1.000      |     |           |
| Producing Hours      | 24.000     |     |           |
| Obs Density          | 34.00000   |     |           |
| Density Temp         | 70.00      | FAH | °F        |
| Hydrometer correcti. | X          |     | Yes       |
| Obs Temp Vol         | 75.00      | FAH | °F        |
| Obs Volume           | 100,000.00 | BBL | barrel    |
| Std Density          | 33.232     |     |           |
| Std Volume           | 99,304.00  | BB6 | bbl 60 °F |

## Appendix C. ASTM D1250-04 with Pressure

The settings are fundamentally the same as for ASTM D1250-80 and ASTM D1250-04 without pressure, however we additionally need the pressure field to appear at the generated input screen and for its values to be passed to the QCI.


When we add the field to the Measurement Type, it will appear at all calculations involving that Type; to avoid this and errors if using ASTM D1250-80 in parallel, we have to create a new Measurement Type and select it by the Major Product Code Oil and a new Minor Product code.

### C.1. PRA settings

#### Material, Major and Minor Product Code

We create a new Material and a new Minor Product Code;

| Pd | Product Code Description           |
|----|------------------------------------|
| 00 | OIL                                |
| 01 | DILUENT OIL                        |
| 03 | SKIM/SCRUB/DRIP OIL                |
| 04 | POWER OIL                          |
| 05 | SKIM OIL                           |
| 06 | TANK BOTTOMS-OIL                   |
| 30 | OIL CONDENSATE MIX                 |
| 3Y | OIL PLT CONDENSATE (PRICED AS GAS) |
| Z1 | OIL under pressure                 |

|               |   |
|---------------|---|
| Material      | EP1Z1   |
| Major Product | Oil  |
| Product code  | Z1  |

## C.2. Measurement System Settings

### Measurement Type

We copy the new measurement Type WCDVLLIOLP from the existing WCDVLLIOLC.

| Measurement type |   |                      |  |
|------------------|---|----------------------|--|
| Meas.Type        | Description                             | Label                |  |
| WCDVLLIOLC       | WC Volumes Oil Condensate Liquids       | Oil Cond Liquids     |  |
| WCDVLLIOLP       | WC Volumes Oil Condensate Liquids Press | Oil Cond Liquids Pr. |  |

Then we assign the new Measurement Type to the Major and Minor Product Code.

| Well Completion Volumes Measurement Type Determinatio |      |            |  |
|---|------|------------|--|
| Major PD  | P... | M.Type     |  |
| Oil   | 00   | WCDVLLIOLC |  |
| Oil   | Z1   | WCDVLLIOLP |  |

Now we add the pressure field to the Readings of the Measurement Type:

| Readings   |                      |            |                       |     |     |                                     |  |
|------------|----------------------|------------|-----------------------|-----|-----|-------------------------------------|--|
| Reading ID | Reading Label        | Read Type  | Reading Type Name     | Col | Row | Obs                                 |  |
| PDAY       | Producing Days       | DAYS       | Days up               |     | 1   | <input checked="" type="checkbox"/> |  |
| PHRS       | Producing Hours      | HOURS_PROD | Producing Hours       |     | 2   | <input checked="" type="checkbox"/> |  |
| ODN        | Obs Density          | DENSITY    | Density               |     | 3   | <input checked="" type="checkbox"/> |  |
| TTMP       | Density Temp         | OBS_VLTMP  | Volumes Temps         |     | 4   | <input checked="" type="checkbox"/> |  |
| HCOR       | Hydrometer correcti. | FLAG       | Flag indicator        |     | 5   | <input checked="" type="checkbox"/> |  |
| OTMP       | Obs Temp Vol         | OBS_VLTMP  | Volumes Temps         |     | 6   | <input checked="" type="checkbox"/> |  |
| OVL        | Obs Volume           | OBS_VOLLIQ | OBS Liquid Volume     |     | 7   | <input checked="" type="checkbox"/> |  |
| APRE       | Alternate pressure   | ALT_PRES   | Alternate pressure    |     | 8   | <input checked="" type="checkbox"/> |  |
| SDN        | Std Density          | STD_DENSI  | STD Density           |     | 9   | <input checked="" type="checkbox"/> |  |
| SVOL       | Std Volume           | STD_C_VOL  | Std Calculated Volume |     | 10  | <input checked="" type="checkbox"/> |  |

And maintain the details of the new Reading:

|  |            |            |   |
|--|------------|------------|---|
| <b>Dialog Structure</b><br>Measurement type<br>Reading groups<br><b>Readings</b> | Meas.Type  | WCDVLL0ILP | WC Volumes Oil Condensate Liquids Press |
|  | Reading ID | APRE       | Alternate pressure                      |

|                |                                |
|----------------|--------------------------------|
| <b>Reading</b> |                                |
| Reading Type   | ALT_PRES    Alternate pressure |
| Reading Group  |                                |

|  |  |
|--|--|
| <b>Status</b><br><input checked="" type="checkbox"/> Active<br><input type="checkbox"/> SAP Active | <b>Control</b><br><input type="checkbox"/> Hidden<br><input type="checkbox"/> Display only<br><input type="checkbox"/> Required<br><input type="checkbox"/> SAP Required |
| <b>Position</b><br>Column <input type="text"/><br>Row <input type="text" value="8"/>               | <b>Input</b><br><input checked="" type="checkbox"/> Derived<br><input checked="" type="checkbox"/> Observed  |
| <b>Copy control</b><br><input type="checkbox"/> Always copy  |  |

## Reading Type - ALT\_PRES

We create the settings of the Reading Type ALT\_PRES for Unit of Measure Group USL:

|  |   |
|--|---|
| <p>Dialog Structure</p> <ul style="list-style-type: none"> <li>Reading type             <ul style="list-style-type: none"> <li>Reading type chara</li> </ul> </li> </ul> | <p>Read.Type <b>ALT_PRES</b> Alternate pressure <span style="float: right;">Format <b>N</b></span></p> <hr/> <p>UoM group <b>USL</b> NA Liquid Barrels @ 60°F</p> <hr/> <p><b>Unit of measure</b></p> <p>Unit of measure <b>PSI</b> pound-force per square Inch <input type="checkbox"/> Required<br/> <input type="checkbox"/> No change</p> <hr/> <p><b>Formatting</b></p> <p>Output length <input type="text"/> Display format <input type="text"/><br/>         Output decimals <b>5</b> Rounding <input type="checkbox"/> 0</p> <hr/> <p><b>Allowed values</b></p> <p><input type="checkbox"/> Allow negative values</p> <p>Default <input checked="" type="checkbox"/> <input type="text" value="0.00000"/><br/>         Warning <input type="checkbox"/> <input type="text"/> to <input type="text"/><br/>         Error <input type="checkbox"/> <input type="text"/> to <input type="text"/></p> <hr/> <p><b>Data Dictionary</b></p> <p>Check table <input type="text"/><br/>         Check field <input type="text"/><br/>         Reference domain <input type="text"/><br/>         Search help <input type="text"/><br/>         Search parameter <input type="text"/></p> |
|--|---|

### Function OIU\_QCI\_STD\_CONVERSION – add new field

We have to make sure that the pressure field will be passed to the QCI.

Dialog Structure: Measurement type > Calculation

Meas.Type: WCDVLL0ILP WC Volumes Oil Condensate Liquid... Sequence

| Calculation |      |                                |                                |  |
|-------------|------|--------------------------------|--------------------------------|--|
| Calc        | CSeq | Function Module                | Short text for function module |  |
| UOME        |      | OIU_ME_VERIFY_NO_CONDITION_UOM | Edit check for UOM's on volume |  |
| 1           | 1    | OIU_ME_WCDVLH_DAYS_HOURS       | days hours                     |  |
| TTMP        | 2    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another       |  |
| OTMP        | 3    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another       |  |
| ODN         | 9    | OIU_ME_VOLUMES_OIL_DENSITY     | Oil gravity Edits              |  |
| 2           | 10   | OIU_ME_WCDVLH_OBS_TEMP         | OBS Temperature                |  |
| 3           | 11   | OIU_ME_WCTST_BSW_PERCENT_EDIT  | BSW Percent / Oil Volume edit  |  |
| 4           | 12   | OIU_ME_WCDVLH_STD_UOM          | Gets STD UOM from UOMG tab     |  |
| 5           | 13   | OIU_QCI_STD_CONVERSION         | Calculate Gas Volume, Quantit  |  |

Dialog Structure: Measurement type > Calculation

Meas.Type: WCDVLL0ILP WC Volumes Oil Condensate Liquids Press

Calculation: 5

Function: OIU\_QCI\_STD\_CONVERSION


Calculate Gas Volume, Quantity, Energy by QCI

| Observed parameters |            |   |            |  |
|---------------------|------------|---|------------|--|
| P.Seq               | Reading ID | Description                             | Param      |  |
|                     | UOMG       | unit of measure group                   | UOMGR      |  |
|                     | TTMP       |   | OBSTMETT   |  |
|                     | STMP       | STD Temperature                         | STDMETMP   |  |
|                     | OVL        | Observed Volume                         | OBSQTY     |  |
|                     | OTMP       | Observed Temperature                    | OBSMETTP   |  |
|                     | ODN        | Observed Density                        | OBSTDENS   |  |
|                     | OCOF       | Compressibility factor at observed cond | COMPFCOBSR |  |
|                     | HCOR       | Hydrometer correction                   | HYDROCORR  |  |
|                     | CONV       | conversion group                        | CONVGROUP  |  |
|                     | AQTY       |   | ALTQTY     |  |
|                     | APRE       |   | ALTMETPRES |  |
|                     | ACOF       | Compressibility factor at observed cond | COMPFCALT  |  |



Here, the generated sub screen with the calculated results.

### WC Volume Transaction

|                  |   |              |                                    |
|------------------|---|--------------|------------------------------------|
| Well Completion  | 11  | 1            | Oil Well 11 Completion 1           |
| Delivery Network | 5   |              | Oil ASTM D1250-04 60 FAH API Press |
| Effective From   | 01/01/2015  | Effective To | 01/01/2015                         |
| Material         | EP1Z1   |              | Oil                                |
| Volume Type      | ALLOCATION VOLUME  |              |                                    |

**Allocation Frequency**

Monthly
  Daily

| Reading              | Value      | UoM | Name                  |
|----------------------|------------|-----|-----------------------|
| Producing Days       | 1.000      |     |                       |
| Producing Hours      | 24.000     |     |                       |
| Obs Density          | 34.00000   |     |                       |
| Density Temp         | 70.00      | FAH | °F                    |
| Hydrometer correcti. | X          |     | Yes                   |
| Obs Temp Vol         | 75.00      | FAH | °F                    |
| Obs Volume           | 100,000.00 | BBL | barrel                |
| Alternate pressure   | 50.000     | PSI | lbf / in <sup>2</sup> |
| Std Density          | 33.232     |     |                       |
| Std Volume           | 99,329.00  | BB6 | bbl 60 °F             |

## Appendix D. GPA 8217 / TP-27 – LPG

There is no example for LPG provided by SAP.

Since PRA supports only the calculated Standard Volume and Standard Density, we can use a simple conversion group and ignore all other functionality provided by BCP, such as vapour mass and energy calculations, etc.

The structure of this configuration will be the same as for ASTM D1250-04 with pressure, see ASTM D1250-04 with Pressure.

### D.1. PRA Settings


Material, Major and Minor Product Code

We create a new Material and a new Minor Product Code at the Major Product code

Plant NGLS – 4.

| Major Product Code: 4 |                            |
|-----------------------|----------------------------|
| Pd                    | Product Code Description   |
| Z1                    | LIQUID PETROLEUM GAS - LPG |

Assign the product codes to the material.

|               |  |
|---------------|--|
| Material      | EP4Z1  |
| Major Product | Plant NGLS  |
| Product code  | Z1   |

### Measurement Group

- create a new one

Unit of Measure Group: TP27\_60REL  
 Major Product Code: Plant NGLS (4)  
 Conversion Group: Q715  
 Unit of Measure Group: USR with IG6 and LB

Measurement Group

| Entries |               |       |                        |       |                          |
|---------|---------------|-------|------------------------|-------|--------------------------|
|         | Major Product | Uo... | Description            | Co... | Description              |
|         | Plant NGLS    | USR   | NA Gallons @ 60°F, RDW | Q715  | LPG GPA TP-27 REL.DEN... |

### Delivery Network

Assign the Measurement Group to the Network.

Delivery Network  LPG GPA TP-27 REL.DENS 60 °F  
 DN type   
 Effective From  Effective To

**Production** Contract Allocation Valuation

Allocated  Inactive

Meas. Group  TP-27 60 FAH REL. DENS

Gas Allocation Basis  
 Volume  Energy  Dual

## D.2. Measurement System settings

### Measurement Type

We copy the new measurement Type WCV\_LPGSAP from the existing WCDVLLILOIC; also copying the field transport which can be used as defined.

| Measurement type |                          |                     |
|------------------|--------------------------|---------------------|
| Meas.Type        | Description              | Label               |
| WCV_LPGSAP       | WC Volumes LPG SAP Model | WC Vols LPG SAP     |
| WCV_NGLGEN       | WC Vols NGL Generic      | WC Vols NGL Generic |

Then we assign the new Measurement Type to the Major and Minor Product Codes.

| Well Completion Volumes Measurement Type Determina |      |            |  |
|--|------|------------|--|
| Major PD   | P... | M.Type     |  |
| P1ant NGLS   | 00   | WCV_NGLGEN |  |
| P1ant NGLS   | Z1   | WCV_LPGSAP |  |

### Readings

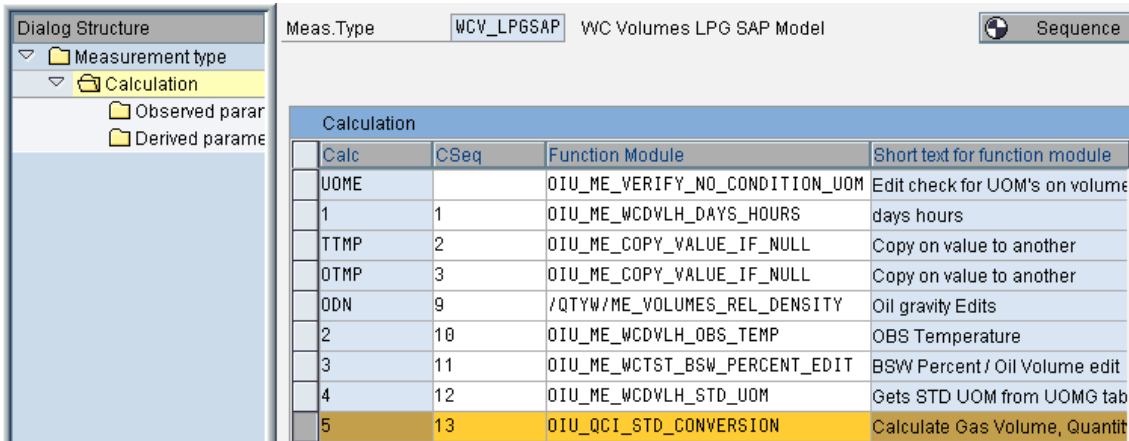
We do not need to define a Reading Group.

The readings have already been copied with the Measurement Type, but need to be maintained. The Reading Types of the marked readings have to be set as they have to appear on the input screen using Unit of Measure Group USR.

| Readings   |                      |            |                       |     |     |                                     |  |
|------------|----------------------|------------|-----------------------|-----|-----|-------------------------------------|--|
| Reading ID | Reading Label        | Read Type  | Reading Type Name     | Col | Row | Obs                                 |  |
| PDAY       | Producing Days       | DAYS       | Days up               |     | 1   | <input checked="" type="checkbox"/> |  |
| PHRS       | Producing Hours      | HOURS_PROD | Producing Hours       |     | 2   | <input checked="" type="checkbox"/> |  |
| DDN        | Obs Density          | RELDENSITY | Relative Density      |     | 3   | <input checked="" type="checkbox"/> |  |
| TTMP       | Density Temp         | OBS_VLTMP  | Volumes Temps         |     | 4   | <input checked="" type="checkbox"/> |  |
| HCOR       | Hydrometer correcti. | FLAG       | Flag indicator        |     | 5   | <input checked="" type="checkbox"/> |  |
| OTMP       | Obs Temp Vol         | OBS_VLTMP  | Volumes Temps         |     | 6   | <input checked="" type="checkbox"/> |  |
| DVL        | Obs Volume           | OBS_VOLLIQ | OBS Liquid Volume     |     | 7   | <input checked="" type="checkbox"/> |  |
| SDN        | Std Density          | STD_DENSI  | STD Density           |     | 8   | <input checked="" type="checkbox"/> |  |
| SVOL       | Std Volume           | STD_C_VOL  | Std Calculated Volume |     | 9   | <input checked="" type="checkbox"/> |  |

### Function OIU\_QCI\_STD\_CONVERSION

ODN (Observed Density) calculations are not necessary; the corresponding function can be deleted or changed to relative density.



The screenshot shows a software dialog box titled 'Meas.Type' with the value 'WCV\_LP6SAP' and the subtitle 'WC Volumes LPG SAP Model'. On the left, a 'Dialog Structure' tree shows 'Measurement type' expanded to 'Calculation', which includes 'Observed param' and 'Derived param'. The main area displays a table with the following data:


| Calculation |      |                                |                                |
|-------------|------|--------------------------------|--------------------------------|
| Calc        | CSeq | Function Module                | Short text for function module |
| UOME        |      | OIU_ME_VERIFY_NO_CONDITION_UOM | Edit check for UOM's on volume |
| 1           | 1    | OIU_ME_WCDVLH_DAYS_HOURS       | days hours                     |
| TTMP        | 2    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another       |
| OTMP        | 3    | OIU_ME_COPY_VALUE_IF_NULL      | Copy on value to another       |
| ODN         | 9    | /QTYW/ME_VOLUMES_REL_DENSITY   | Oil gravity Edits              |
| 2           | 10   | OIU_ME_WCDVLH_OBS_TEMP         | OBS Temperature                |
| 3           | 11   | OIU_ME_WCTST_BSW_PERCENT_EDIT  | BSW Percent / Oil Volume edit  |
| 4           | 12   | OIU_ME_WCDVLH_STD_UOM          | Gets STD UOM from UOMG tab     |
| 5           | 13   | OIU_QCI_STD_CONVERSION         | Calculate Gas Volume, Quantit  |

The copied parameters can be used as defined.

All necessary settings have been completed and the WC Volume Transaction can be used.

Here, the generated sub screen with the calculated results.

### WC Volume Transaction

|                  |   |              |                              |
|------------------|---|--------------|------------------------------|
| Well Completion  | 7   | 1            | LPG Well 7 Completion 1      |
| Delivery Network | 3   |              | LPG GPA TP-27 REL.DENS 60 °F |
| Effective From   | 01/02/2015  | Effective To | 01/02/2015                   |
| Material         | EP4Z1   |              | Oil                          |
| Volume Type      | ALLOCATION VOLUME  |              |                              |

Allocation Frequency

Monthly
  Daily

| Reading              | Value      | UoM | Name       |
|----------------------|------------|-----|------------|
| Producing Days       | 2.000      |     |            |
| Producing Hours      | 48.000     |     |            |
| Obs Density          | 0.470      | RDW | RDW        |
| Density Temp         | 60.00      | FAH | °F         |
| Hydrometer correcti. | X          |     | Yes        |
| Obs Temp Vol         | 70.00      | FAH | °F         |
| Obs Volume           | 100,000.00 | GAL | gal (U.S.) |
| Std Density          | 0.470      | RDW | RDW        |
| Std Volume           | 81,553.775 | IG6 | gi - 60 °F |

## Legal Notices

---

© Copyright 2021 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.