SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA
Release 2.0 1909

Gas Extensions - User Manual

Document-History

Before you start the implementation, make sure you have the latest version of this document. You can find the latest version at the following location: http://service.sap.com/instguides -> *SAP Solution Extensions -> S/4HANA Utilities extensions for meter to cash processes -> 2.0 1909*

The following table provides an overview of the most important document changes.

Version	Important Changes
1	Initial version for release 2.0 1909

Table 1: Most important document changes

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1 Introduction

Based upon those national and European regulatory prerequisites *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* is supporting you by providing many functionalities mapping to those rules.

SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA supports the determination of energy amounts by using predefined formulas and function modules.

The functions of *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* support different market roles including Distribution Service Operator, Transmission Service Operator or Balancing Group Manager.

The following functionalities and their use will be described in the next chapters:

- Simple Process Flow: a lightweight processing framework to design process workflows
- H-values calculation: for for the processing of standard load profiles gas
- In comparison to release 1 of SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA the possibility for calculating HTWK-Leipzig-formulas was removed
- Technical quantity determination: for performance measured customers
- EDM Cluster Framework: extended master data checks for IS-U and EDM
- Generic CSV/XML-Importer: Tool for importing CSV and XML data
- Balancing Group Monitor: Overview of quantities structured by balancing information
- Extensions for IS-U & EDM functions
    - Dynamic EDM Settlement: Customizing Settlement procedures without workbench objects
    - Calorific value extensions: billing extensions to determine calorific data from EDM profiles
    - Extension for EDM calculation workbench: automatic execution of the EDM calculation workbench, based on formula ids or formula groups, also additional formulas

2 Handling

2.1 General handling

For general handling of *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* are used the default options by SAP®.
The following options can be used in many places within all functionalities:

 - Create:	Used to create a new entry
 - Change:	Used to change an existing entry
 - Display:	Used to display entries and for switching between create/change and display mode
 - Delete:	Used to delete an entry
 - Save:	Used for saving the current settings e.g. as a selection variant
 - Get Variant:	Used to select a defined selection variant
 - Execute:	Used for starting the current function
 - Details:	Provides some detailed information about an entry
 - Sort in Ascending Order:	Selected entries will be sorted ascending
 - Sort in Descending Order:	Selected entries will be sorted descending
 - Find:	Search for a specific entry in a list
 - Find next:	Continue search
 - Set Filer:	Used to filter the entries of a list
 - Print:	Used for printing a list
 - Views:	Used for changing the presentation of output
 - Export:	Used for exporting a list e.g. to MS Excel
 /  - Change Layout:	Used for changing the table layout (e.g. remove specific columns)

If one of these buttons is used in another way, this will be explained in its respective chapter.

3 Simple Process Flow

The *Simple Process Flow* is a light-weight process configuration and monitoring framework. It is designed to trigger process steps (in the following described as *Nodes*) and manage the outcome within the process. Each process can be started creating a process instance with a process date. Currently the framework supports a sequential processing of nodes, which is calculated when a new version of the configuration is saved within the UI5 application.

In this chapter, relevant information for usage of Simple Process Flow are listed.

3.1 Create process instance

Transaction: */N/PLGA/SPF_CREATE*

This functionality is mostly relevant for background processing and is used to start the processes maintained via Simple Process Flow. Furthermore it is necessary that a SPF process is predefined.

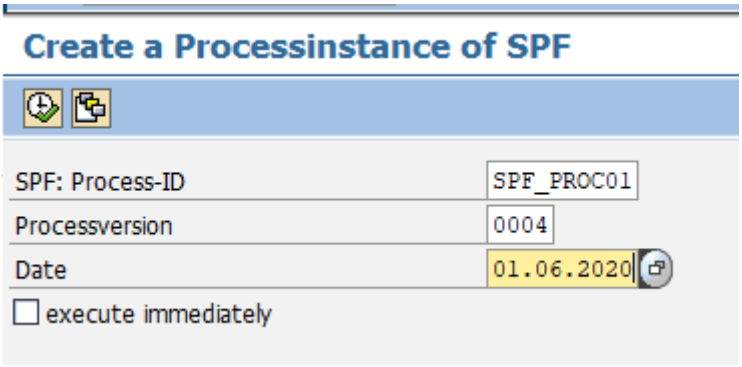


Figure 1: SPF: Create a Processinstance of SPF

The following information are available:

Element	Description
SPF: ID	Enter the SPF Process-ID for the relevant process
Version	Enter the version for the SPF process
Date	Enter the date for the execution (process date)
Execute immediately	If active ☑, then the process is executed immediately

Table 2: SPF: Create a Processinstance of SPF

Note: for use of settlement the control table for dynamic settlement must be maintained.

3.2 EDM Settlement Ext. Maintain control

Transaction: */N/PLGA/EDMSET_CRT_ST*

Within this transaction master data specific settings for using the SPF within combination settlement procedure are made.

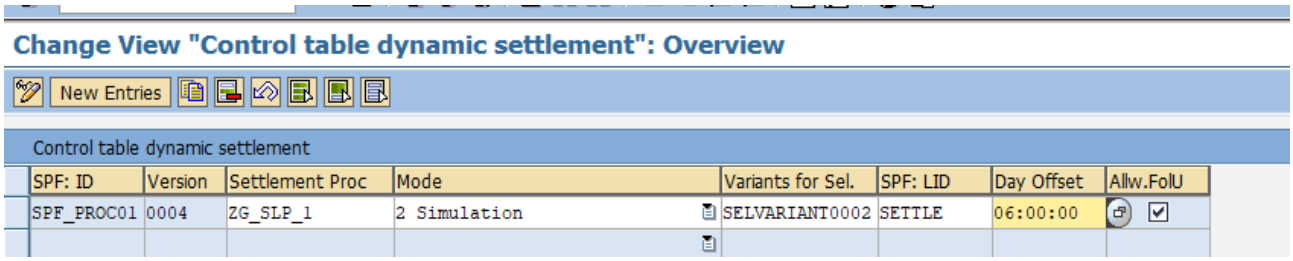


Figure 2: EDM Settlement Ext. Maintain control

The following information are available:

Element	Description
SPF: ID	Enter the SPF-ID for the relevant process
Version	Enter the actual version for the SPF process
Settlement Proc	Enter the Settlement Procedure
Mode	Enter the Settlement Mode (Active / Simulation)
Variants for Sel.	Enter the Settlement Variant
SPF: LID	Enter the SPF Lane-ID
Day Offset	Enter the Day Offset
Allw. FolU	If active ☑, then followup settlement documents are allowed. Only available for Settlement Mode = active

Table 3: EDM Settlement Ext. Maintain control

3.3 Background processing

For background processing it is necessary that the execution of the different SPF processes are planed as regular jobs. The process result can also be monitored within the SPF Monitor App.

3.4 UI-5-Monitor

3.4.1 SPF Monitor App

The SPF Monitor app can be started in the SAP Fiori Launchpad. In precondition of definition of SPF Monitor App using the app which is appropriat definied.

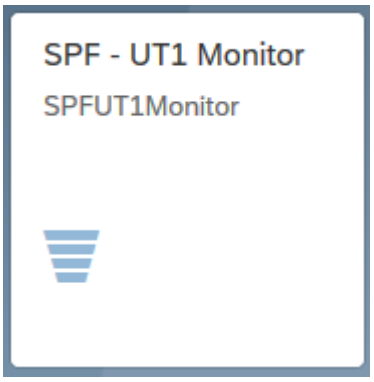


Figure 3: Tile SPF Monitor App - example

To start the application it is necessary to click direct on the app.

3.4.1.1 Overview page

After the app has been started by clicking the tile, the overview page is displayed. The view is also tiled here. On the overview page all process which are calculated for exxample as background processing, are displayed.

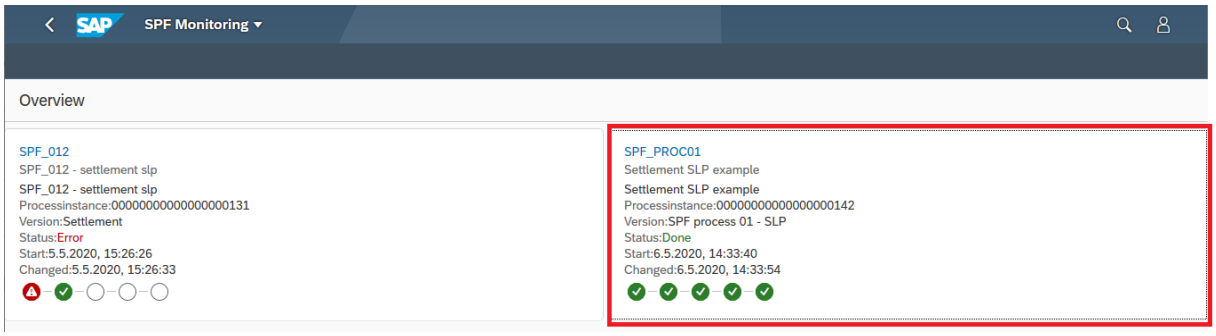


Figure 4: Overview page SPF Monitor - example

This view shows preliminary information regarding the last process instance number.
The following information are available:

Element	Description
SPF ID	Shows the SPF-ID of the SPF-process.
Process description text	Shows the description of the actual SPF-process version.
Processinstance	Unique number of the instance. It is always shown the last process instance
Version	Shows the description of the actual SPF-process version.
Status	Indicates whether the process ran with "Done" (without process interruption) or "Error" (process abort)
Start time	Date and Time from the start of the process
Change time	Date an Time at which the process went through changes
	Each individual green check mark means that a subprocess of the process instance has run through without termination. If all sub-processes of the current lane, which is always shown in the tile as the newest process, are green, then the instance with the number given above has run completely without errors. Otherwise an errror within some lane has occured and the process has stopped

Table 4: Overview page

If you click in the field of the SPF Process ID (blue labeled), you will give an overview of all instance number form the SPF process.

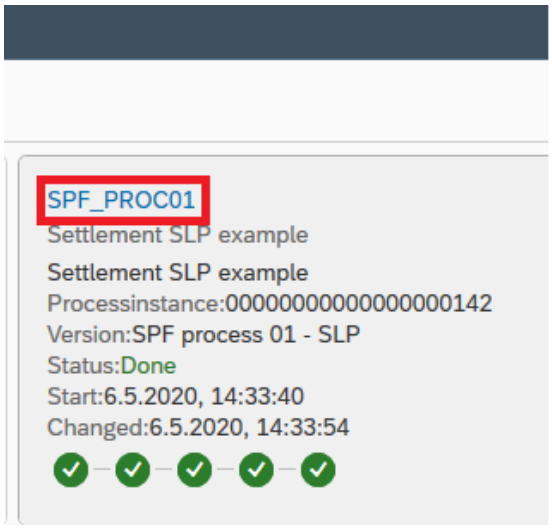


Figure 5: Jump to the overview of the instance numbers

After pressing on the Process Instance Number an owerview of all runs are given.

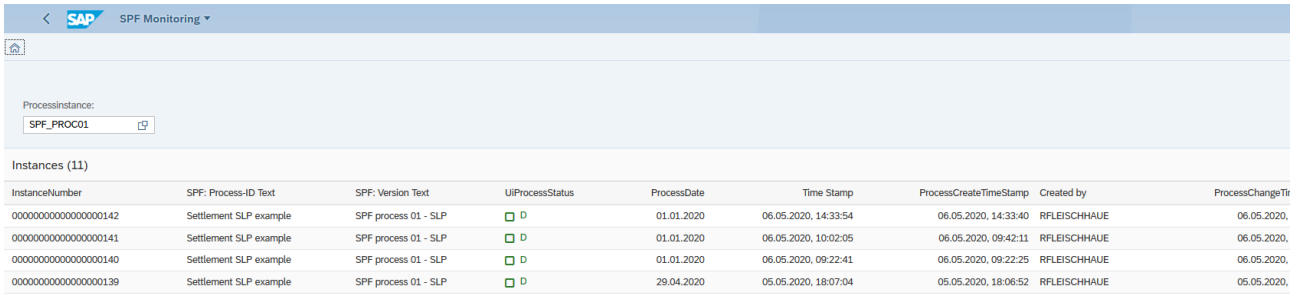


Figure 6: Overview of all instances

The following information are available:

Element	Description
InstanceNumber	Shows all Insstance separate for the selected SPF process
SPF Process-ID Text	Shows the description of the actual SPF process
SPF: Verison Text	Shows the description of the actual SPF-process version.
UiProcessStatus	Shows the status of the process, for example D - done E - error
ProcessDate	Date for the SPF process
Time Stamp	Date an time for execution of process
ProcessCreateTimeStamp	Date an time for start of execution of process
Created by	User which has started the process
ProcessChangeTimeStamp	Daten for last change of process
Changed by	User which has made the last change

Table 5: Overview page - details

Furthermore there is the option to change the view of the table by using the setting wheel which can be changed by adding or removing columns, as well as the option to export it to a spreadsheet program.

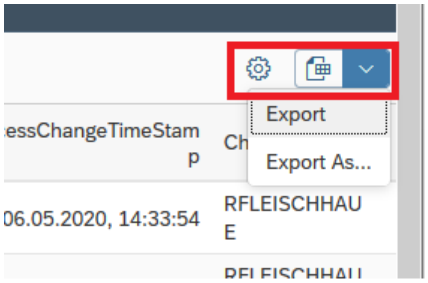


Figure 7: Export table

Any filter can be created within the context menu. New filters are added by selecting "More filters", which opens another context menu in which filter attributes can be added.

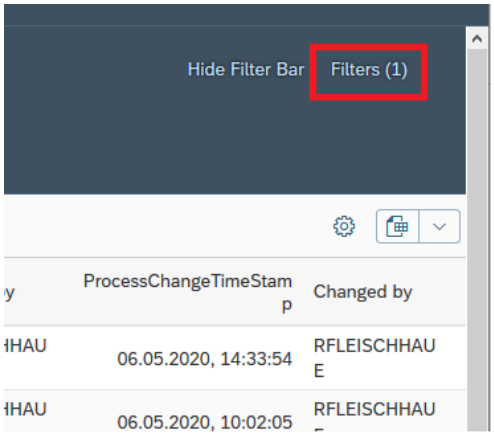


Figure 8: Set filter

Here you can set user specific filter criteria by pressing “More Filters”.

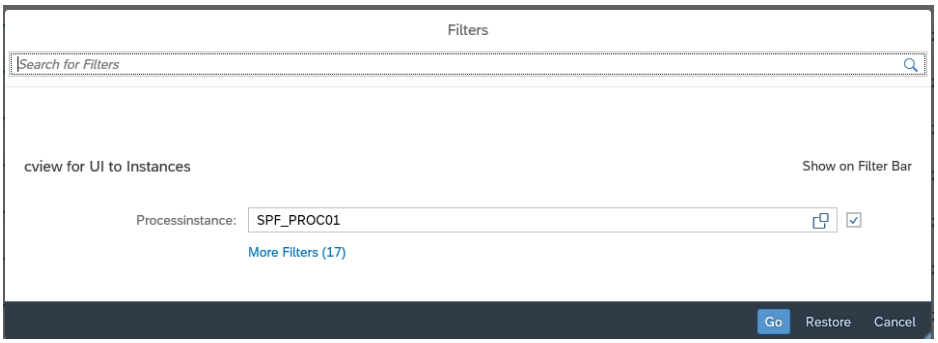


Figure 9: Table filter

The process instance is present because you are already in it by clicking. Of course, you can also call up another process instance in the tile display. If you set the flag next to it you can display the process instance permanently for this session if you show the filter.

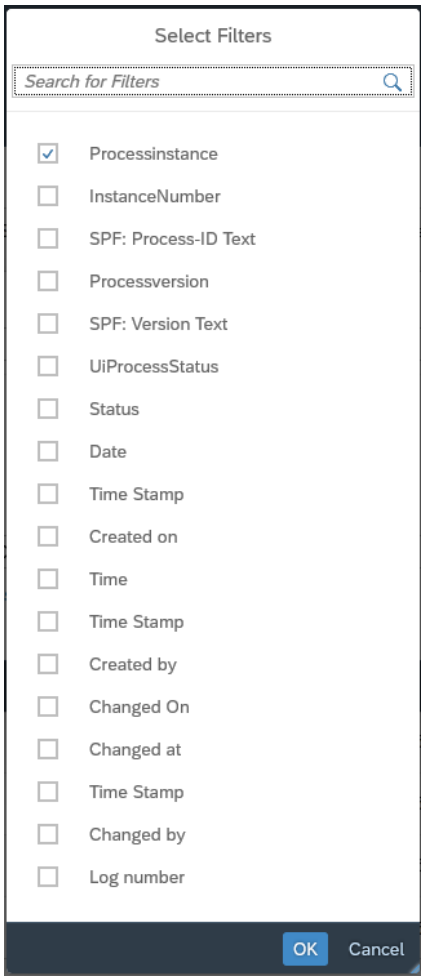


Figure 10: Filter selection

The filters added in this way are then also shown in the header area of the page and can be selected individually.

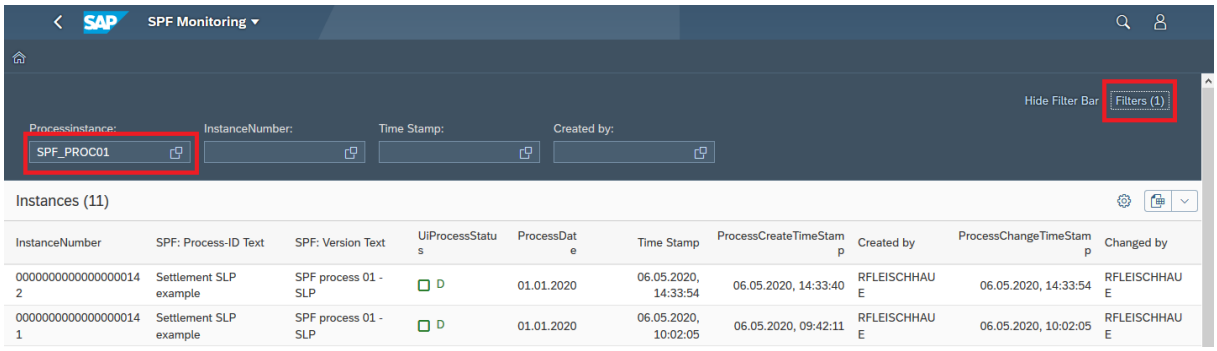


Figure 11: Add filter attributes

The home button brings you back to the overview.

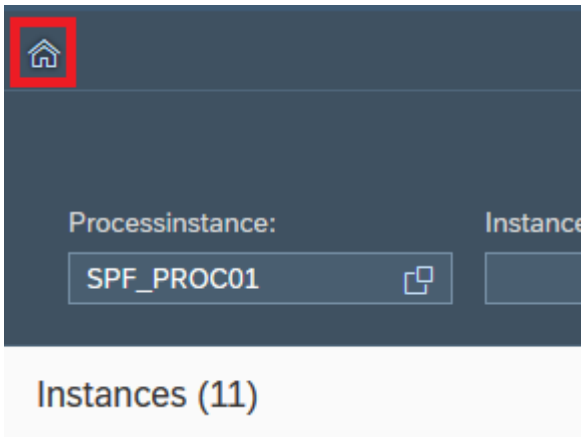


Figure 12: Home button

3.4.1.2 Detailed information of sub-processes

If you have selected an instance number, you can click on it to go to the detailed view of the instance or process and take a closer look at the process and the corresponding process steps. The view is divided into tw0 sections. On the left side a generell overview of the process is given and on the right side detailed information to sub processes are given if the corresponding sub process is marked. Depending on the definition from the line (like "Preparation" or "Calculation") each sub processes is displayed. Furthermore the connection like predecessor and succesor connection are shown.

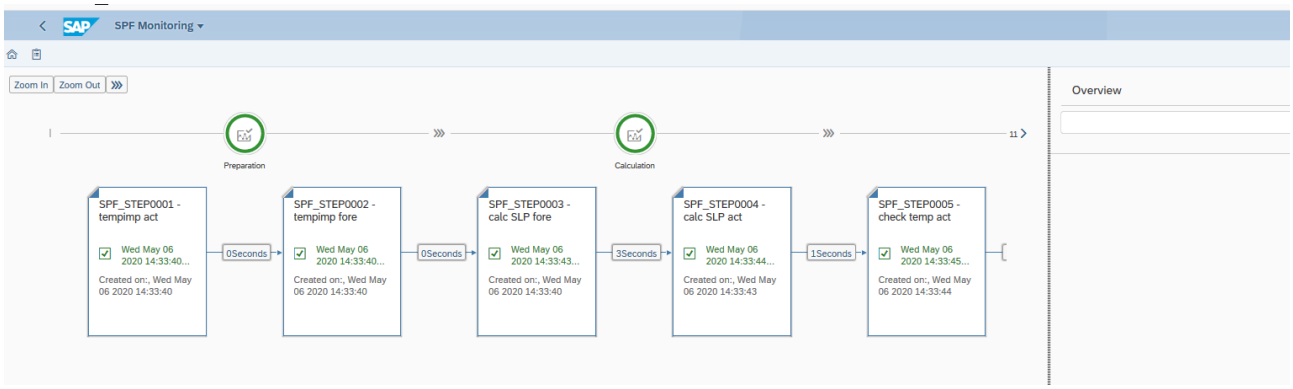


Figure 13: Detailed information to process steps

Here you can see the status of the sub-processes for the selected processinstance which is illustrated by a document symbol with detailed inforamtion about the process liek Created On. By click on the conection between 2 node you can see the runtime between two steps.

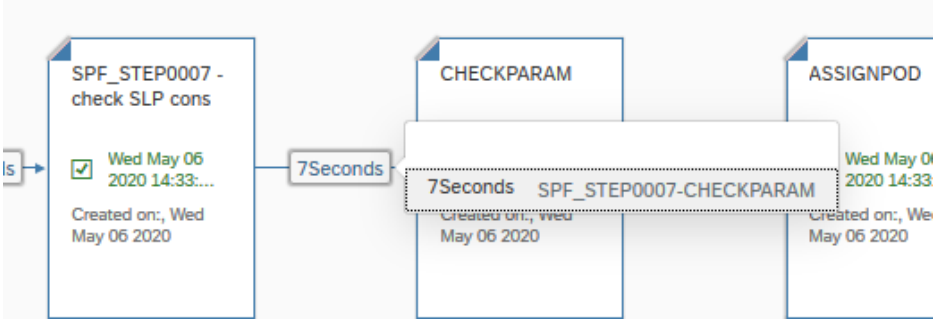


Figure 14: View of the sub-processes

The zoom function clarifies the steps that are now displayed in the document symbol under which the sub-processes are located, which can now be viewed in the overview on the right.

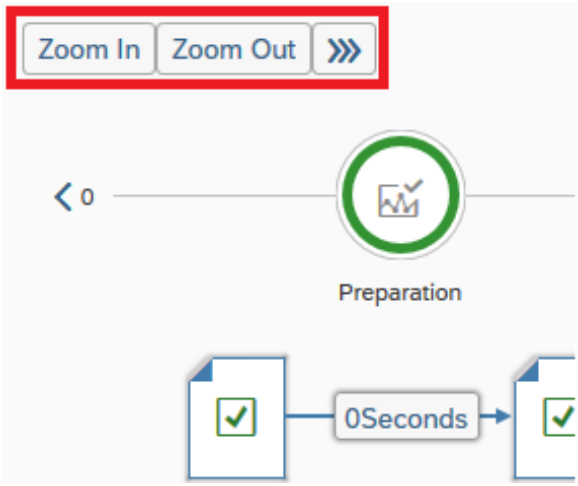


Figure 15: Zoom function

With the function  you will be given a total overview of the process.

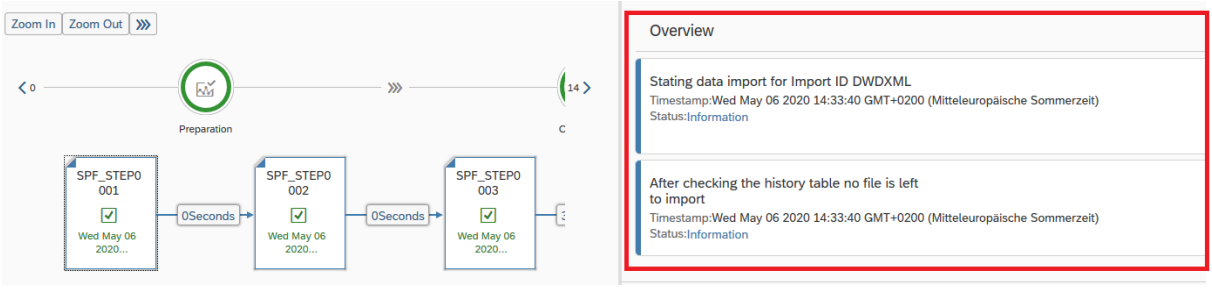


Figure 16: Sub-processes

By clicking on a single sub process detailed information about the sub process are given on the right side "Overview".

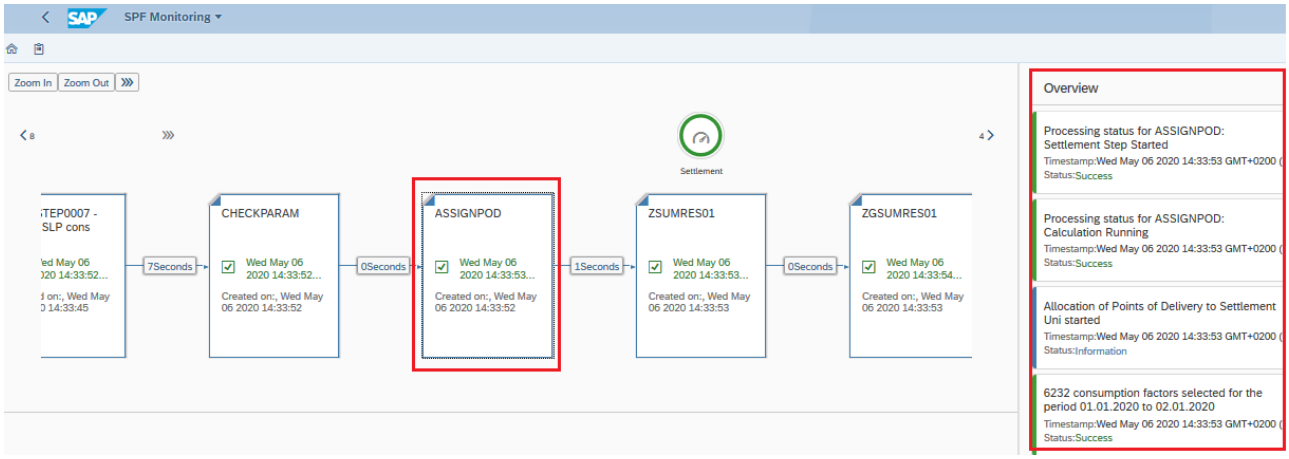


Figure 17: Sub-processes – detailed information

You can exit the view by pressing the home button or the list button.

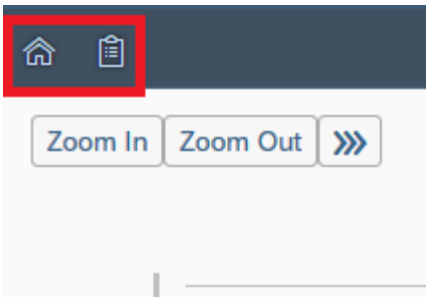


Figure 18: Leave view

Another way to get into the view of the sub-processes is via the overview of the process identification. There you click in the process lane, which is marked with green ticks. Then you can go to the sub-processes by clicking on "Go to process".

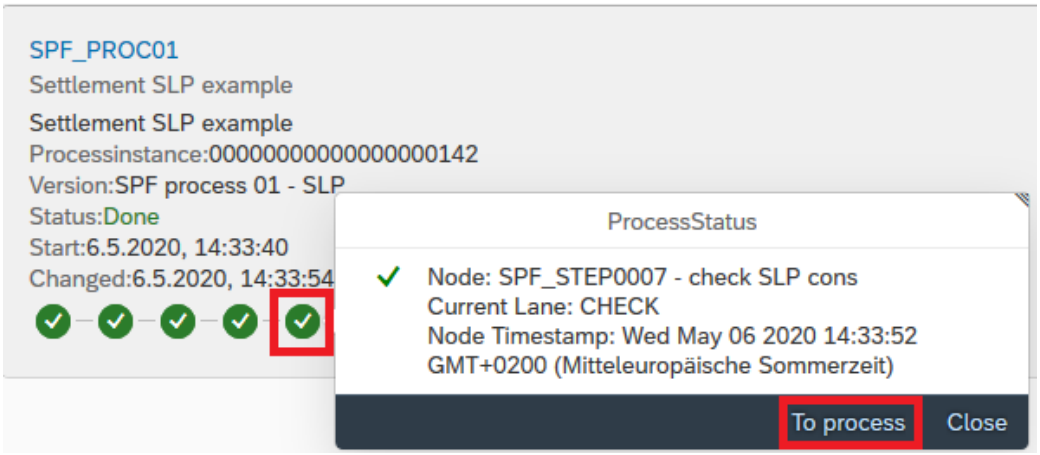


Figure 19: Jump into the sub-processes

4 EDM automatic calculation workbench

Transaction: */N/PLGA/ECA_AUTOCALCWB*

Within this functionality it is possible to calculate EDM formula profile based on Formula Allocation or ID of Formula Group. Furthermore specific properties are taken into account:

- identification of gaps
- multiple selection using formula instances or formula groups

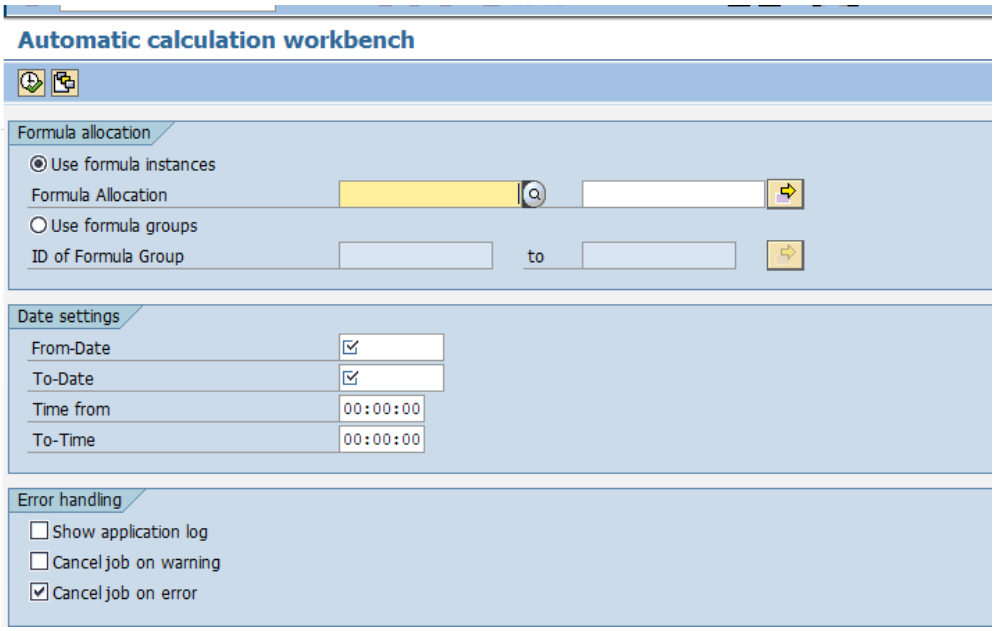


Figure 20: Automatic calculation workbench

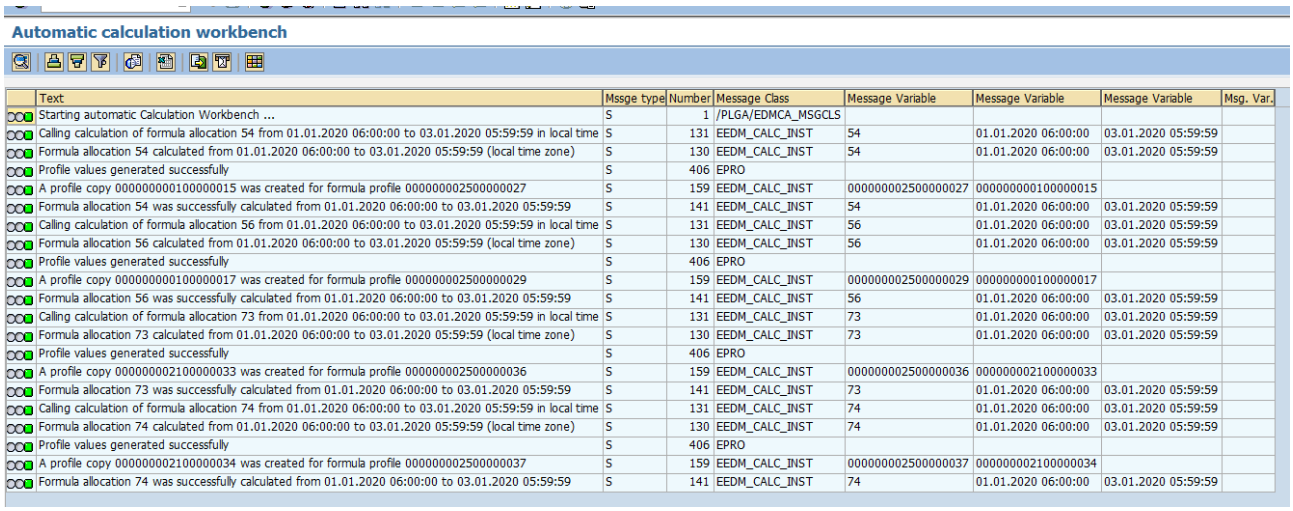
The following information are available

Element	Description
Section "Formula allocation"	
Use formula instances	If this field is active the section for inserting "Formula Allocation" is available. Here it is possible to enter formula allocation from formula profile. Note: only the option "Use formula instances" or "Use formula groups" is possible.
Formula Allocation	Here it is possible to enter ID of Formula Group from formula profile. Only available in combination with "Use formula instances"
Use formula groups	If this field is active the section for inserting "ID of Formula Group" is available. Here it is possible to enter ID of Formula Group from formula profile. Note: only the option "Use formula instances" or "Use formula groups" is possible.
ID of Formula Group	Here it is possible to enter ID of Formula Group from formula profile. Only available in combination with "Use formula groups"
Section "Date settings"	
From-Date	Selection for date from
To-Date	Selection for date to
Time from	Selection for time from
To-Time	Selection for time to

Section "Error handling"	
Show application log	If this option is active ☑, the result of calculation is displayed
Cancel job on warning	This option is only relevant for background processing. If this option is active ☑, the status of background job is cancelled, if a warning message occurs during calculation
Cancel job on error	This option is only relevant for background processing. If this option is active ☑, the status of background job is cancelled, if a error message occurs during calculation

Table 6: Automatic calculation workbench - overview

After executing the calculation by "F8" or by pressing  a log with calculation result is displayed, if the option "Show application log" is active.



Automatic calculation workbench

Text	Mssge type	Number	Message Class	Message Variable	Message Variable	Message Variable	Msg. Var.
Starting automatic Calculation Workbench ...	S	1	/PLGA/EDMCA_MSGCLS				
Calling calculation of formula allocation 54 from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 in local time	S	131	EEDM_CALC_INST	54	01.01.2020 06:00:00	03.01.2020 05:59:59	
Formula allocation 54 calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 (local time zone)	S	130	EEDM_CALC_INST	54	01.01.2020 06:00:00	03.01.2020 05:59:59	
Profile values generated successfully	S	406	EPRO				
A profile copy 000000000100000015 was created for formula profile 000000002500000027	S	159	EEDM_CALC_INST	000000002500000027	000000000100000015		
Formula allocation 54 was successfully calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59	S	141	EEDM_CALC_INST	54	01.01.2020 06:00:00	03.01.2020 05:59:59	
Calling calculation of formula allocation 56 from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 in local time	S	131	EEDM_CALC_INST	56	01.01.2020 06:00:00	03.01.2020 05:59:59	
Formula allocation 56 calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 (local time zone)	S	130	EEDM_CALC_INST	56	01.01.2020 06:00:00	03.01.2020 05:59:59	
Profile values generated successfully	S	406	EPRO				
A profile copy 000000000100000017 was created for formula profile 000000002500000029	S	159	EEDM_CALC_INST	000000002500000029	000000000100000017		
Formula allocation 56 was successfully calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59	S	141	EEDM_CALC_INST	56	01.01.2020 06:00:00	03.01.2020 05:59:59	
Calling calculation of formula allocation 73 from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 in local time	S	131	EEDM_CALC_INST	73	01.01.2020 06:00:00	03.01.2020 05:59:59	
Formula allocation 73 calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 (local time zone)	S	130	EEDM_CALC_INST	73	01.01.2020 06:00:00	03.01.2020 05:59:59	
Profile values generated successfully	S	406	EPRO				
A profile copy 000000002100000033 was created for formula profile 000000002500000036	S	159	EEDM_CALC_INST	000000002500000036	000000002100000033		
Formula allocation 73 was successfully calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59	S	141	EEDM_CALC_INST	73	01.01.2020 06:00:00	03.01.2020 05:59:59	
Calling calculation of formula allocation 74 from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 in local time	S	131	EEDM_CALC_INST	74	01.01.2020 06:00:00	03.01.2020 05:59:59	
Formula allocation 74 calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59 (local time zone)	S	130	EEDM_CALC_INST	74	01.01.2020 06:00:00	03.01.2020 05:59:59	
Profile values generated successfully	S	406	EPRO				
A profile copy 000000002100000034 was created for formula profile 000000002500000037	S	159	EEDM_CALC_INST	000000002500000037	000000002100000034		
Formula allocation 74 was successfully calculated from 01.01.2020 06:00:00 to 03.01.2020 05:59:59	S	141	EEDM_CALC_INST	74	01.01.2020 06:00:00	03.01.2020 05:59:59	

Figure 21: Automatic calculation workbench log

5 Functions for standard load profiles

The processing developed by *Technische Universität München* (TU Munich) could be used for calculating consumption values of SLP customers. It is described by the following sigmoid function:

$$h(\vartheta) = \left(\frac{\mathrm{A}}{1 + \left(\frac{\mathrm{B}}{\vartheta - 40} \right)^{\mathrm{C}}} + \mathrm{D}' \right) * \mathrm{F(d)}$$

This function provides the daily consumption value (a so-called h-value) as a result. That value is multiplied by the customer value to gain the actual consumption value. The customer value (CV) is defined as normalized to the observation period consumption of the customer.

For calculating the daily consumption value within *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* the following formula is implemented:

$$Q_{Day}(\vartheta_d) = CV * h(\vartheta_d) * F(d)$$

If the daily mean temperature is calculated by using the geometric series, the calculation already takes place while importing the temperature values into the EDM (Energy Data Management) profile. For using the SLP by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* no further adjustments of the SAP® standards are needed.

To mirror the consumption dependency from the week days of commercial customers, week day factors are used. This is expressed by the factor F(d) within the formulas. Since consumption of private customers in general is independent from week days, for those factors F(d) = 1 is considered.

For implementation of SLP within *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA*, the following data structure is used:

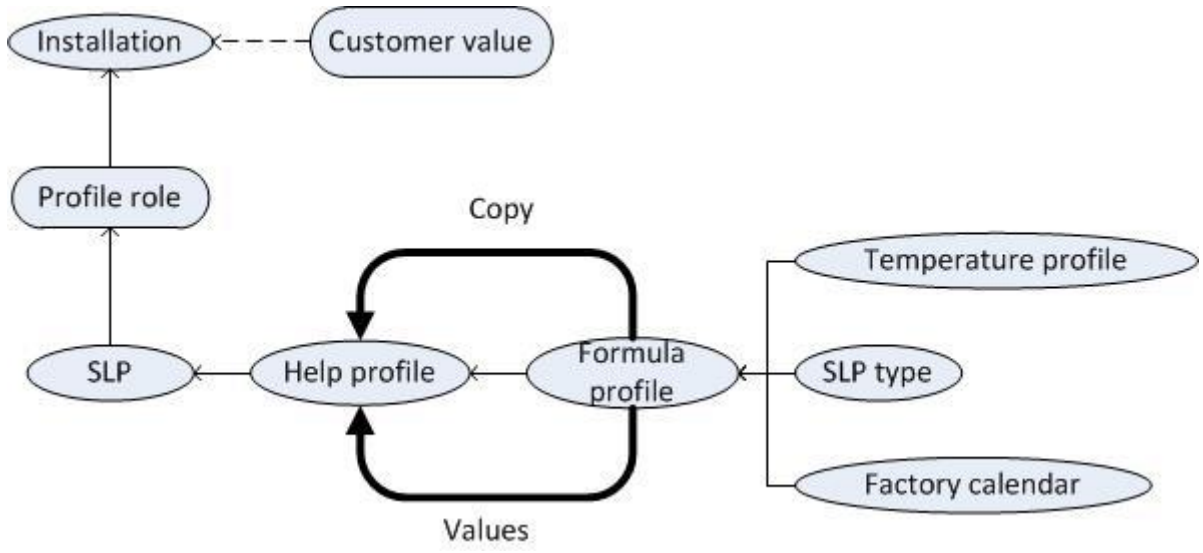


Figure 22: Data structure SLP

An installation represents an individual customer that is assigned to the consumption of gas. Thus, such an installation must be present within the system for each customer. The SLP gets connected to each installation by using a profile role, which also has a customer value. In this manner, an SLP is assigned to each customer and each customer is respectively within settlement.

5.1 Formulas for calculating SLP

For calculation of SLP-Profiles are different options available.

5.1.1 Standard SLP profile construct

The actual calculation, according to the formulas described above, is performed by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by using formula profiles. The temperature dependent daily consumption values for each SLP type are calculated by those formula profiles.

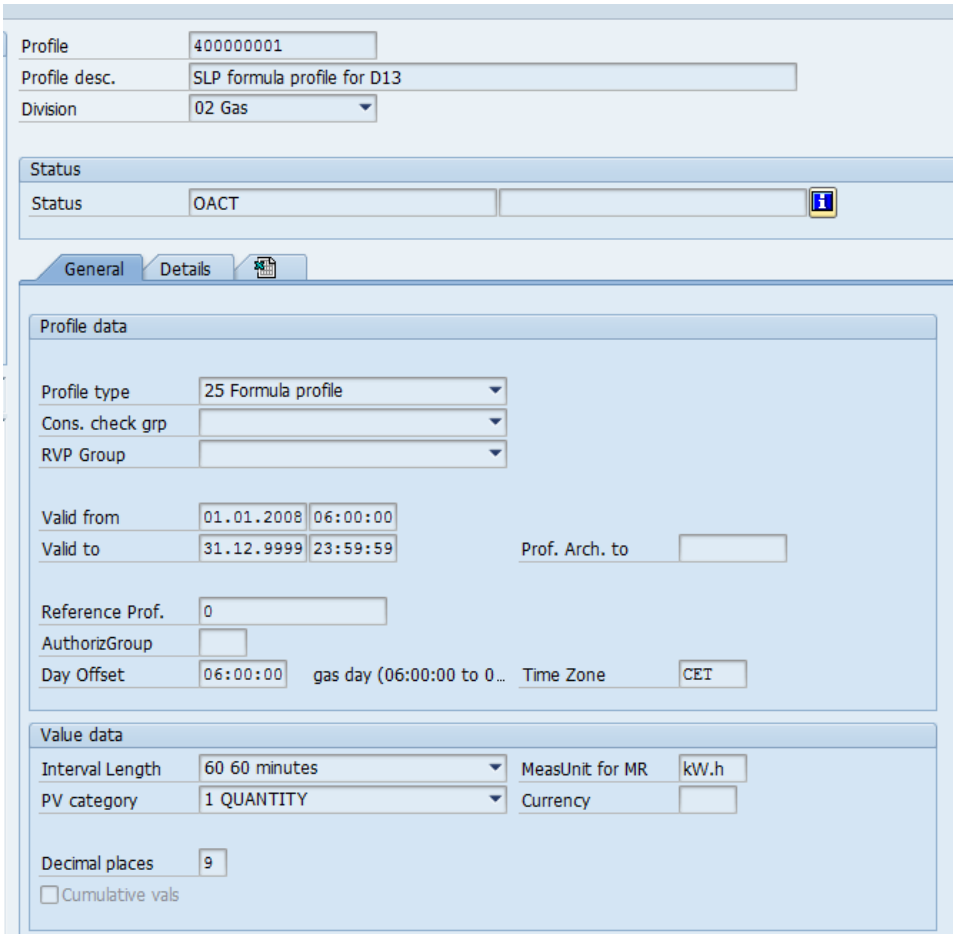


Figure 23: SLP formula profile header

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

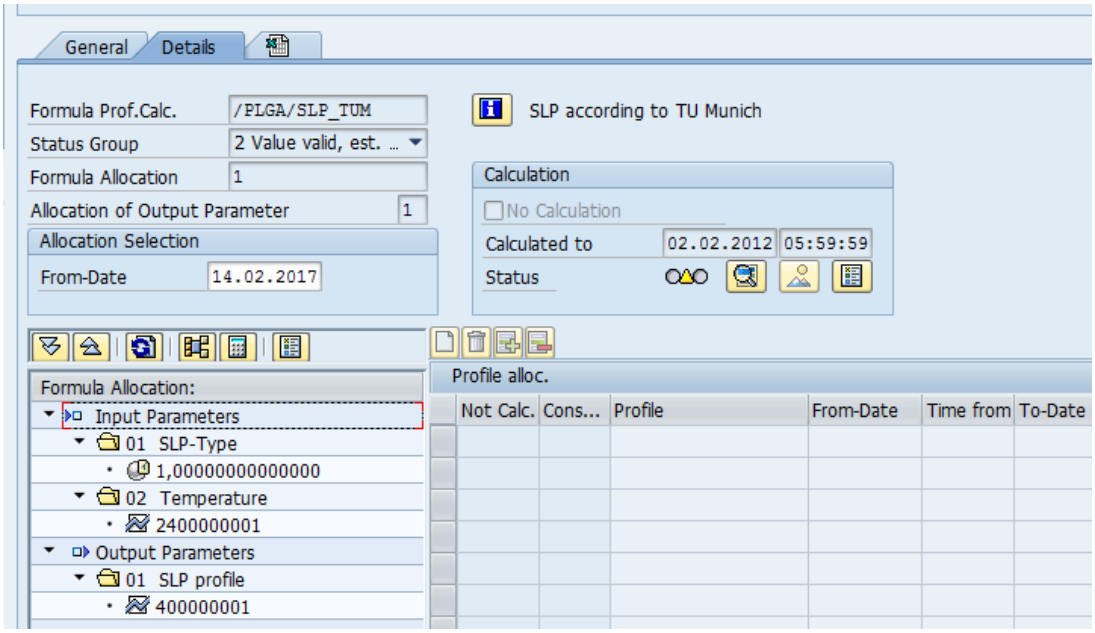


Figure 24: SLP formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are two inputs and one output for the SLP formula shown here.

The first input is the SLP type (constant value), the second is the temperature profile.

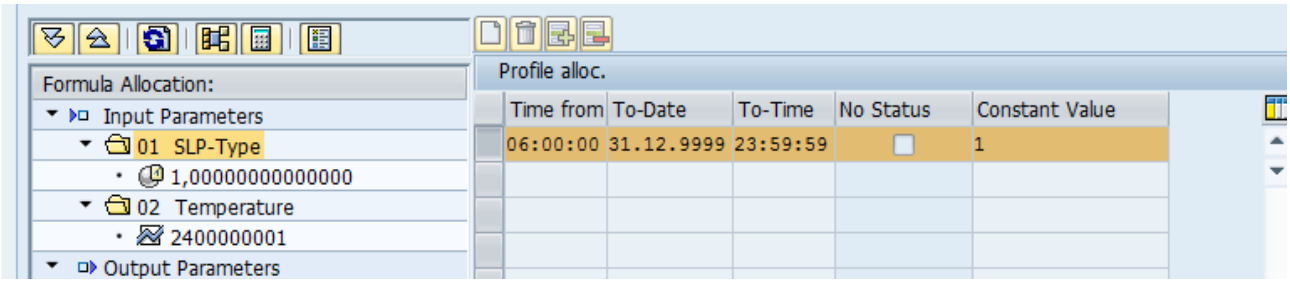


Figure 25: SLP formula profile input 1

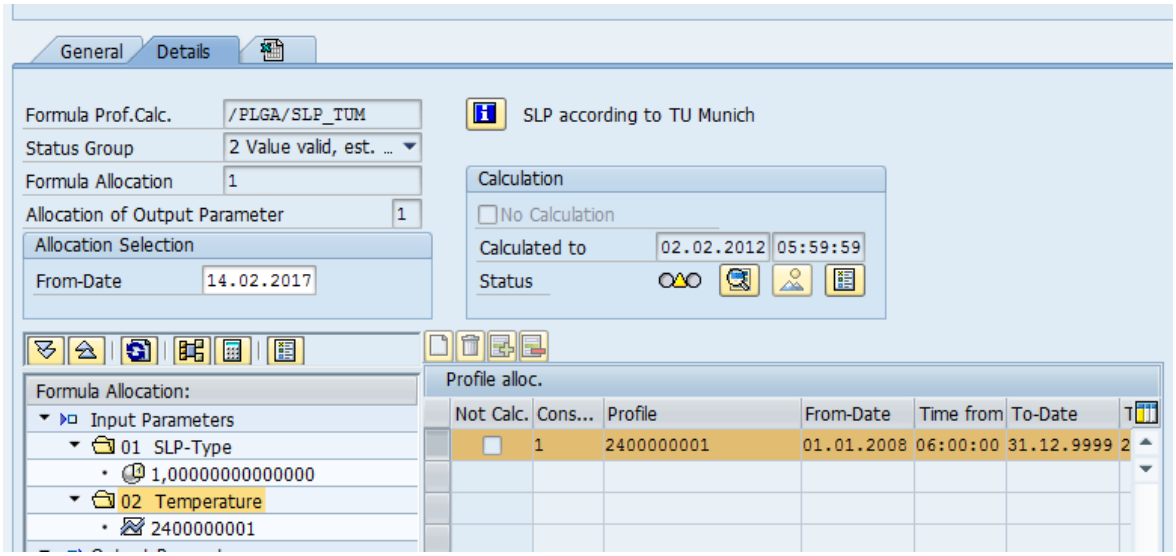


Figure 26: SLP formula profile input 2

The output parameter is filled out automatically, since it is the current created/edited formula profile. After saving, the profile must be edited again. This time, the box under "Create Copy" must be marked within the output parameter. This change must be saved yet again. By saving, a new profile is created automatically and the number of that profile will be displayed in the "Profile Copy" field.

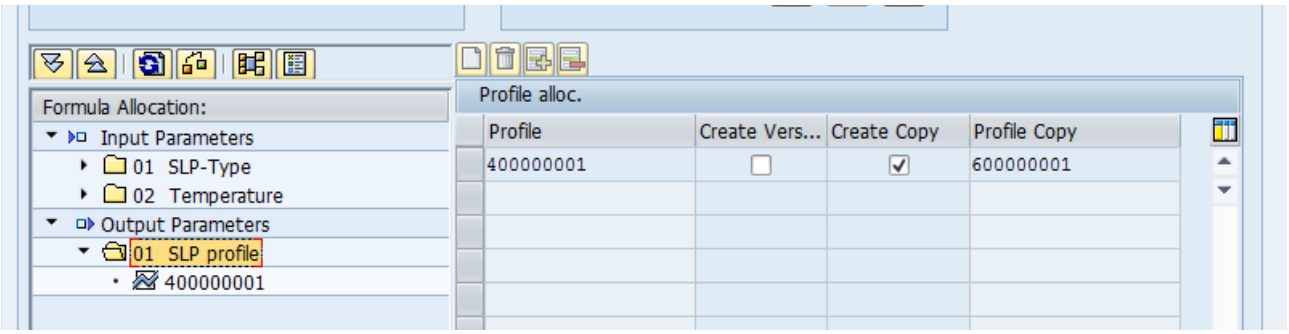


Figure 27: SLP formula profile output

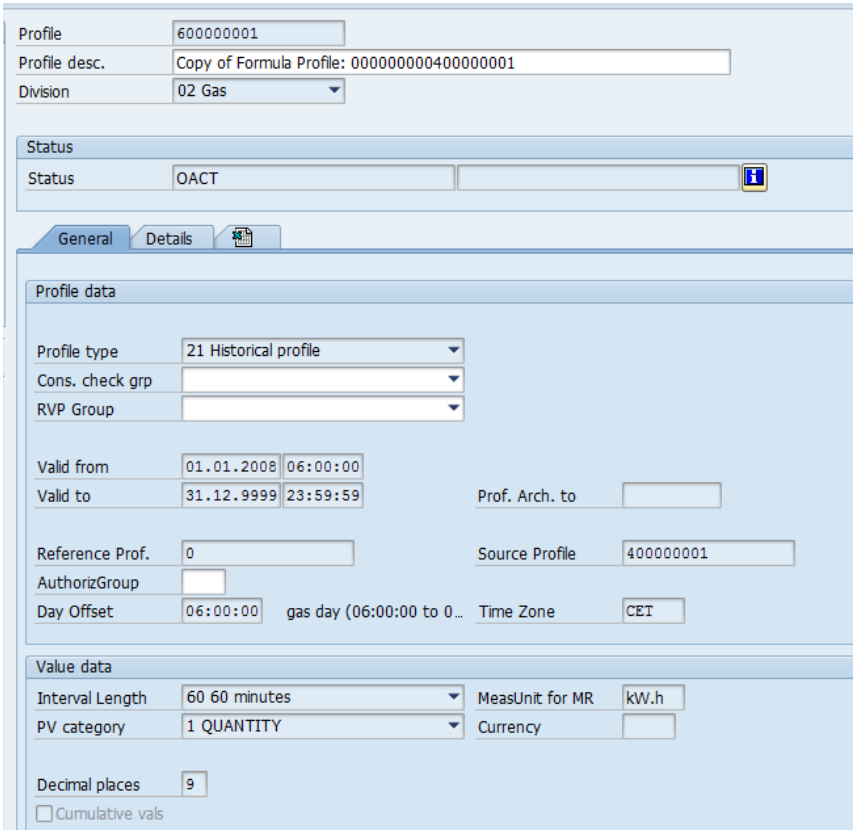


Figure 28: SLP formula profile - Profile copy

The profile copy that is created here is used in the last step for producing the actual SLP profile. This is of type "Gas SLP". The newly generated profile copy is to be assigned within the "Details" tab of that profile. The SLP profile is eventually used for assignment to the customer installations. The SAP® default tools can be used for calculating the profile values.

5.1.2 Standard SLP profile construct using hourly factor values

The actual calculation, according to the formulas described above by using hourly factor values, is performed by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by using formula profiles. The temperature dependent daily consumption values for each SLP type are calculated by those formula profiles.

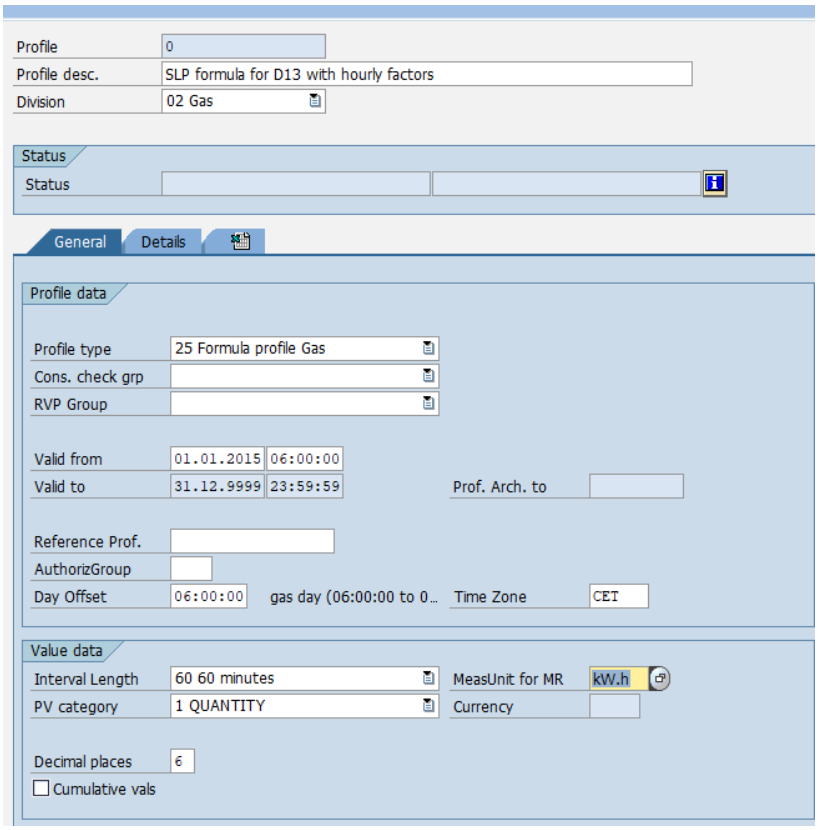


Figure 29: SLP formula profile header

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

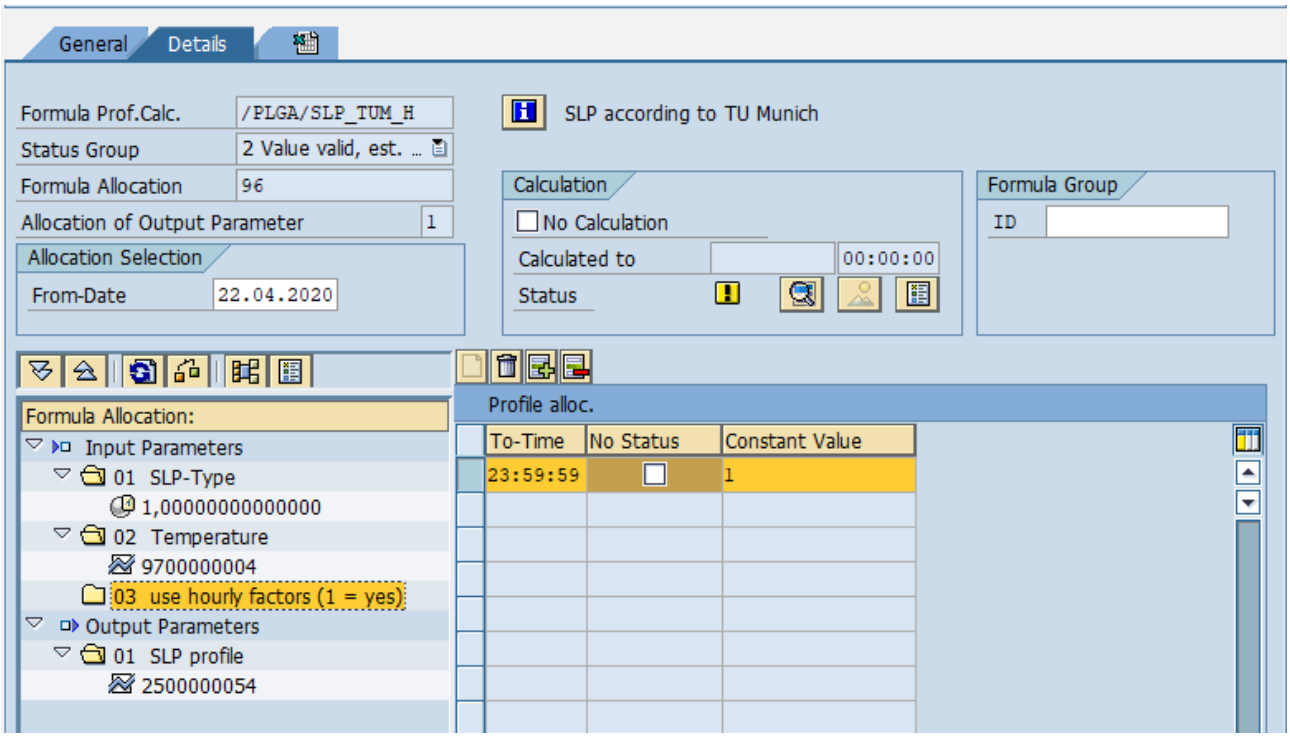


Figure 30: SLP formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are three inputs and one output for the SLP formula shown here.

The first input is the SLP type (constant value).

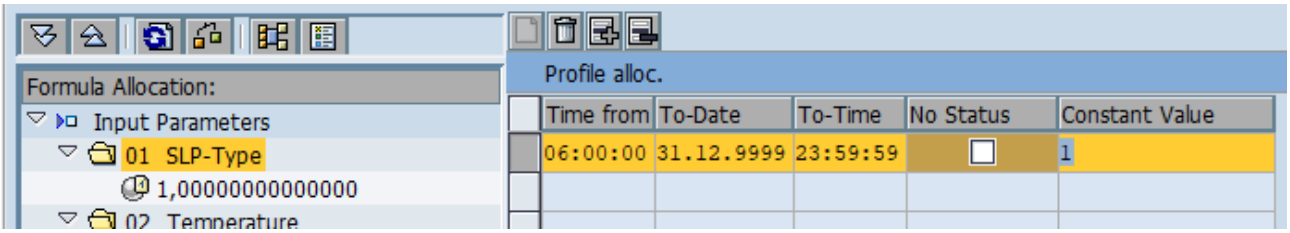


Figure 31: SLP formula profile input 1

The second is the temperature profile.

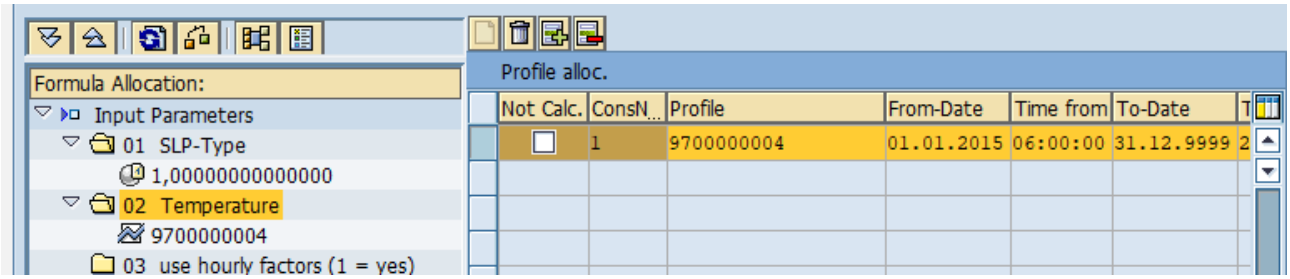


Figure 32: SLP formula profile input 2

The third is the factor to use hourly values whereby 1 = use and 0 = don't use means.

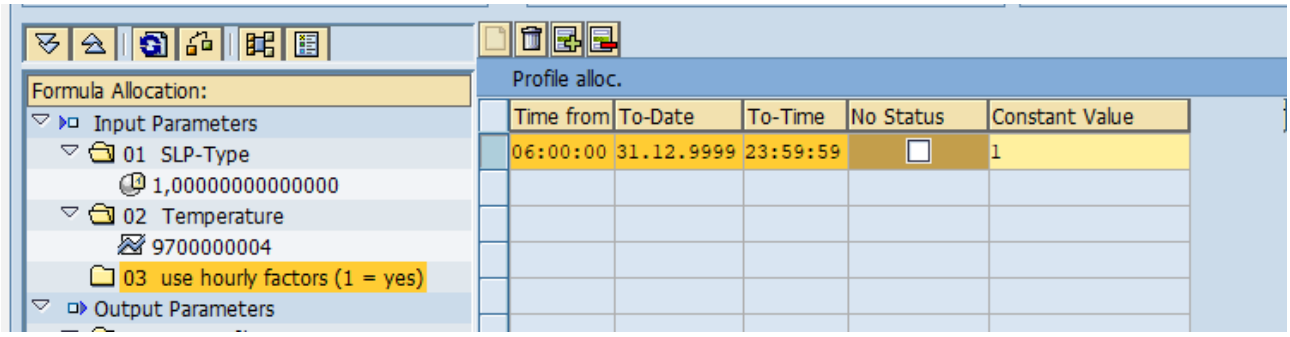


Figure 33: SLP formula profile input 3

The output parameter is filled out automatically, since it is the current created/edited formula profile. After saving, the profile must be edited again. This time, the box under "Create Copy" must be marked within the output parameter. This change must be saved yet again. By saving, a new profile is created automatically and the number of that profile will be displayed in the "Profile Copy" field.

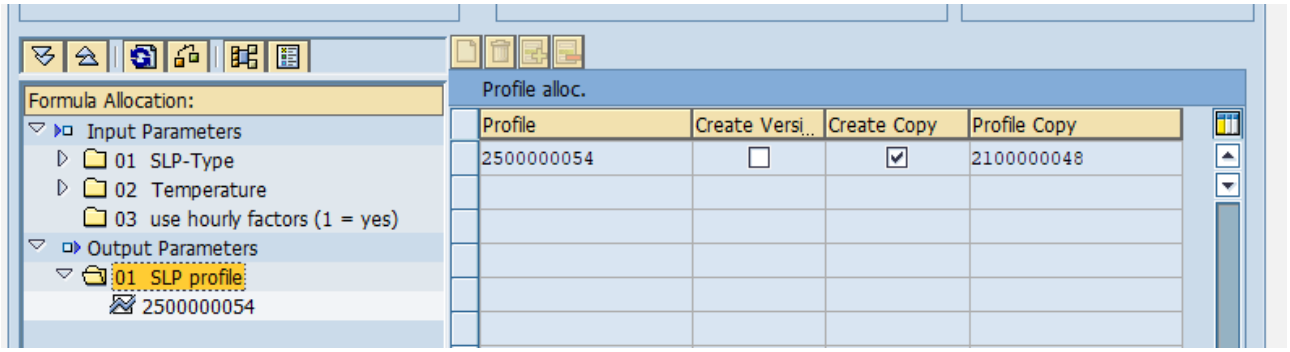


Figure 34: SLP formula profile output

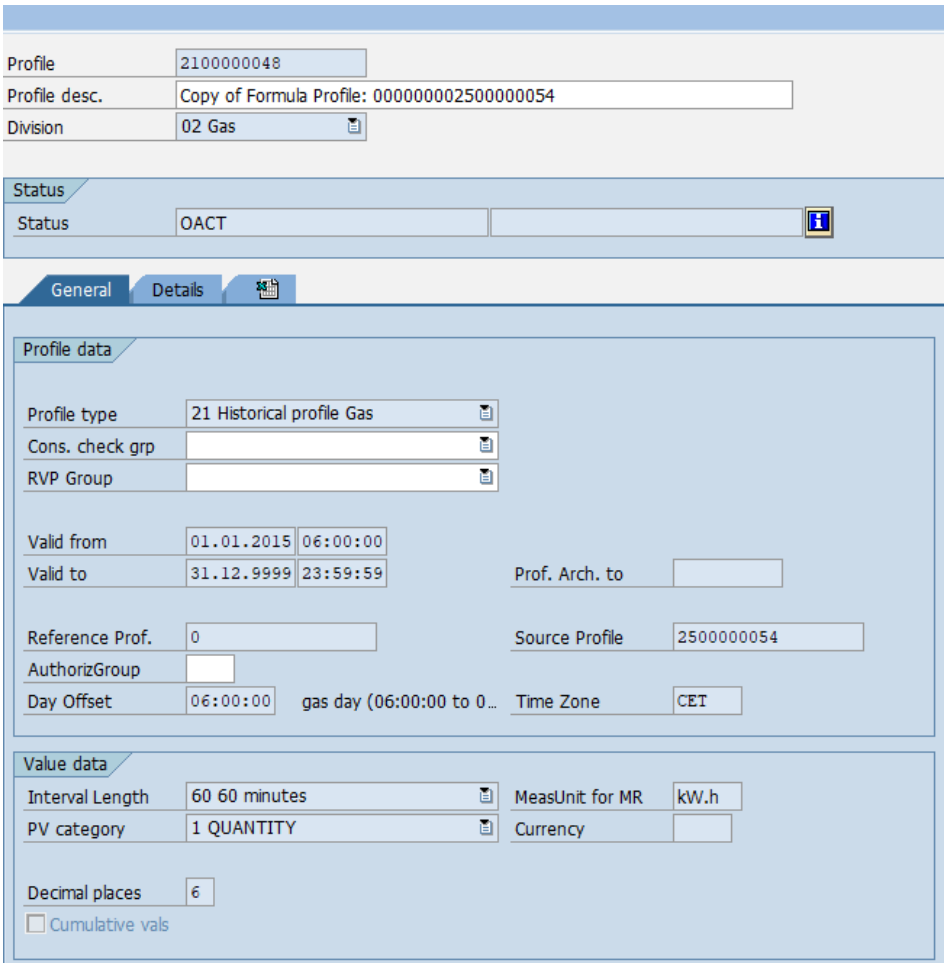


Figure 35: SLP formula profile - Profile copy

The profile copy that is created here is used in the last step for producing the actual SLP profile. This is of type "Gas SLP". The newly generated profile copy is to be assigned within the "Details" tab of that profile. The SLP profile is eventually used for assignment to the customer installations. The SAP® default tools can be used for calculating the profile values.

5.2 Configure of own TUM SLP coefficient

Transaction: */N/PLGA/EDM_SLP_TUMX*

Within this functionality it is possible to maintain own SLP coefficient (TUM) which could be used to calculated SLP profiles according TUM.

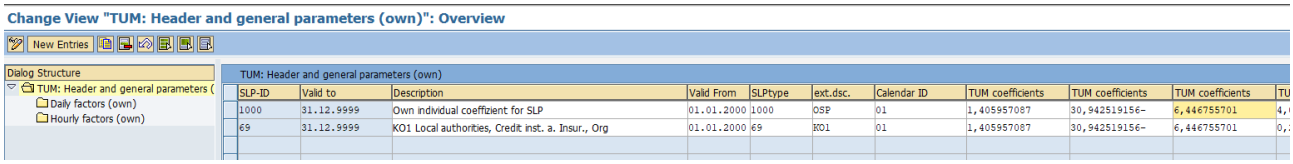


Figure 36: Configure own SLP coefficient

The following information are available in section "TUM: Header and general parameter"

Element	Description
SLP-ID	Numeric SLP-ID, which is given by user
Valid to	Date to for which the coefficients is valid
Description	Description for own SLP type
Valid From	Date from which SLP type is valid
SLPtype	SLP type
Ext.dsc.	Short description for SLP type
Calendar ID	Calendar ID
TUM coefficients	TUM coefficient A (9 decimal places)
TUM coefficients	TUM coefficient B (9 decimal places)
TUM coefficients	TUM coefficient C (9 decimal places)
TUM coefficients	TUM coefficient D (9 decimal places)
FfE coefficients	FfE coefficient (mh)
FfE coefficients	FfE coefficient (bh)
FfE coefficients	FfE coefficient (mw)
FfE coefficients	FfE coefficient (bw)
Ref. temp	Reference temperature
Daily factors	Use daily factor, should always be active ☑

Table 7: TUM Header information

Further the definition of Daily factors should be done within the section "Daily factors (own)".

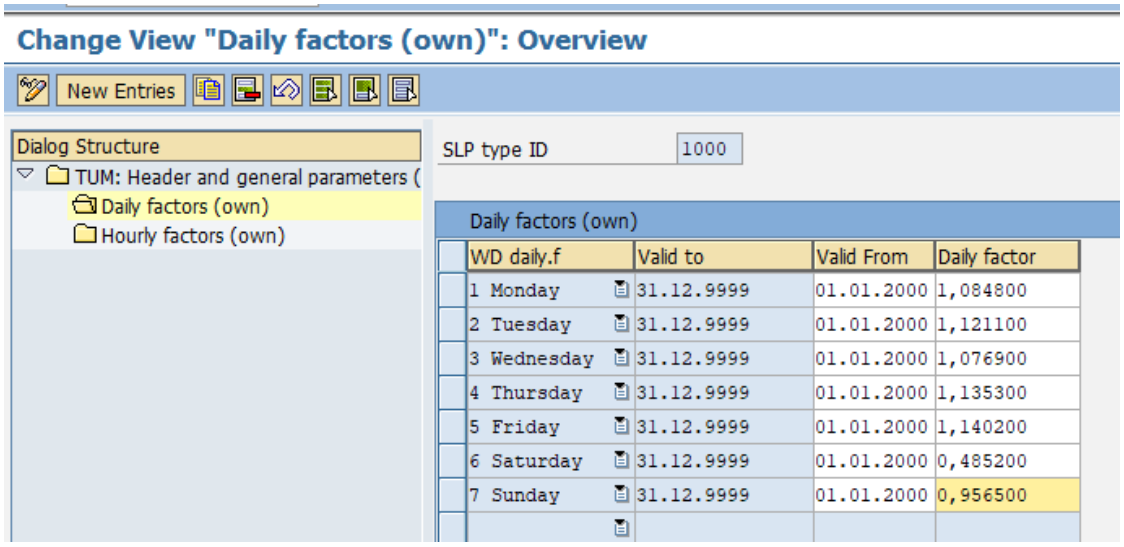


Figure 37: Configure own Daily factors

The following information are available in section "Daily factors (own)"

Element	Description
SLP type ID	SLP type ID
WD daily factor	Daily factor, for 0 – whole week 1 – Monday

	2 – Tuesday 3 - Wednesday 4 - Thursday 5 - Friday 6 - Saturday 7 - Sunday
Valid to	Date to for which values are valid
Valid From	Date from for which values are valid
Daily factor	Enter the daily factor

Table 8: TUM daily factors (individual) information

Furthermore it is optional possible to maintain own hourly factors:

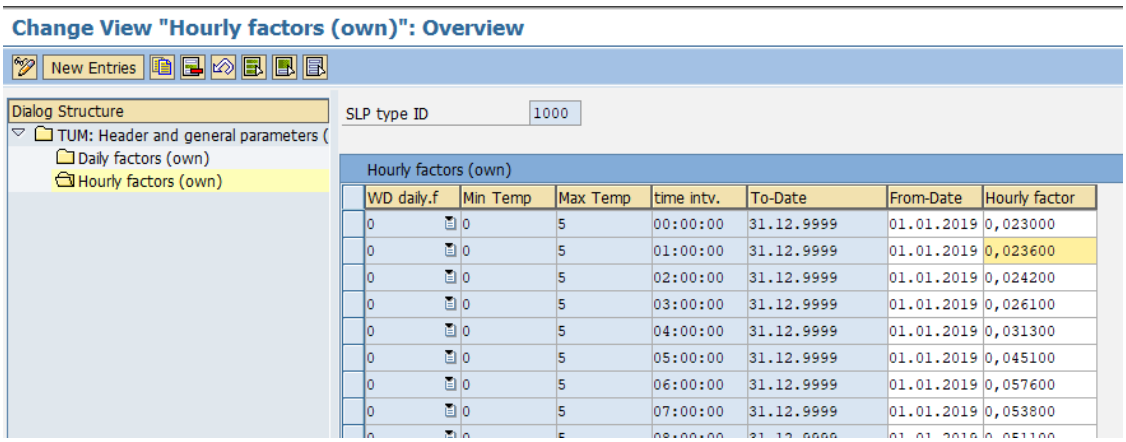


Figure 38: Configure own Hourly factors

The following information are available in section "Hourly factors (own)"

Element	Description
WD daily factor	Daily factor, for 0 – whole week 1 – Monday 2 – Tuesday 3 - Wednesday 4 - Thursday 5 - Friday 6 - Saturday 7 - Sunday
Min Temp	Enter the minimum temperature for temperature interval
Max Temp	Enter the maximum temperature for temperature interval
Time interval	Enter the time for interval
To-Date	Date to for which values are valid
From-Date	Date from for which values are valid
Hourly factor	Enter the hourly factor

Table 9: TUM hourly factors (own) information

5.3 Creation of SLP profiles (TUM)

Transaction: */N/PLGA/EDM_CREATE_SLP*

Within this functionality it is possible to create SLP profiles according to TU Munich. Furthermore it is necessary that all relevant master data like temperature area and temperature profile within the transaction /PLGA/EDM_TAPROF are defined.

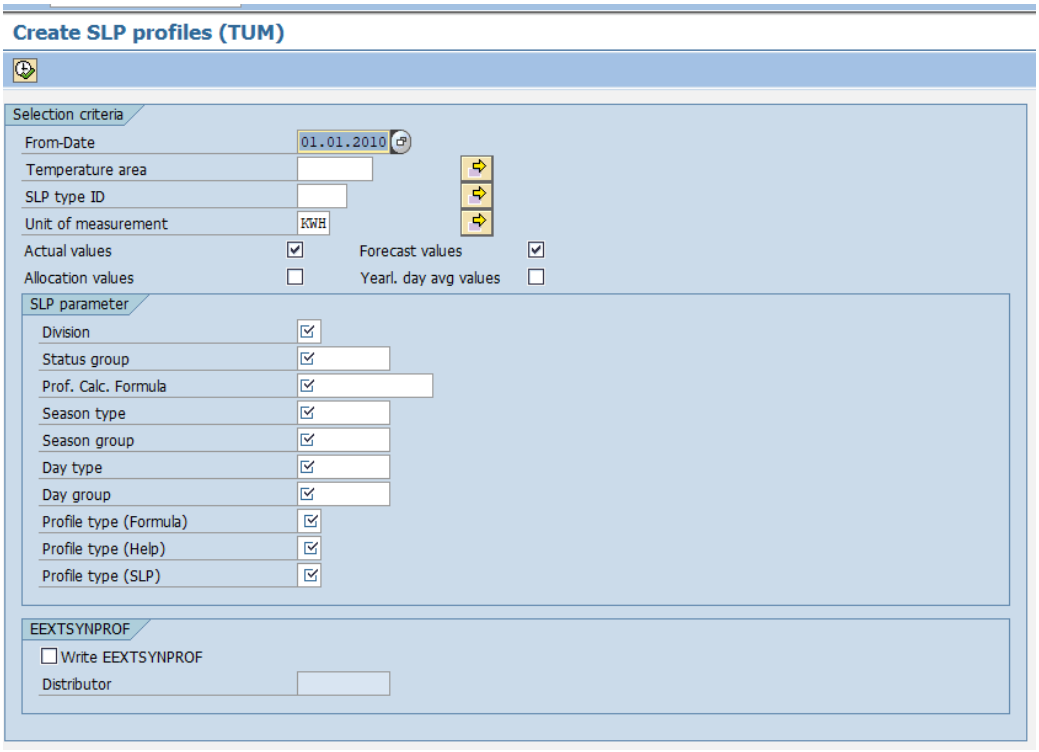


Figure 39: Create SLP profiles (TUM)

The following information are available:

Element	Description
Section "Section criteria"	
From-Date	From-Date for profile header information. Mandatory field.
Temperature area	Temperature area, for which SLP profile are generated. Multi selection is possible. Mandatory field.
SLP type ID	Select the SLP-type for which profile should be created. Multi selection is possible. The SLP-type must be pre-defined within the system using the product functionalities. Mandatory field.
Unit of measurement	Measurement unit for which the profile should be create. Mandatory field.
Actual values	If this field is active ☑ then the profiles are created with the actual temperature profile who are defined in transaction /PLGA/EDM_TAPROF – Temperature area profiles. Activation of more than one temperature profile is possible. Mandatory field.
Forecast values	If this field is active ☑ then the profiles are created with the forecast temperature profile who are defined in transaction /PLGA/EDM_TAPROF – Temperature area profiles. Activation of more than one temperature profile is possible. Mandatory field.
Allocation values	If this field is active ☑ then the profiles are created with the allocation temperature profile who are defined in transaction /PLGA/EDM_TAPROF –

	Temperature area profiles. Activation of more than one temperature profile is possible. Mandatory field.
Yearl. Day. Avg values	If this field is active ☑ then the profiles are created with the yearly daily average temperature profile who are defined in transaction /PLGA/EDM_TAPROF – Temperature area profiles. Activation of more than one temperature profile is possible. Mandatory field.
Section "SLP parameter"	
Division	Division for the profile. Mandatory field.
Status group	Status group for the SLP formula profile. Mandatory field.
Prof. Calc. Formula	Formula for SLP formula profile. Mandatory field.
Season type	Season type for synthetically SLP profile. Mandatory field.
Season Group	Season group for synthetically SLP profile. Mandatory field.
Day type	Day type for synthetically SLP profile. Mandatory field.
Day group	Day group for synthetically SLP profile. Mandatory field.
Profile type (Formula)	Profile type for formula profile. Mandatory field.
Profile type (Help)	Profile type for formula help profile. Mandatory field.
Profile type (SLP)	Profile type for synthetically profile. Mandatory field.
Section "EEXTSYNPROF"	
Write EEXTSYNPROF	If this field is active ☑ then further information are write in table EEXTSYNPROF.
Distributor	Only available if "Write EEXTSYNPROF" is active. Selection of Distributor for which the entries are written.

Table 10: Create SLP profile (TUM) - details

After entering the selection criteria an execution the functionality by pressing F8 or a log with the results is displayed:

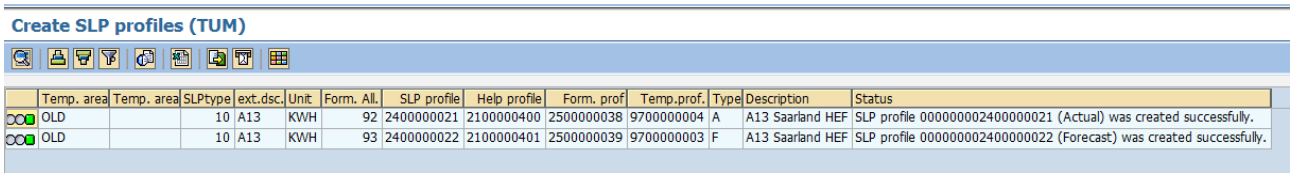


Figure 40: Result log – Create SLP profiles (TUM)

5.3.1 Precondition for creation of SLP profiles (TUM)

Transaction: /n*/PLGA/EDM_TAPROF*

Within this functionality, the allocation from temperature area to distinct temperature profile is possible.

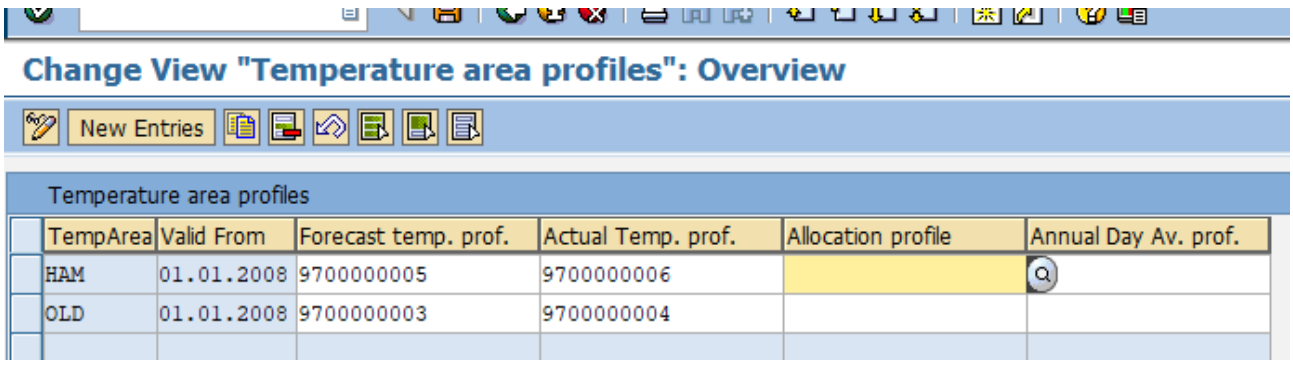


Figure 41: Profile table for temperature area and temperature profiles

The following information are available:

Element	Description
TempArea	Specification from temperature area. Mandatory field.
Valid From	Specification Valid from for temperature area. Mandatory field.
Forecast temp. profile	Temperature profile number for forecast temperature profile.
Actual temp. profile	Temperature profile number for actual temperature profile.
Allocation profile	Temperature profile number for allocation temperature profile.
Annual day average profile	Temperature profile number for annual day average temperature profile.

Table 11: Temperature area profiles - details

6 Processes for technical quantity determination

An end-consumer consuming more than 1.5 million kWh or having a load exceeding 500 kW must be equipped with a load measurement. Different time series must be imported and processed into their appropriate profiles.

The following time series data is mapped to such profiles:

- Operational volume: Vb
- Standard volume: Vn
- Pressure: p
- Temperature: T
- Compressibility: K
- Condition number: Z
- Calorific value: Hon

Exit points for an IMC (interval metered customer) are necessary to have a full overview about gas composition, the time series of each customer and knowledge about the measurement device connections (i.e. Z-connection, parallel).

Calculating IMC consumptions is performed in different steps like:

1. Technical quantity determination (TQD) for calculating Vn from Vb.
2. Calculating energy (Qn) from Vn
3. Technical quantity determination (TQD) for calculating energy from Vb
4. Calculation from compression factor
5. Calculation from amount based average calculation

In the following chapters the different formula profile by using *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by are displayed.

6.1 Technical quantity determination according to G685

The actual calculation, according to the formulas described above, is performed by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by using formula profiles is bescribed.

Within this given functionality the following input information are used for calculation from energy according G685:

- Measured volume
- Temperature
- Standard temperature
- Zero temperature
- Measured pressure
- Air pressure
- Standard air pressure
- Compressibility
- Calorifc value

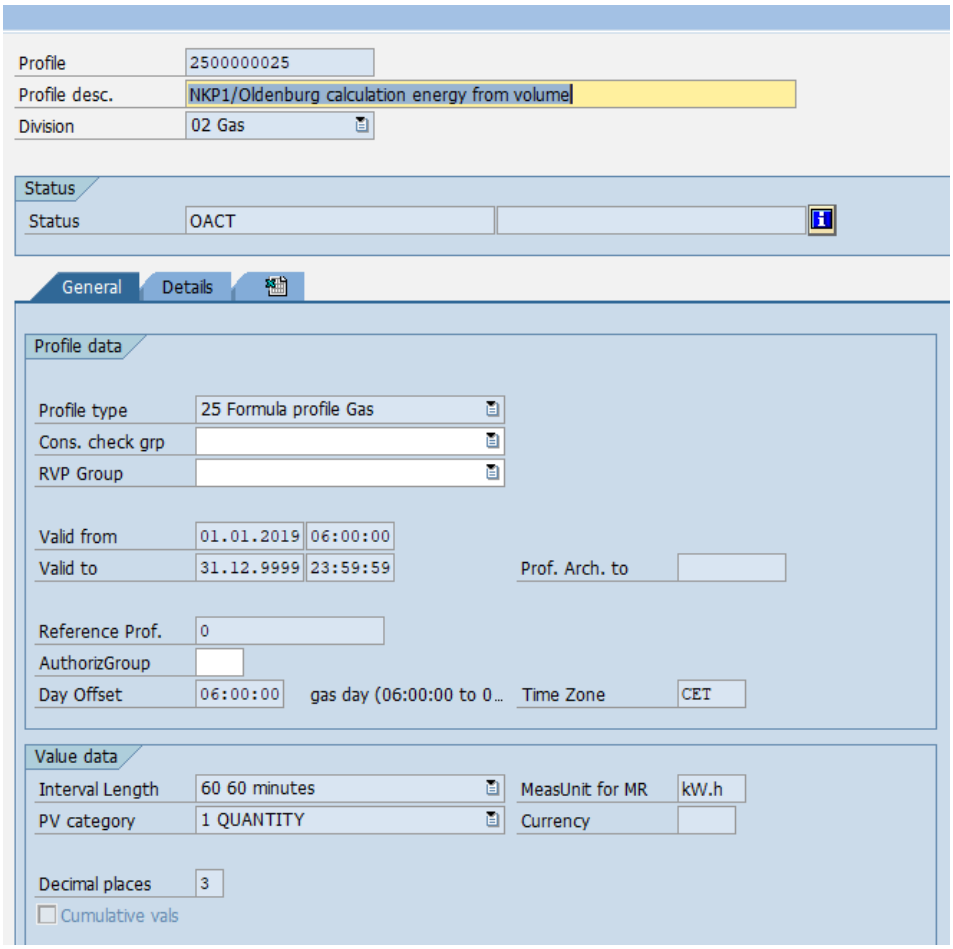


Figure 42: TQD formula profile header

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

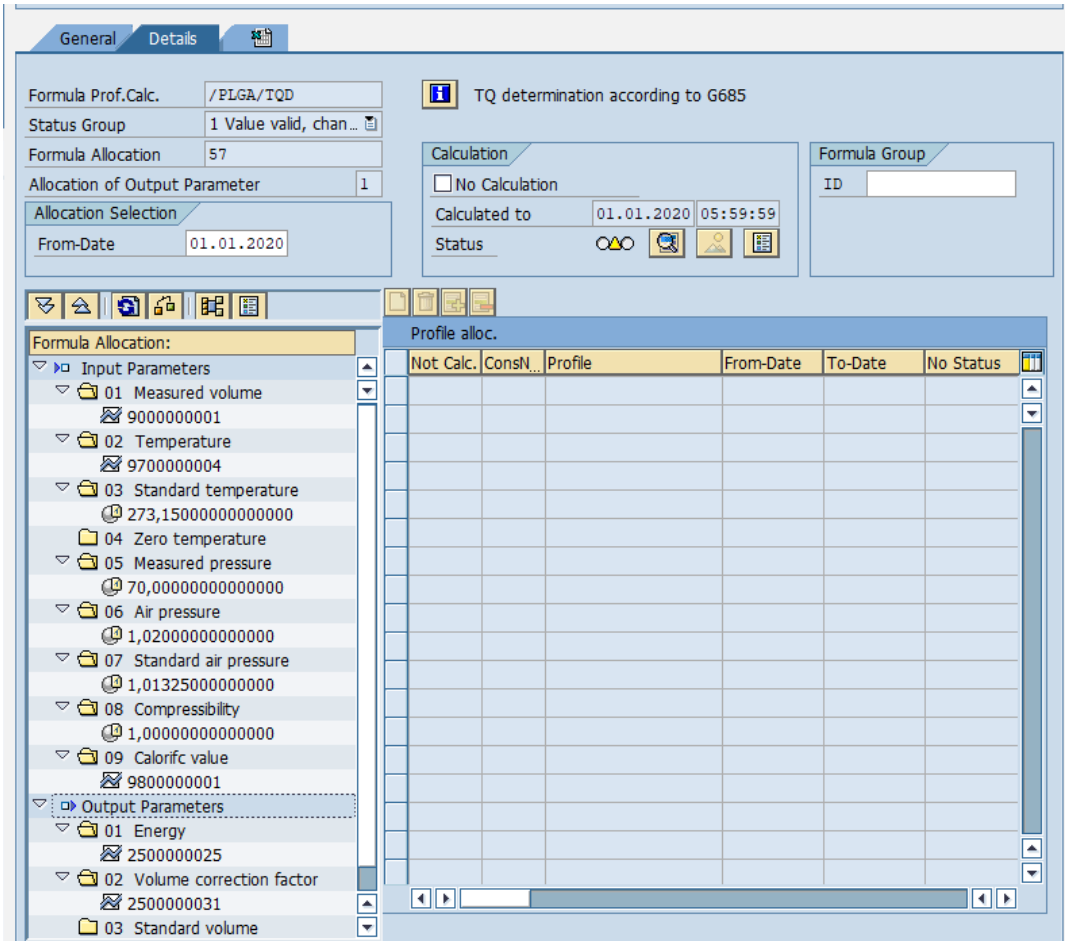


Figure 43: TQD formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It contains all in- and output parameters of the formula. There are nine inputs and two outputs for the formula shown here.

The first input is the measures volume (profile)

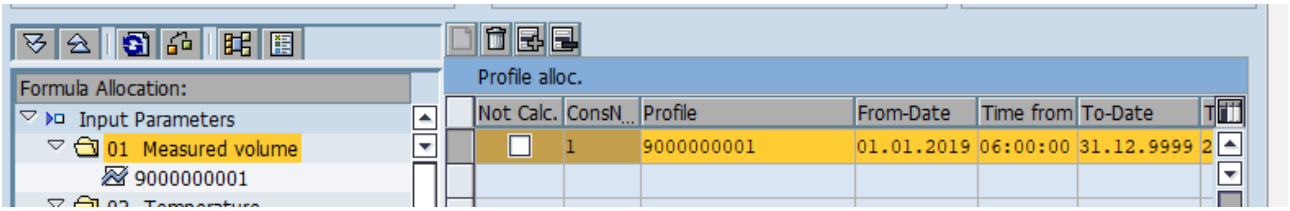


Figure 44: TQD formula profile input 1

The second input is the temperature (profile)

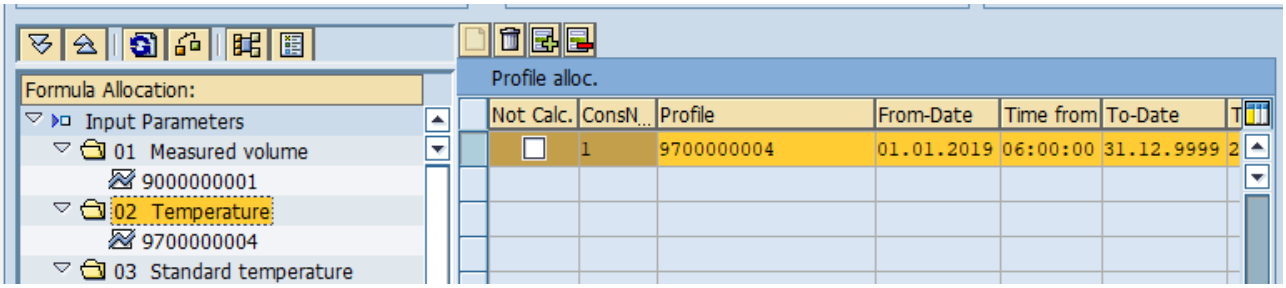


Figure 45: TQD formula profile input 2

The third input is the standard temperature (constant value).

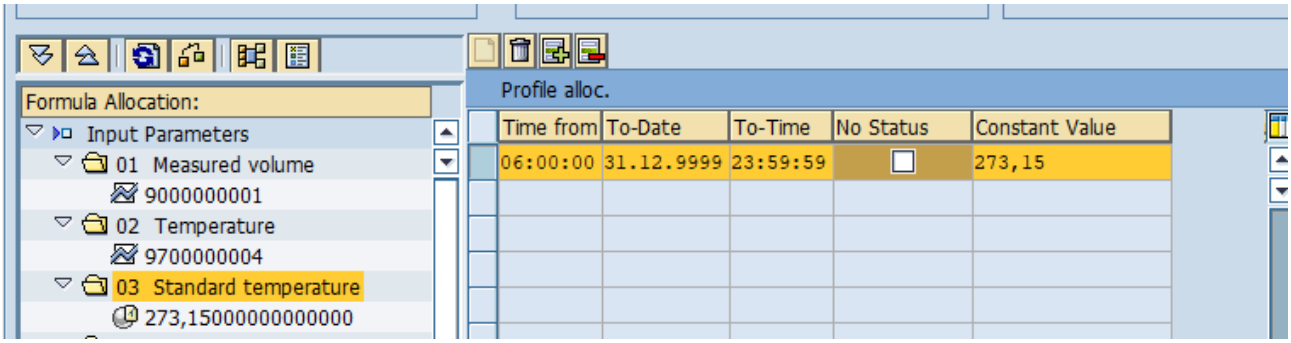


Figure 46: TQD formula profile input 3

The fourth input is the zero temperature (constant value).

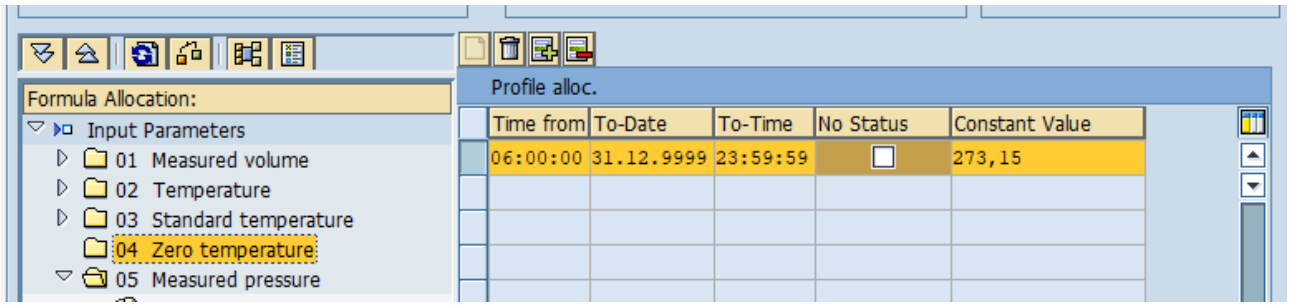


Figure 47: TQD formula profile input 4

The fifth input is the measured pressure (constant value).

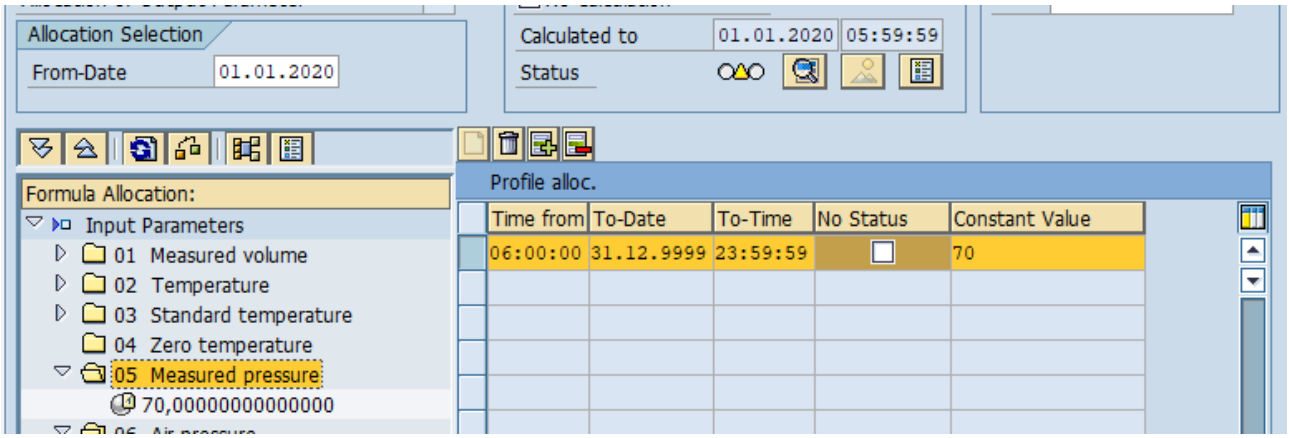


Figure 48: TQD formula profile input 5

The sixth input is the air pressure (constant value or profile).

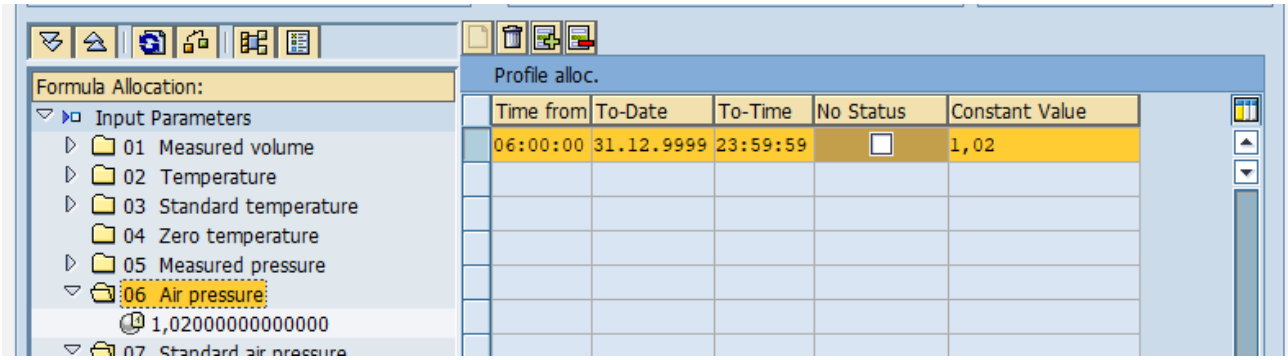


Figure 49: TQD formula profile input 6

The seventh input is the standard air pressure (constant value).

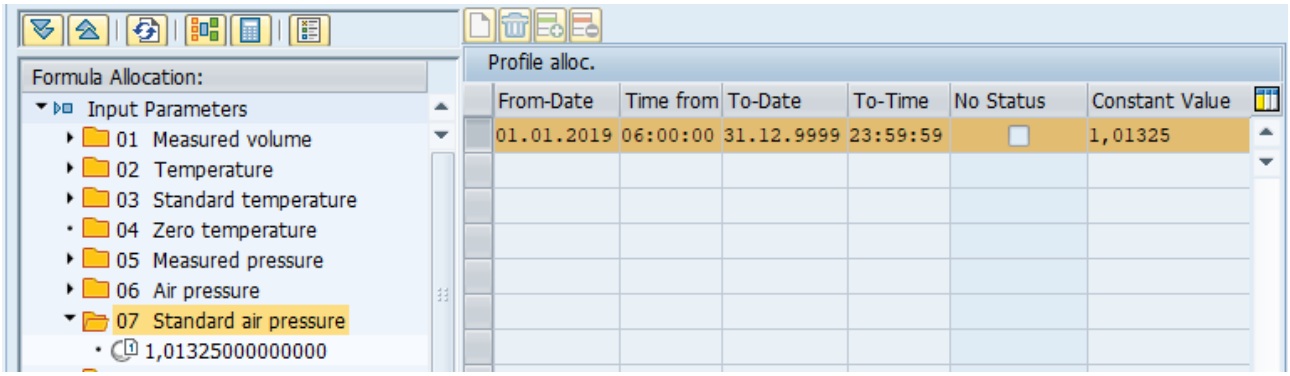


Figure 50: TQD formula profile input 7

The eighth input is the compressibility (constant value).

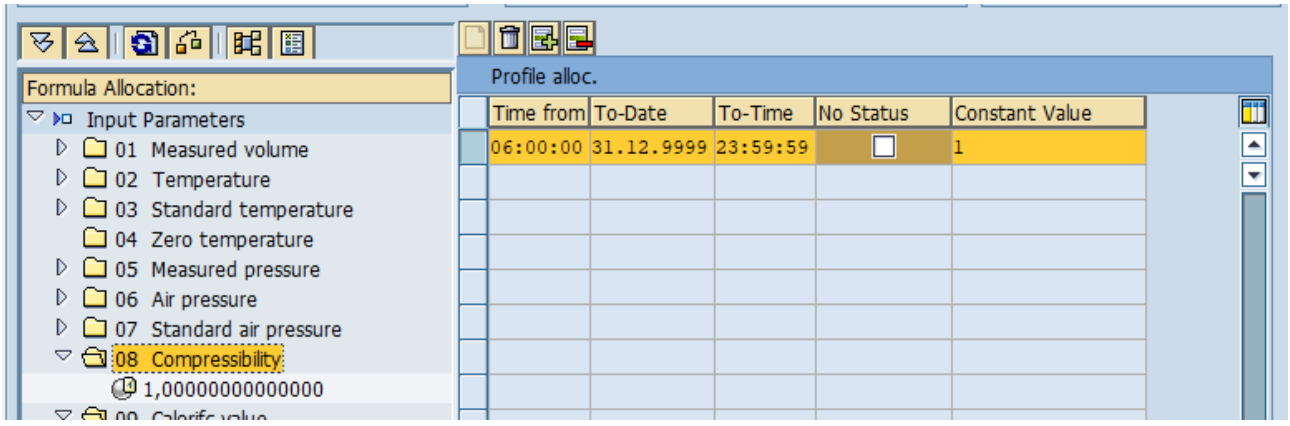


Figure 51: TQD formula profile input 8

The ninth input is the calorific value (profile)

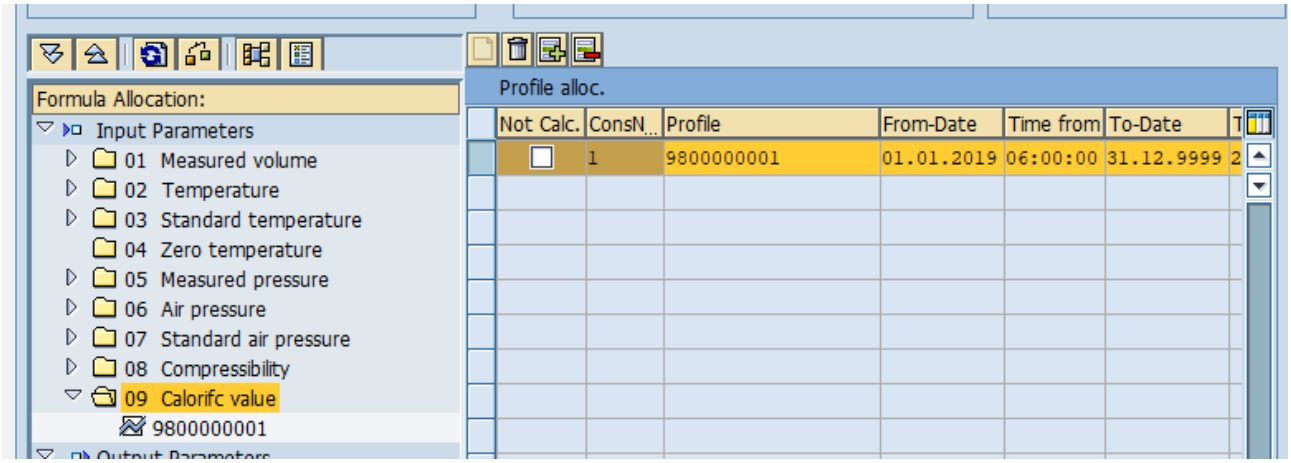


Figure 52: TQD formula profile input 9

The output parameter is filled out automatically, since it is the current created/edited formula profile. After saving, a new formula profile for the second output parameter must be created.

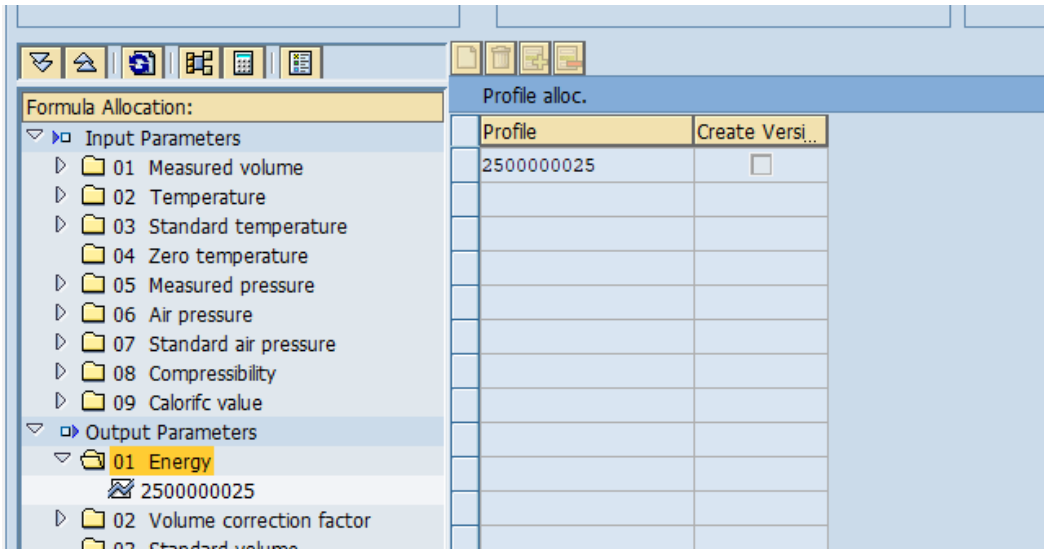


Figure 53: TQD formula profile output parameter 1

For the second output parameter a new formula profile must be created.

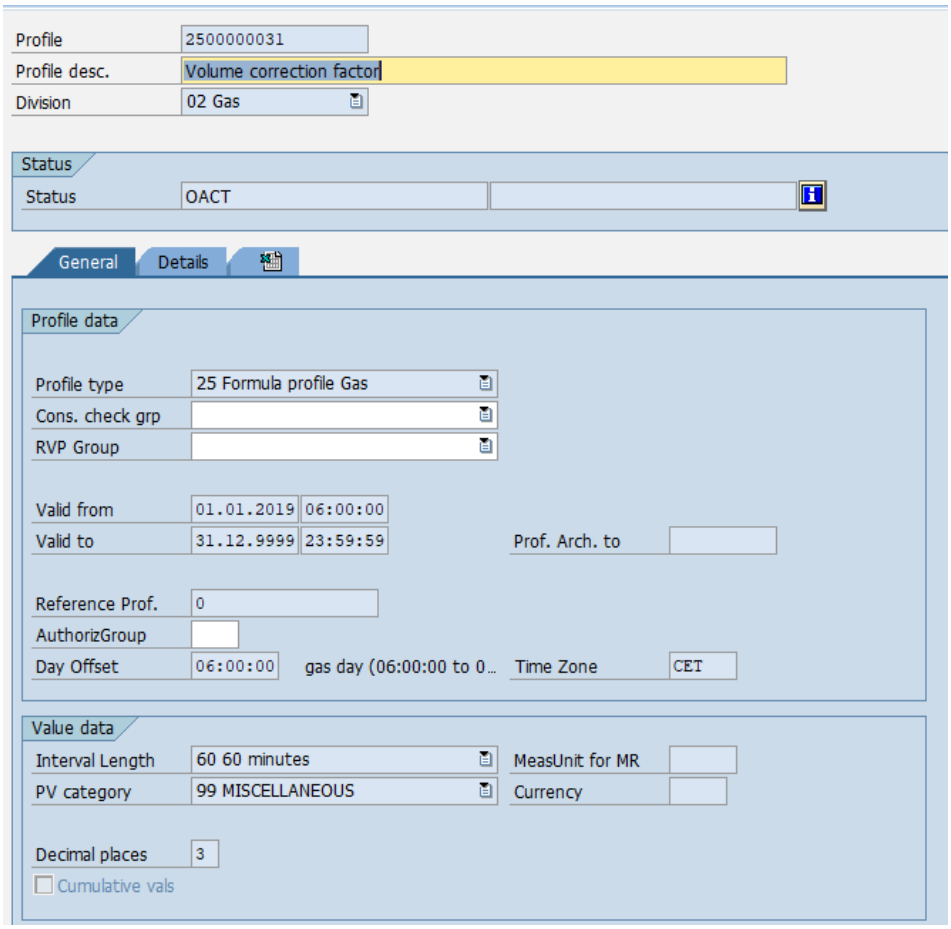


Figure 54: TQD formula profile for output parameter 2 – general data

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

On the tab "Details" there must be enter the following information:

- Formula Prof. Calc
- Status Group
- Formula Allocation from the previous created profile
- Allocation of Output parameter = 2

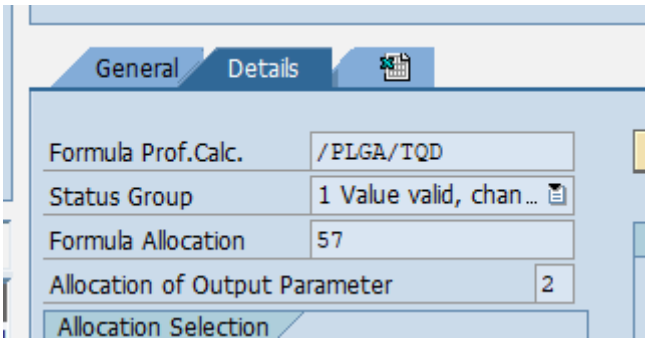


Figure 55: TQD formula profile for output parameter 2 – Details

By pressing the "ENTER" all required information are filled automatically. After saving the profile the second output parameter is created.

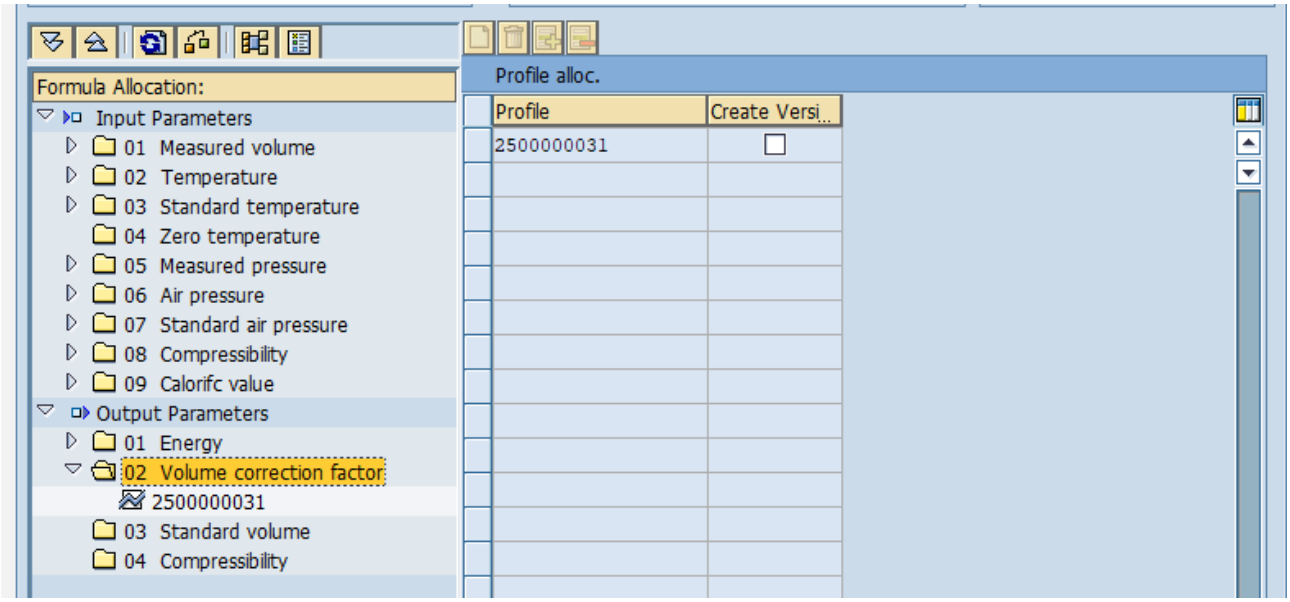


Figure 56: Formula profile for output parameter 2 – Details 2

6.2 Determination of Compressibility after DVGW

Within this functionality, the calculation of compression factors implementing "ISO 12213 Part 3: Calculation using physical properties" also known as an SGERG-88 equation. Implementation passes the validation test in ISO 12213-3 Annex C Parameters 1 to 6 are mapped to the input parameters of SGERG-88 with the sole exception of parameter 5 expecting kwh/m³ instead of MJ/m³. Parameter 7 serves as a conversion base for processing percentages based on either 1 or 100. Parameter 8 is needed for controlling the conversion of absolute density measured in kg/m³ to relative density as needed for the calculation. For suiting DVGW G486-B2 in addition to the original calculation a 2nd one is done for calculating the compression factor in normative conditions (Zn). The result is thus given as K = Z / Zn.

A formula must be created for calculating compressibility.

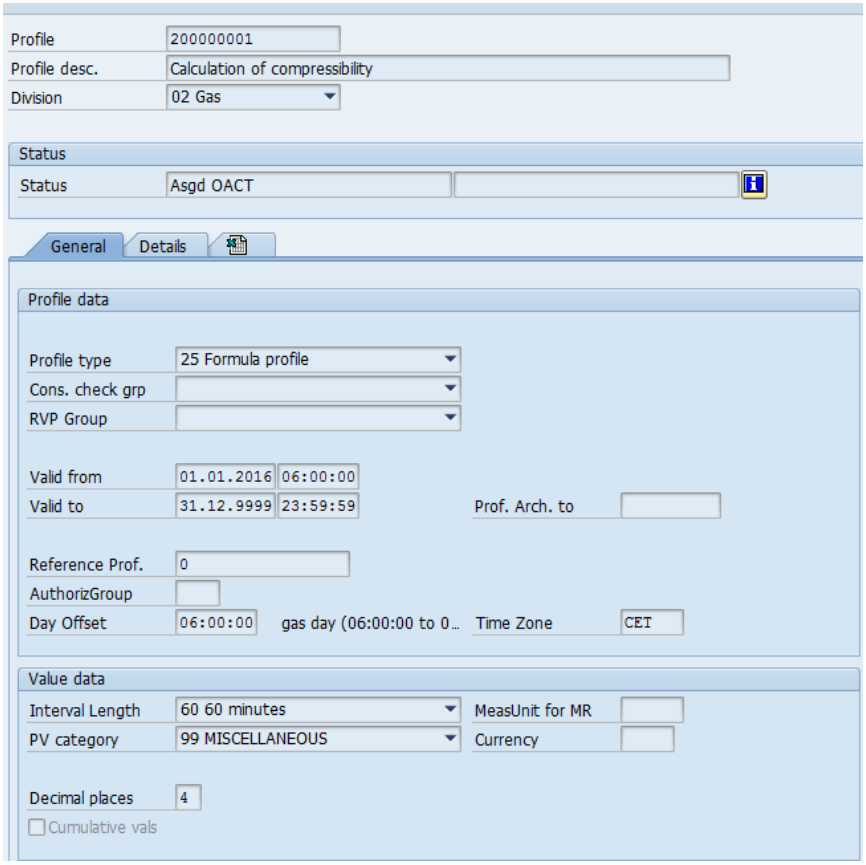


Figure 57: Formula profile for calculating compressibility

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- PV category

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

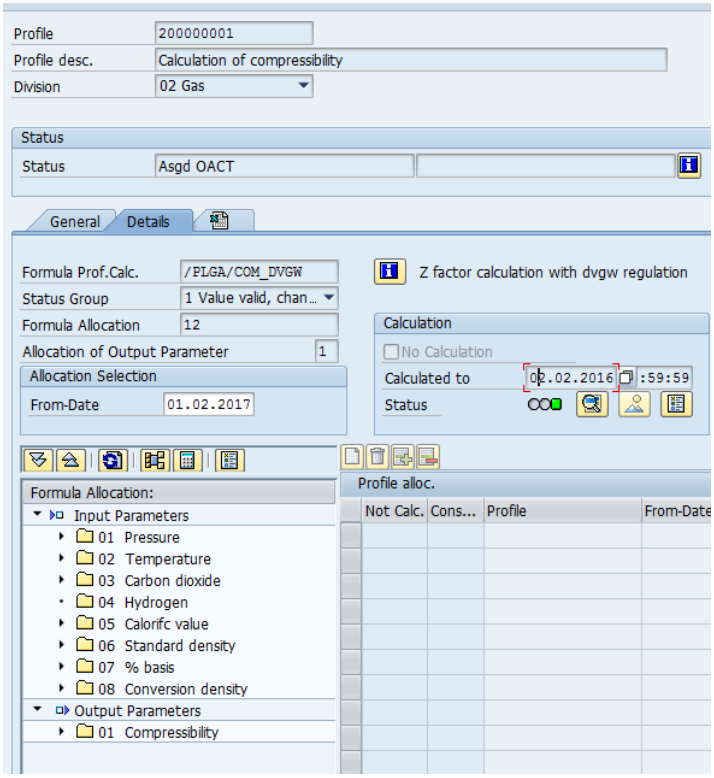


Figure 58: Compressibility formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are eight inputs and one output for the SLP formula shown here.

The first input is the pressure (profile).

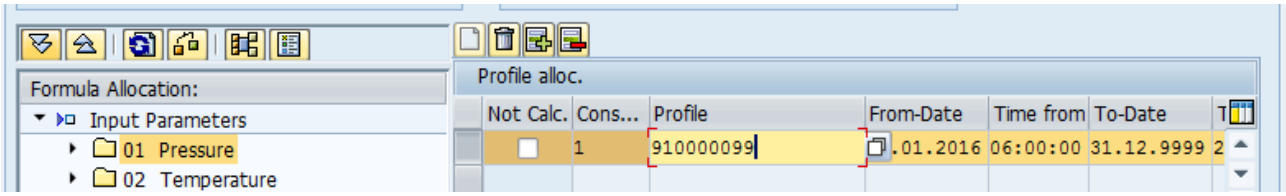


Figure 59: Compressibility formula profile input 1

The second is the temperature (profile).

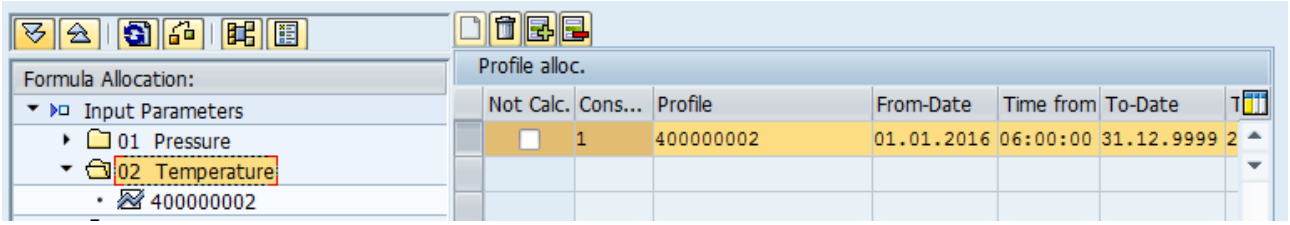


Figure 60: Compressibility formula profile input 2

The third is carbon dioxide (profile or constant value).

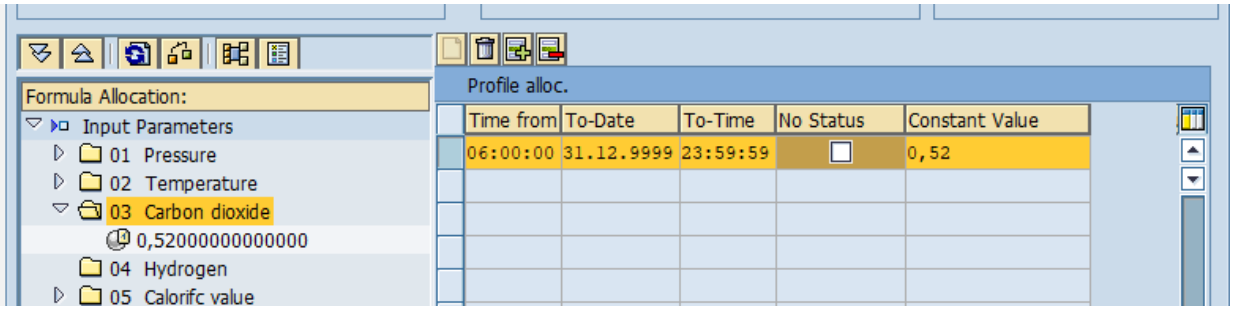


Figure 61: Compressibility formula profile input 3

The fourth is hydrogen (constant value).

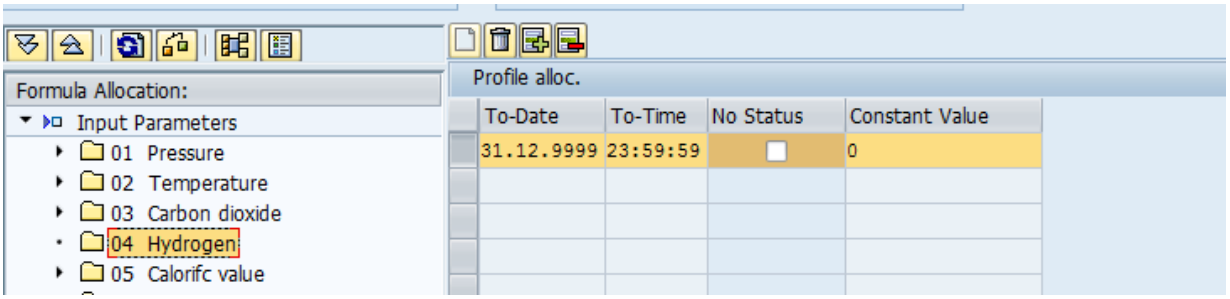


Figure 62: Compressibility formula profile input 4

The fifth is calorific value (constant value or profile).

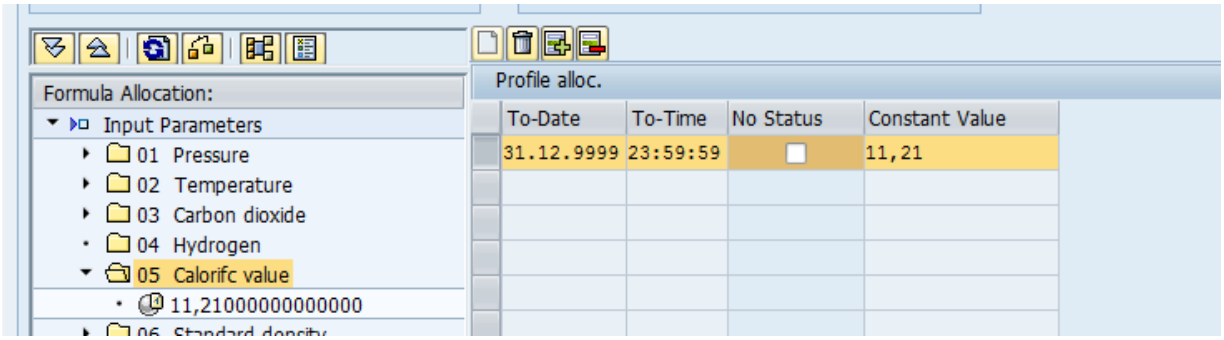


Figure 63: Compressibility formula profile input 5

The sixth is standard density (constant value or profile).

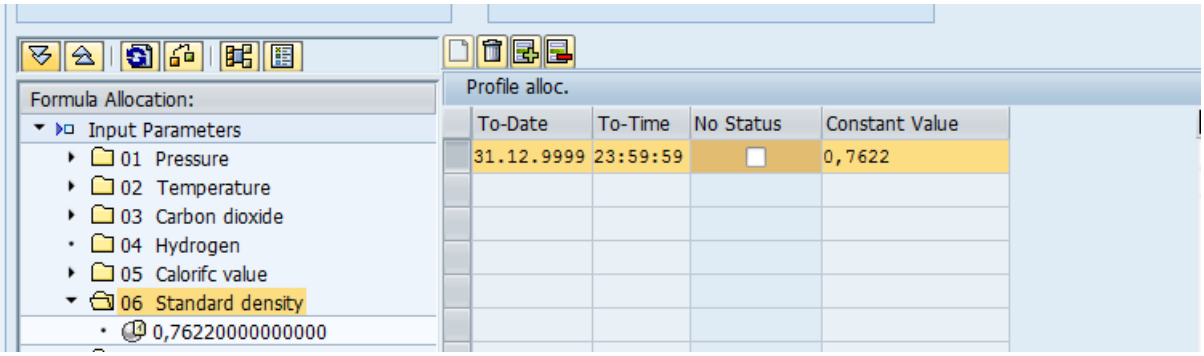


Figure 64: Compressibility formula profile input 6

The seventh is the % basis (constant value 1 or 100).

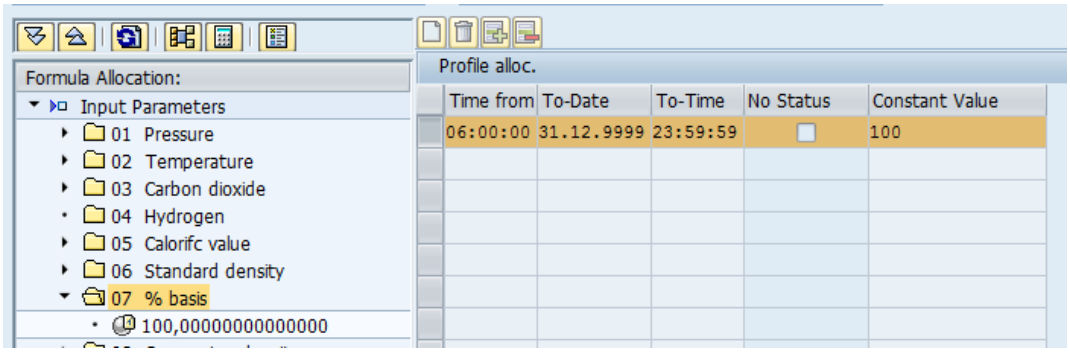


Figure 65: Compressibility formula profile input 7

The eighth is the conversion density (constant value).

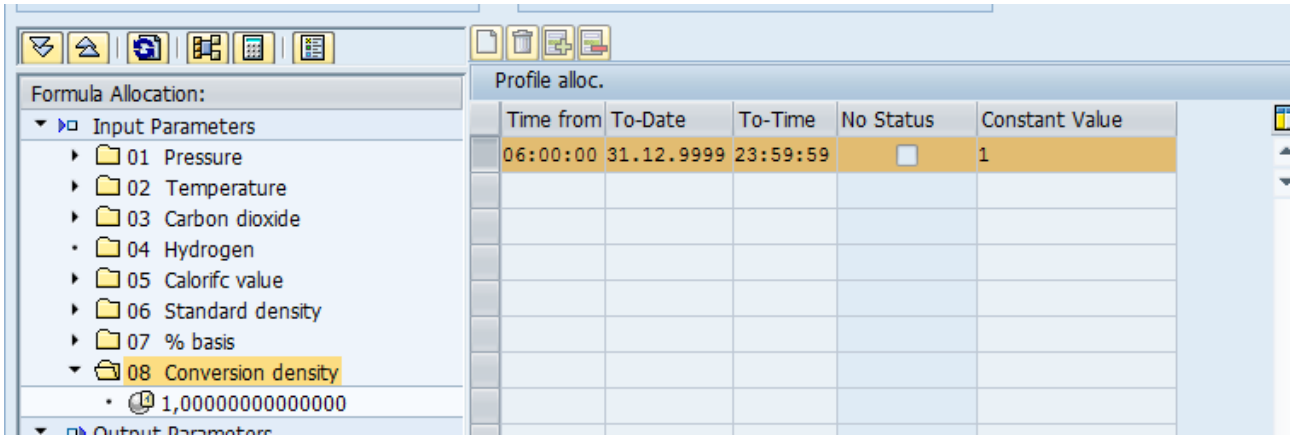


Figure 66: Compressibility formula profile input 8

The output parameter is filled out automatically since it is the currently created/edited formula profile.

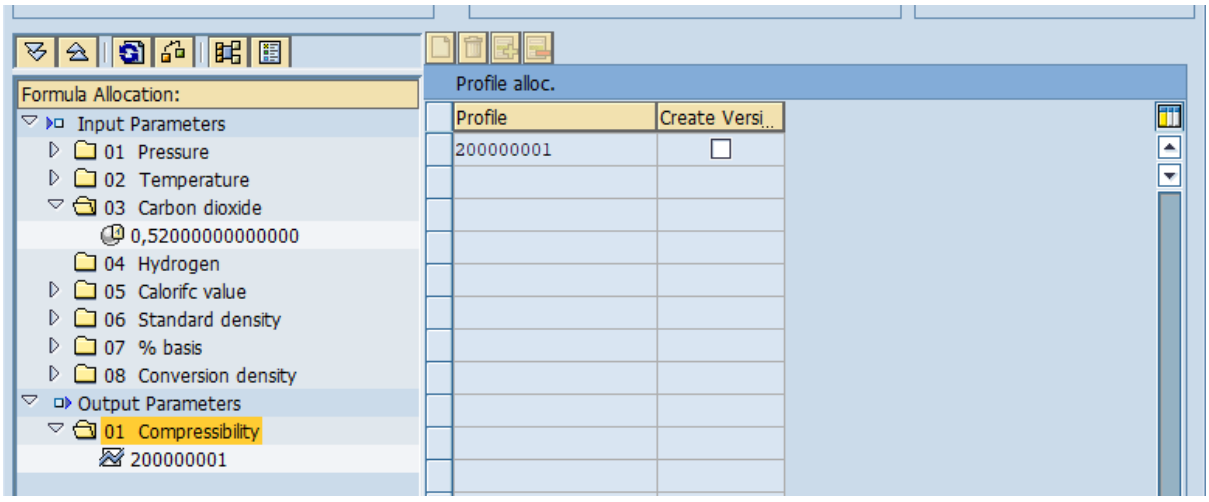


Figure 67: Compressibility formula profile output parameter 1

6.3 Determination of Compressibility using AGA8

As part of the state volume conversion (SVC), using *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* carries out the conversion of the operating volume of a gas quantity into the standard volume. The operating pressure of the gas, the gas temperature and the compressibility number serve as input variables.

The compressibility (K) or K-number is calculated in using *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by according to the American Gas Association standard, which the association describes in its Report 8 (AGA 8) Has. Due to the higher accuracy, the DVGW will make this procedure mandatory from 2011. In SAP® Energy Data Management, add-on for gas regulatory compliance by PROLOGA, the algorithm is implemented in accordance with the standards and thus enables the gas network operator (DSO) to create legal-for-trade substitute values even at high operating pressures.

To calculate the input variable K, the substance proportions of the 21 leading gas components are evaluated in this process. In contrast to the classic calculation algorithm according to GERG 88, the calculation of the K number here is based on a full analysis of the gas. To calculate the compressibility, the input values for the substance quantities of the 21 gas components, as well as gas pressure and temperature are received by the ZFA and processed in the calculation module (formula profile) for the K number.

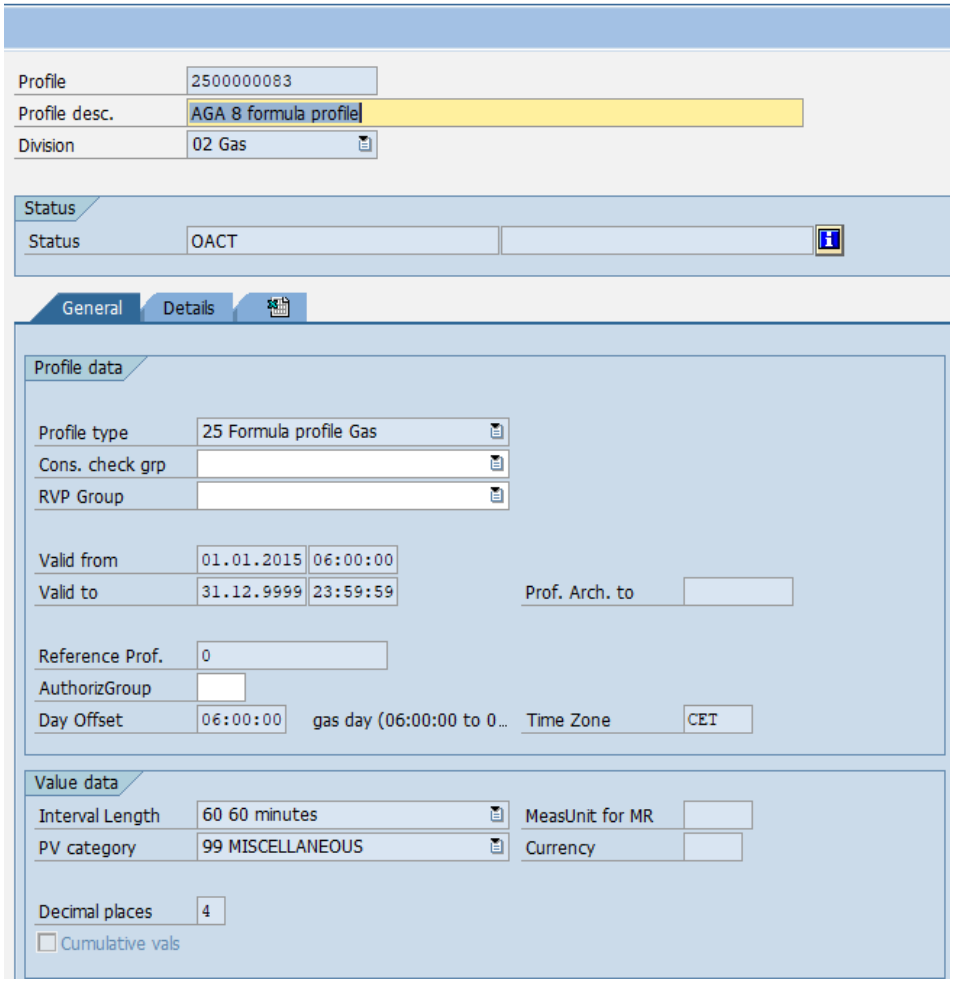


Figure 68: AGA 8 formula profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

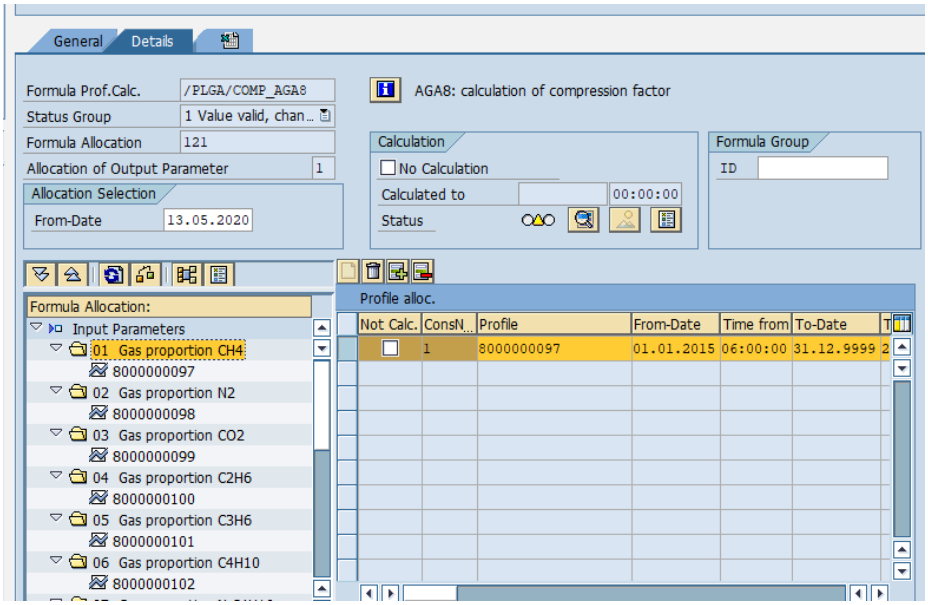


Figure 69: AGA 8 formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in- and output parameters of the formula. There are twentythree inputs and one output for the formula shown here. Twentyone of the inputparameters represents the gas elements.

The first is the gas proportion CH4 (profile)

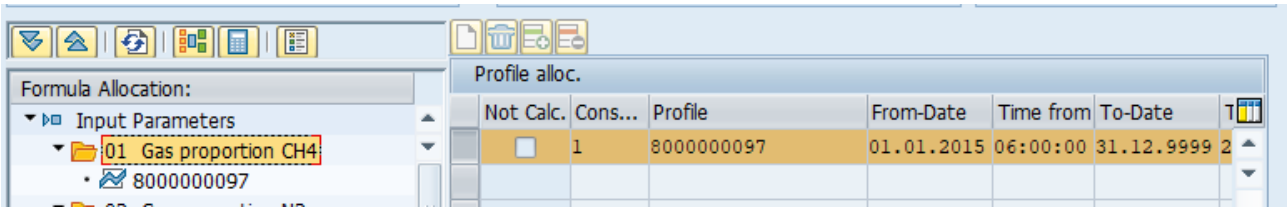


Figure 70: AGA 8 formula profile input 1

The second is the gas proportion N2 (profile)

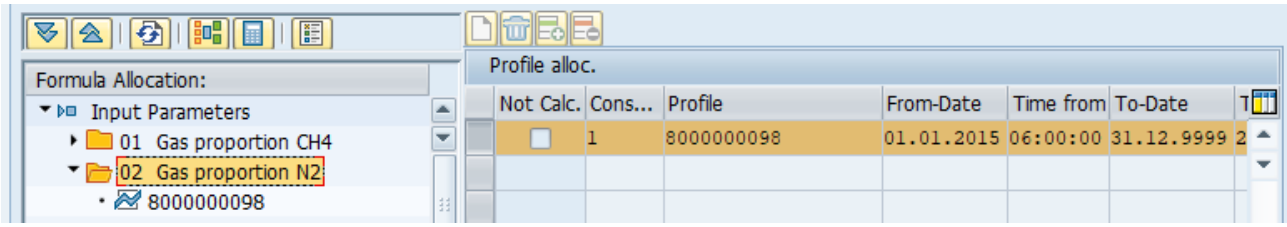


Figure 71: AGA 8 formula profile input 2

The third is the gas proportion CO2 (profile)

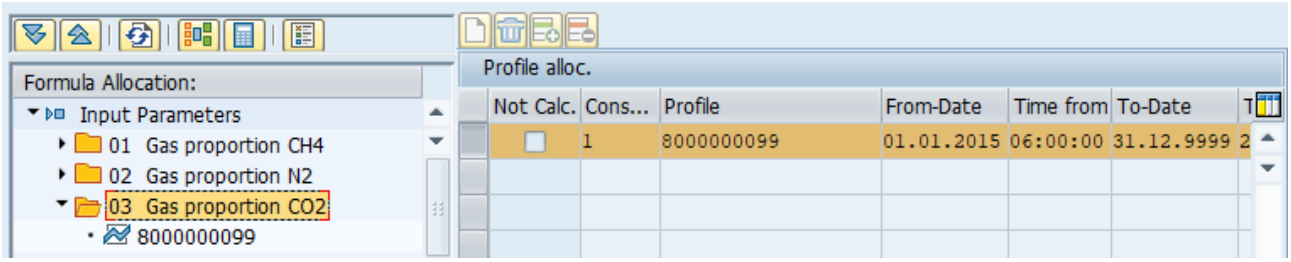


Figure 72: AGA 8 formula profile input 3

The fourth is the gas proportion C2H6 (profile)

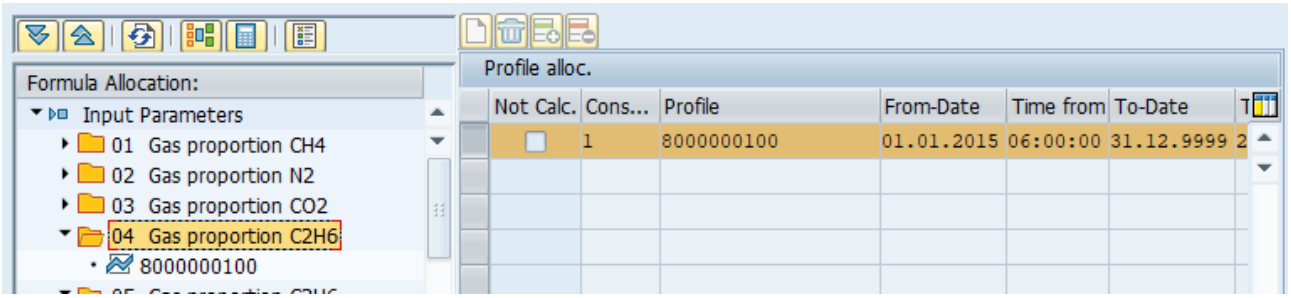


Figure 73: AGA 8 formula profile input 4

The fifth is the gas proportion C3H6 (profile)

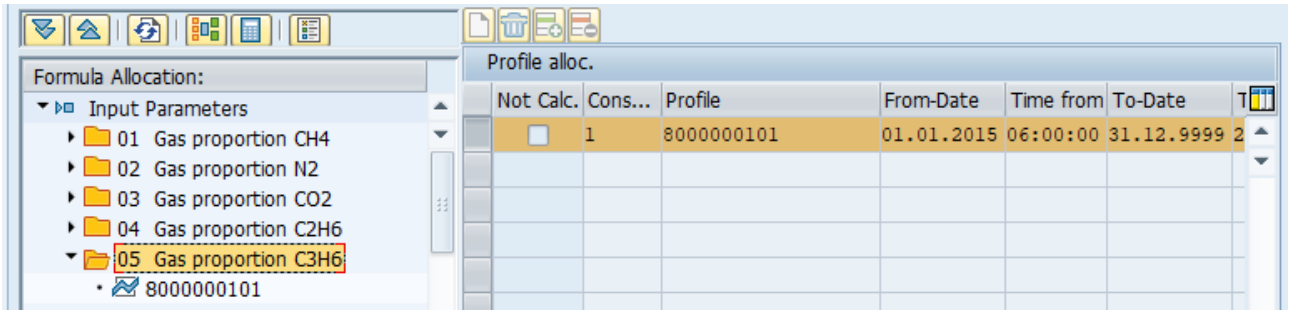


Figure 74: AGA 8 formula profile input 5

The sixth is the gas proportion C4H10 (profile)

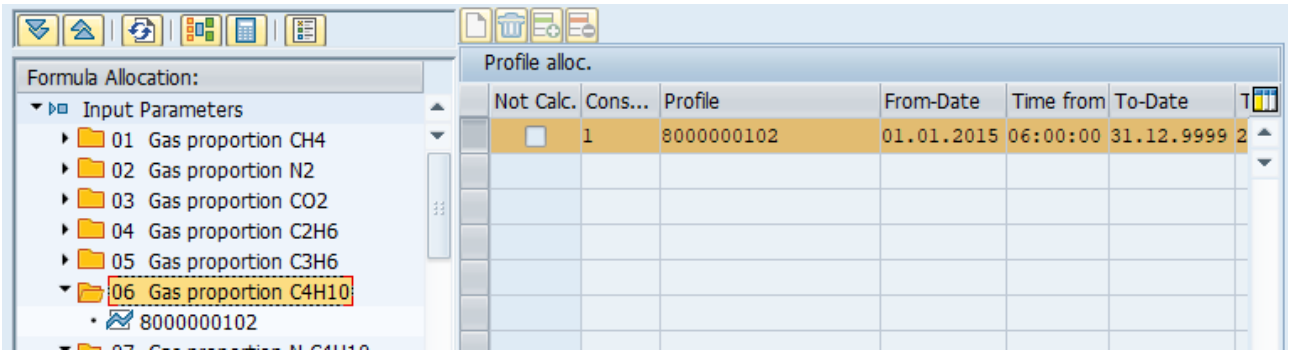


Figure 75: AGA 8 formula profile input 6

The seventh is the gas proportion N-C4H10 (profile)

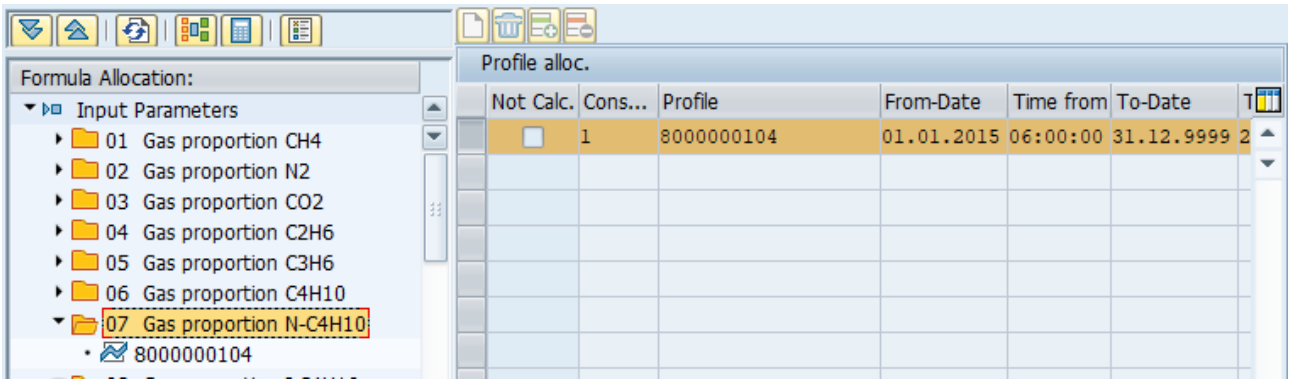


Figure 76: AGA 8 formula profile input 7

The eighth is the gas proportion I-C4H10 (profile)

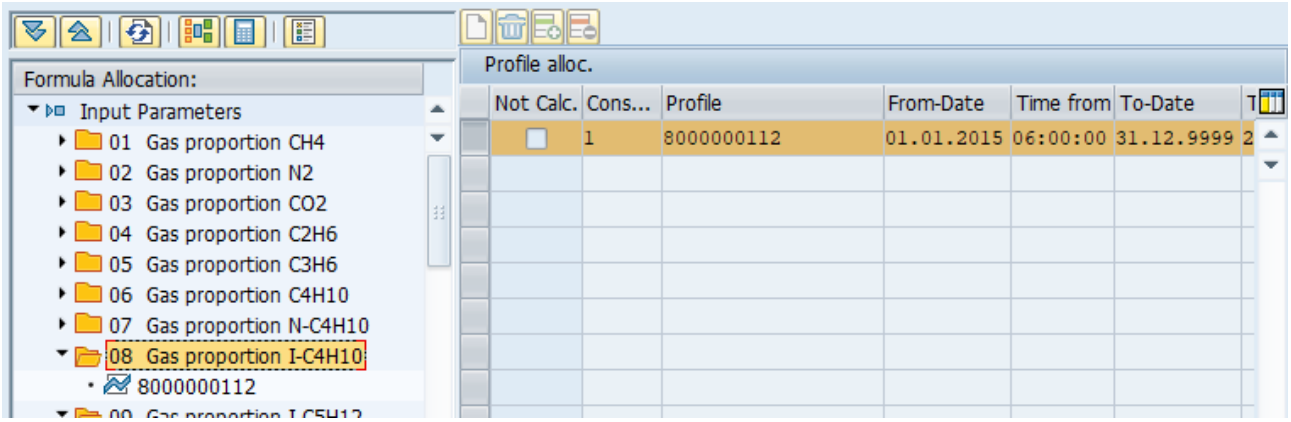


Figure 77: AGA 8 formula profile input 8

The ninth is the gas proportion I-C5H12 (profile)

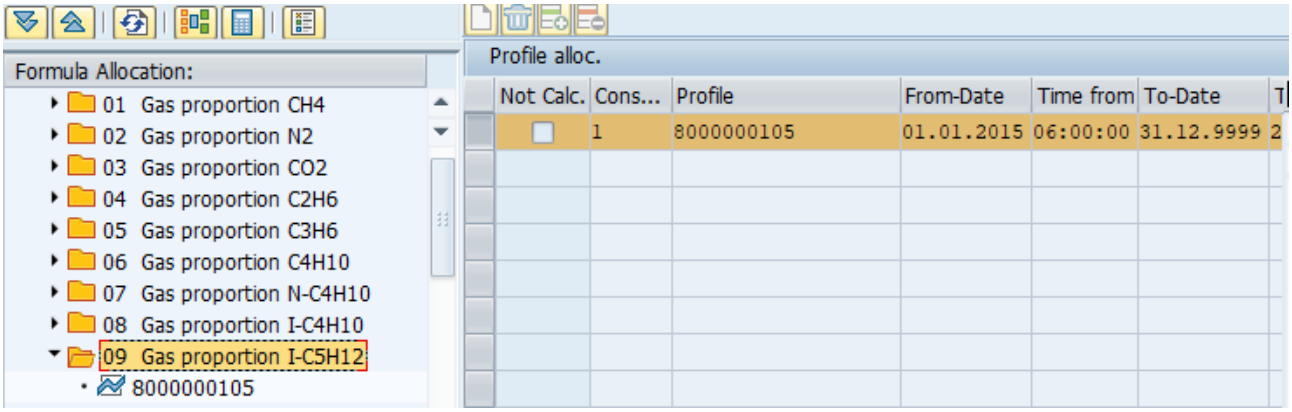


Figure 78: AGA 8 formula profile input 9

The tenth is the gas proportion N-C6 (profile)

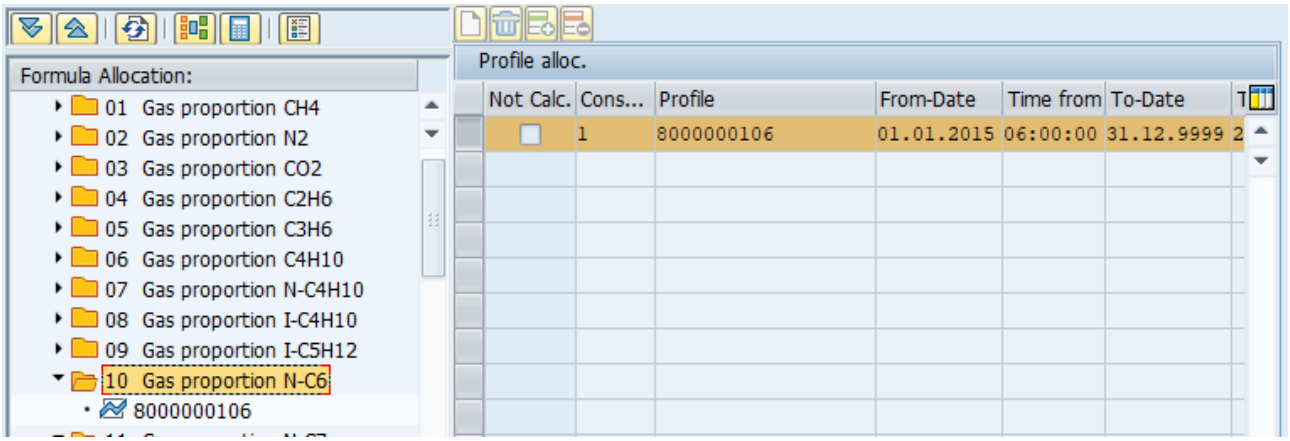


Figure 79: AGA 8 formula profile input 10

The eleventh is the gas proportion N-C7 (profile)

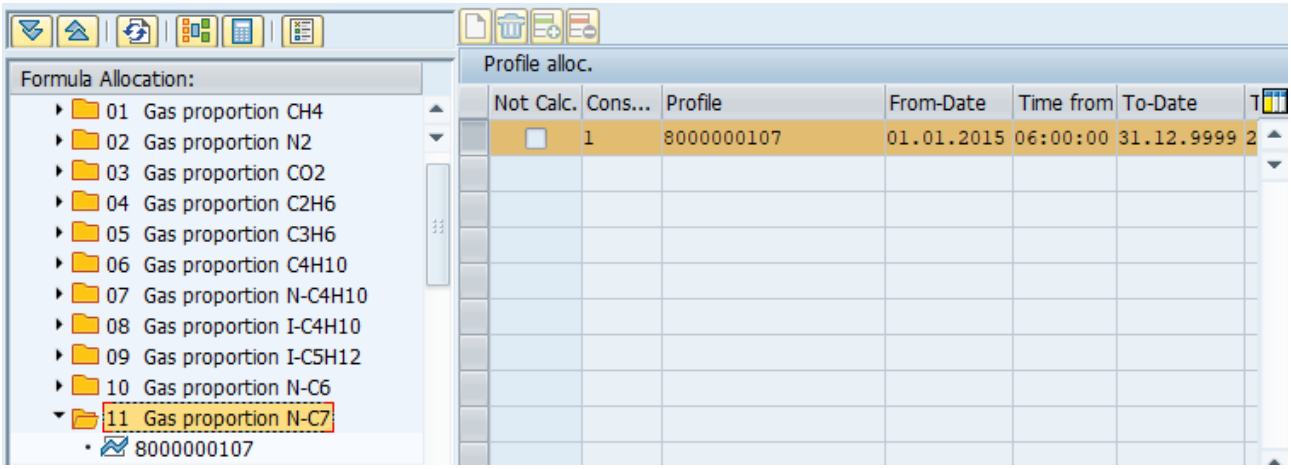


Figure 80: AGA 8 formula profile input 11

The twelth is the gas proportion N-C8 (profile)

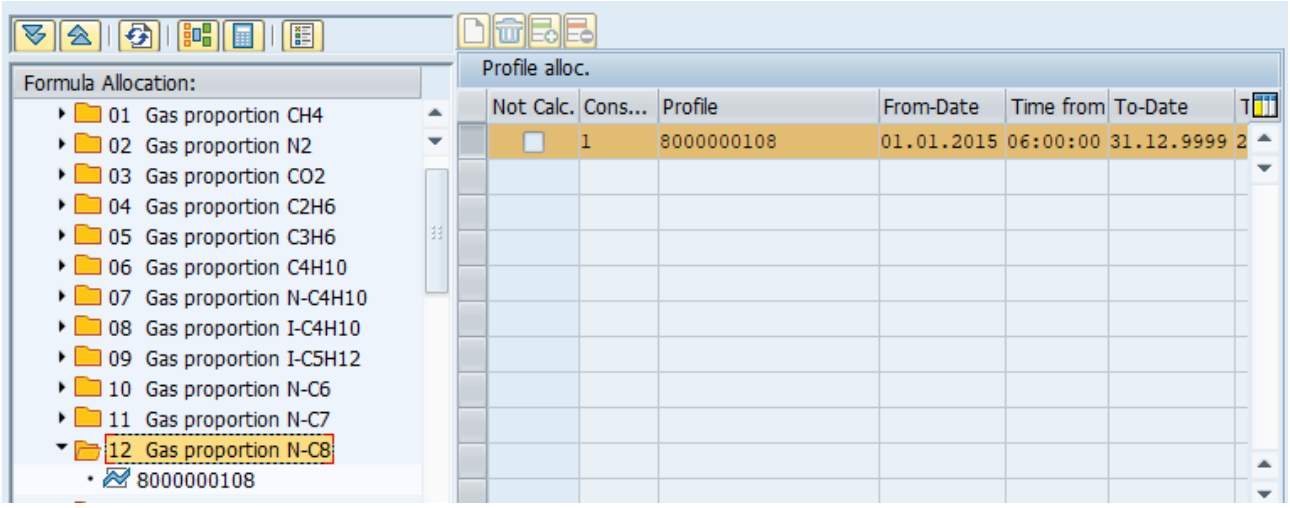


Figure 81: AGA 8 formula profile input 12

The thirteenth is the gas proportion N-C9 (profile)

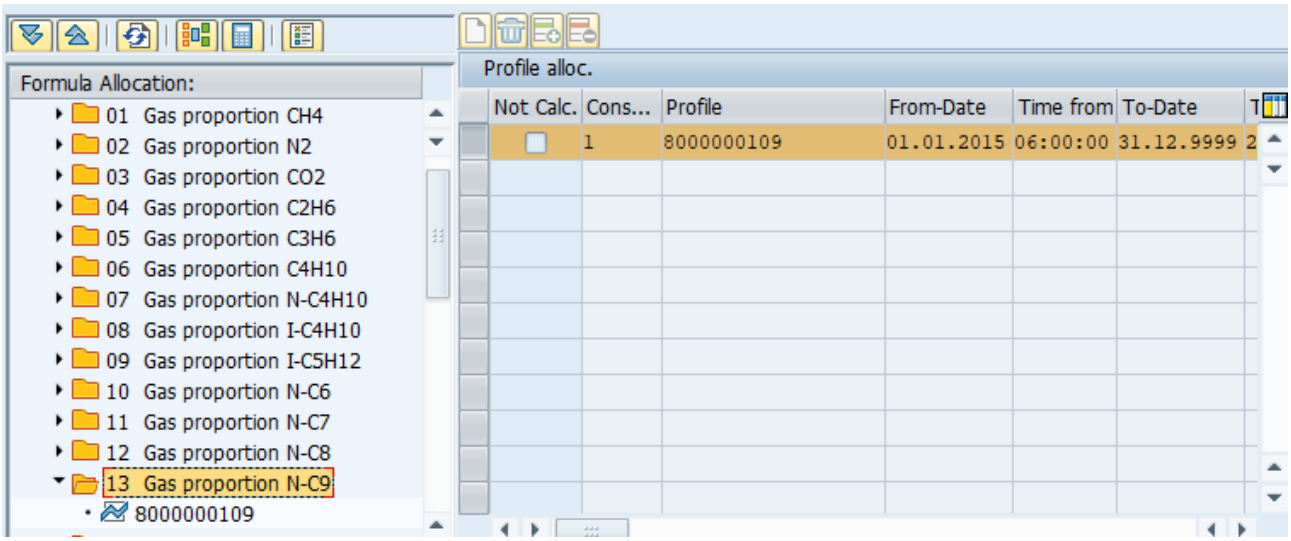


Figure 82: AGA 8 formula profile input 13

The fourteenth is the gas proportion N-C10 (profile)

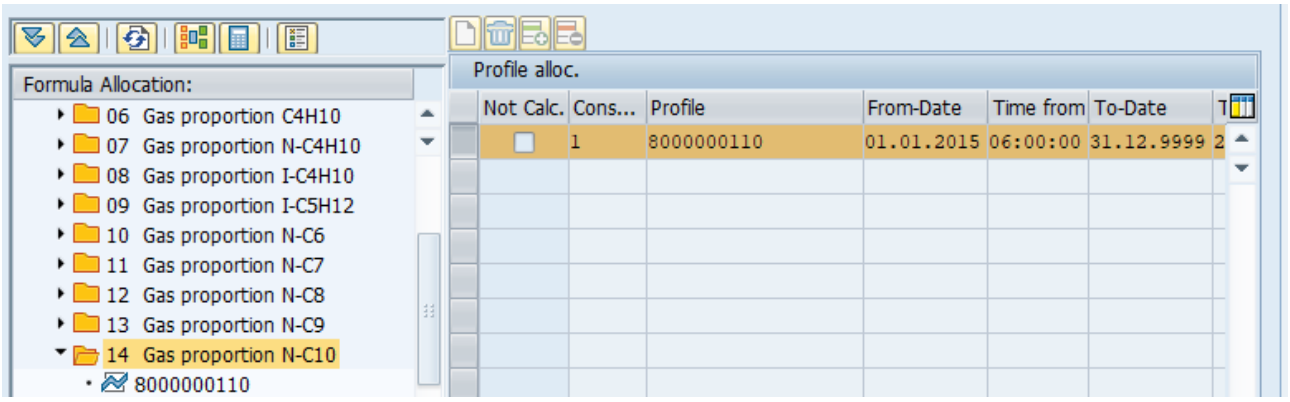


Figure 83: AGA 8 formula profile input 14

The fifteenth is the gas proportion HE (profile)

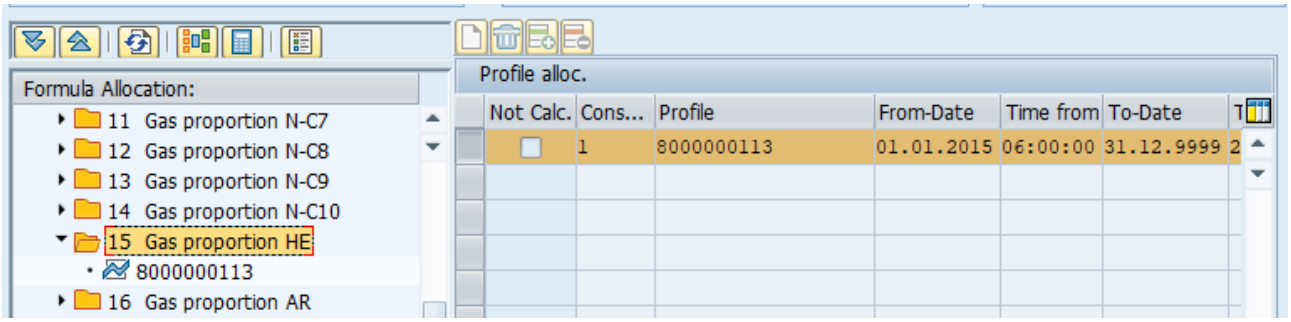


Figure 84: AGA 8 formula profile input 15

The sixteenth is the gas proportion AR (profile)

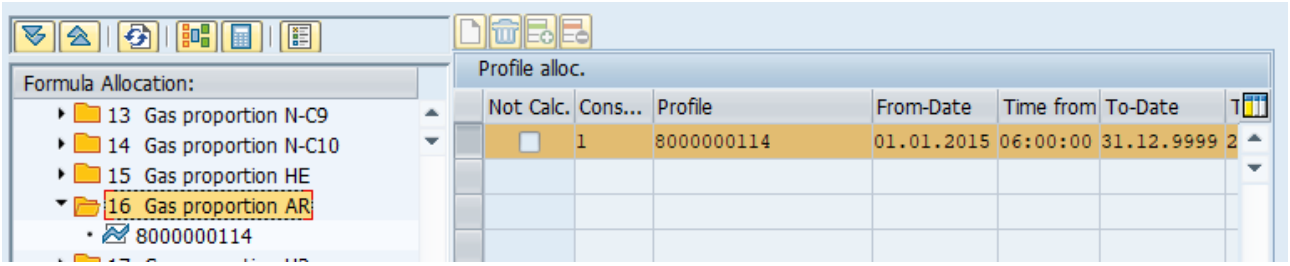


Figure 85: AGA 8 formula profile input 16

The seventeenth is the gas proportion H2 (profile)

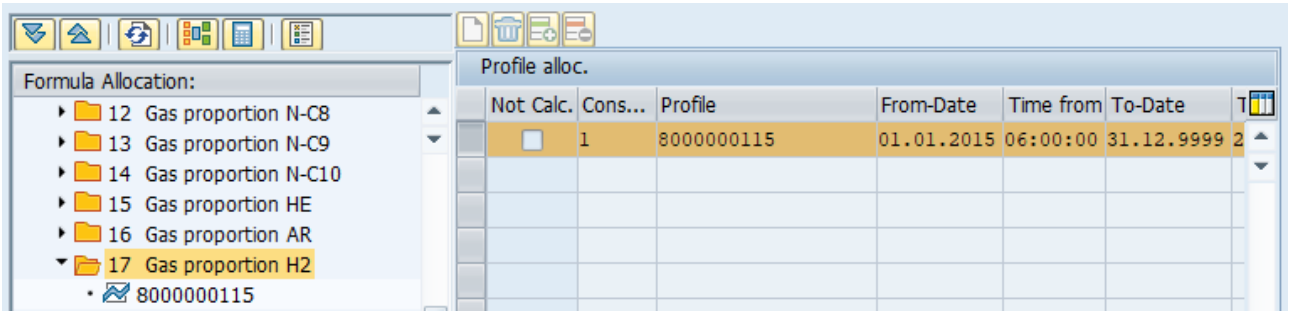


Figure 86: AGA 8 formula profile input 17

The eighteenth is the gas proportion O2 (profile)

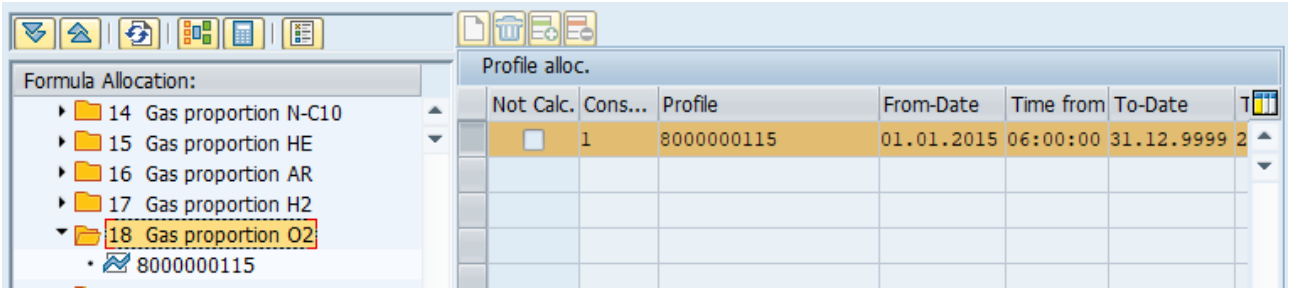


Figure 87: AGA 8 formula profile input 18

The nineteenth is the gas proportion CO (profile)

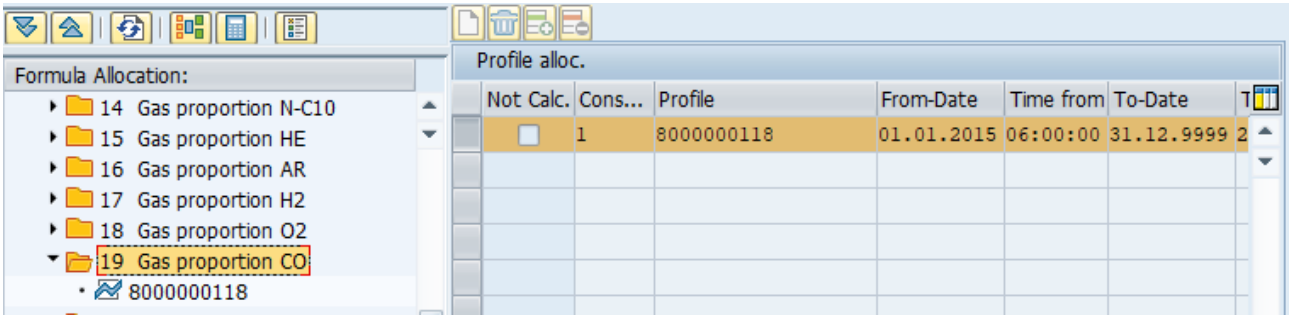


Figure 88: AGA 8 formula profile input 19

The twentieth is the gas proportion H2O (profile)

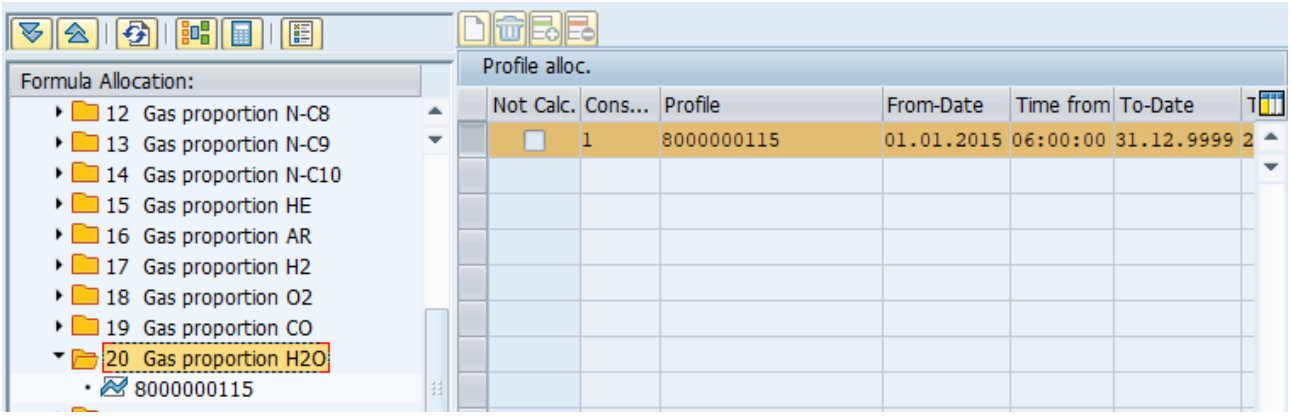


Figure 89: AGA 8 formula profile input 20

The twenty-first is the gas proportion H2S (profile)

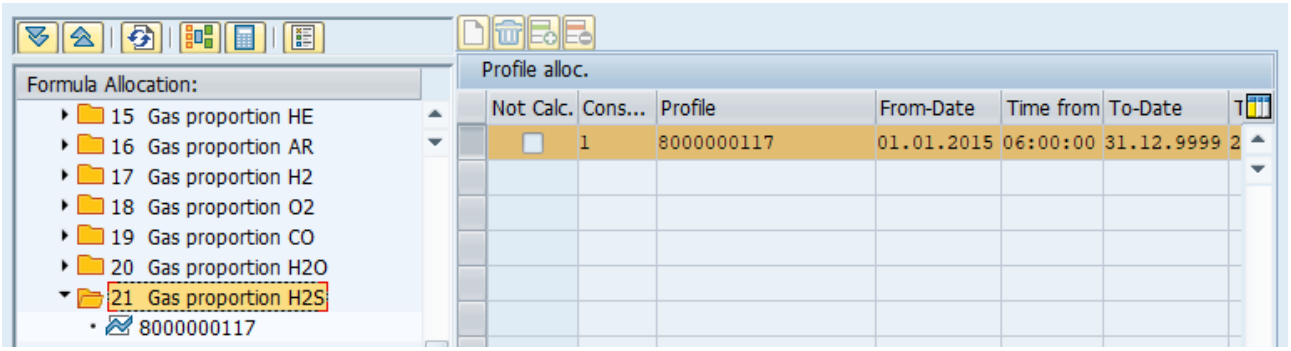


Figure 90: AGA 8 formula profile input 21

The twenty-second is the temperature (profile).

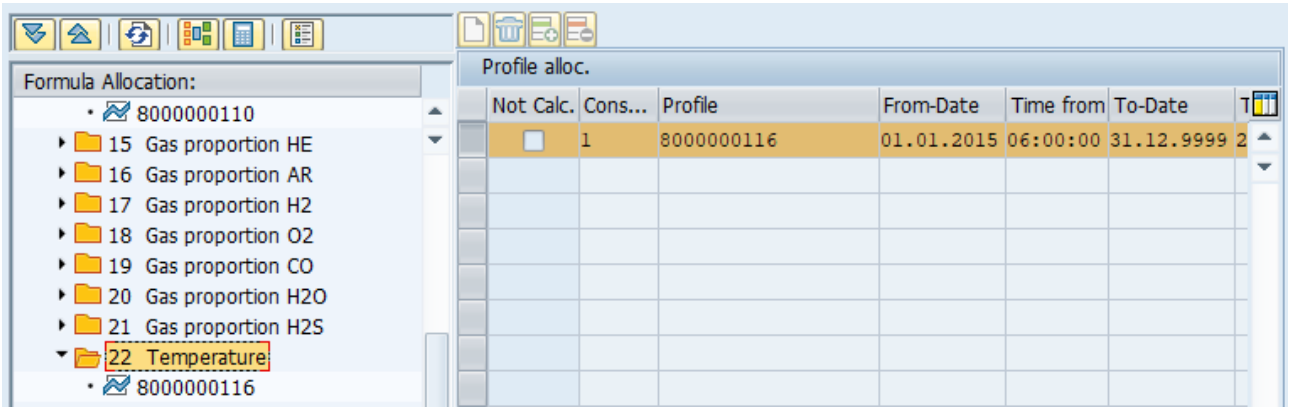


Figure 91: AGA 8 formula profile input 22

The twenty-third is the pressure (profile).

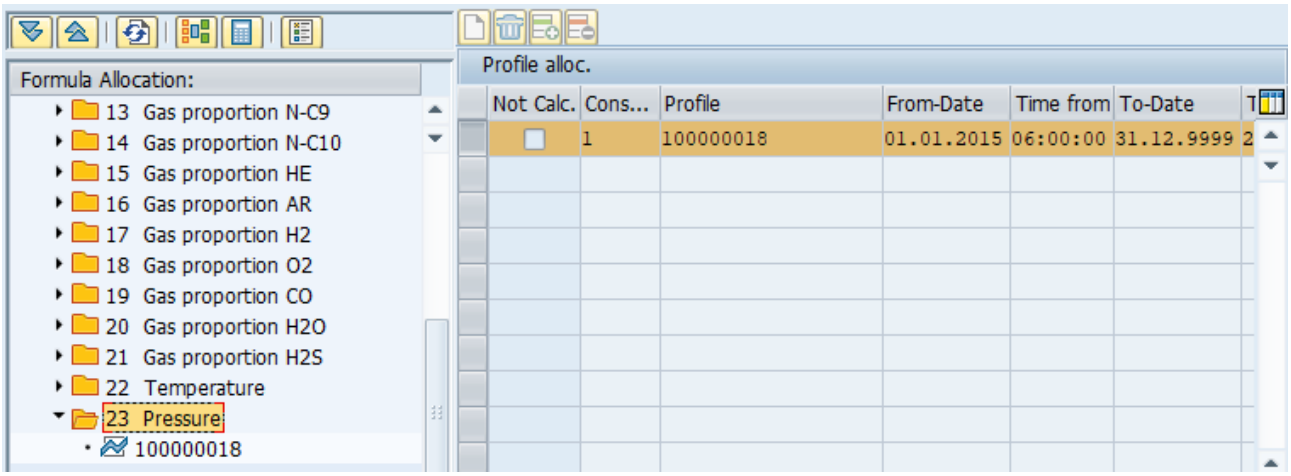


Figure 92: AGA 8 formula profile input 23

The output parameter is filled out automatically since it is the currently created/edited formula profile.

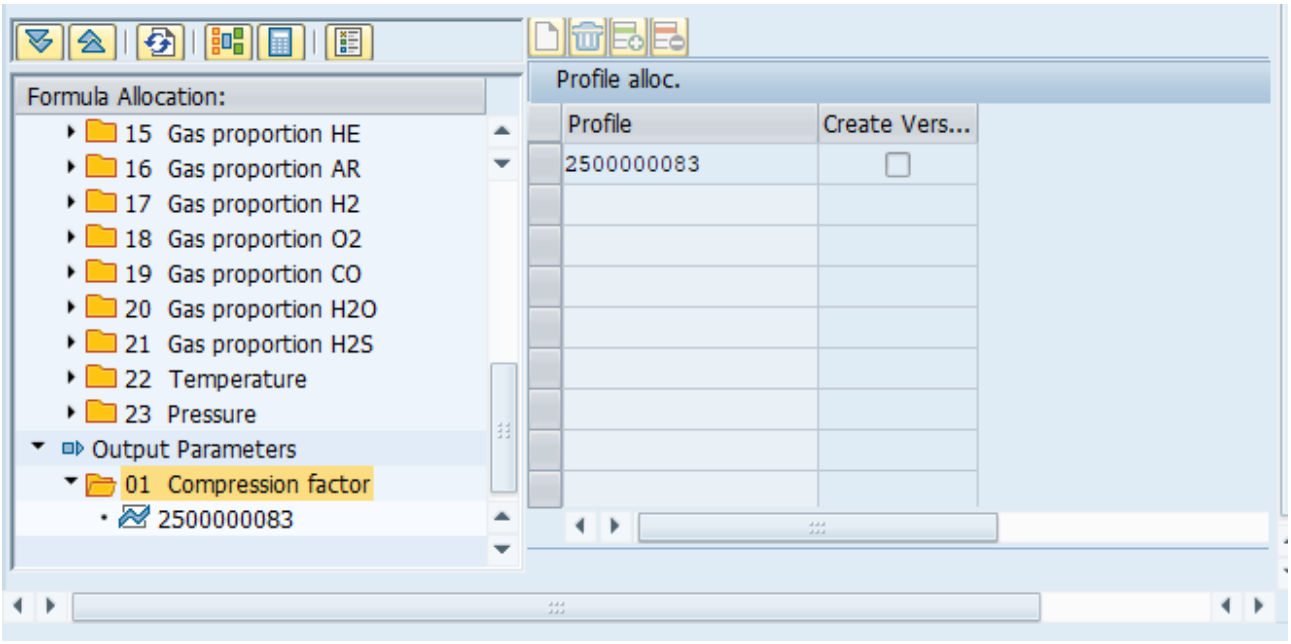


Figure 93: AGA 8 formula profile output

6.4 Determination of compression factors SGERG-88

This function module implements the calculation of compression factors Implementing "ISO 12213 Part 3: Calculation using physical properties" also known as SGERG-88 equation. It's a fairly accurate conversion of the original FORTRAN code to ABAP. Implementation passes the validation test in ISO 12213-3 Annex C Parameters 1 to 6 are mapped to the input parameters of SGERG-88 with the sole exception of parameter 5 expecting kwh/m³ instead of MJ/m³. Parameter 7 serves as conversion base for processing percentages based on either 1 or 100. Parameter 8 is needed for controlling the conversion of absolute density measured in kg/m³ to relative density as needed for the calculation.

In addition to the general information such as profile name, division, validity period, unit, etc., the calculation method and the input parameters are specified in the "Details" tab. Furthermore, the basic setup of the necessary formula is considered a prerequisite.

The following input variables are processed as input parameters for this profile:

- Pressure,
- Temperature,
- Carbon dioxide,
- Hydrogen,
- Calorific value,
- Standard density,
- % basis,
- Conversion density

The calculation provides the following values as output parameters:

• Compressibility

A formula must be created to calculate the compression factor according to SGERG 88.

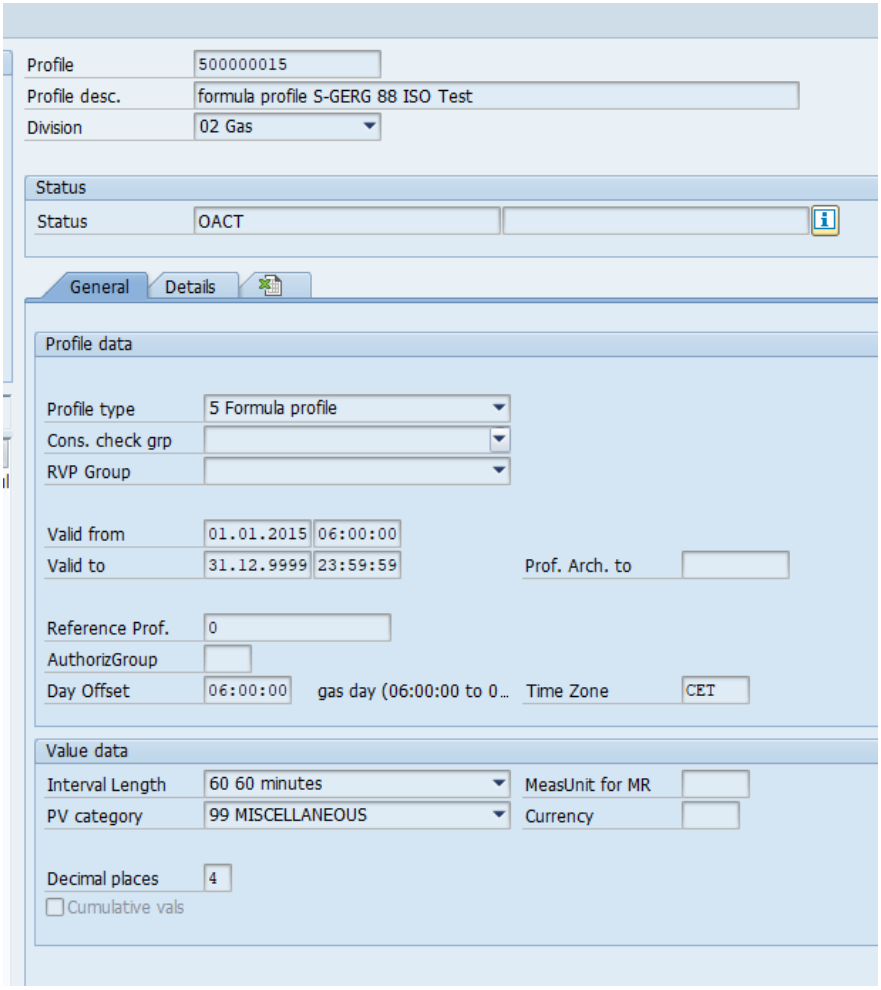


Figure 94: S-GERG 88 formula profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- PV category

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

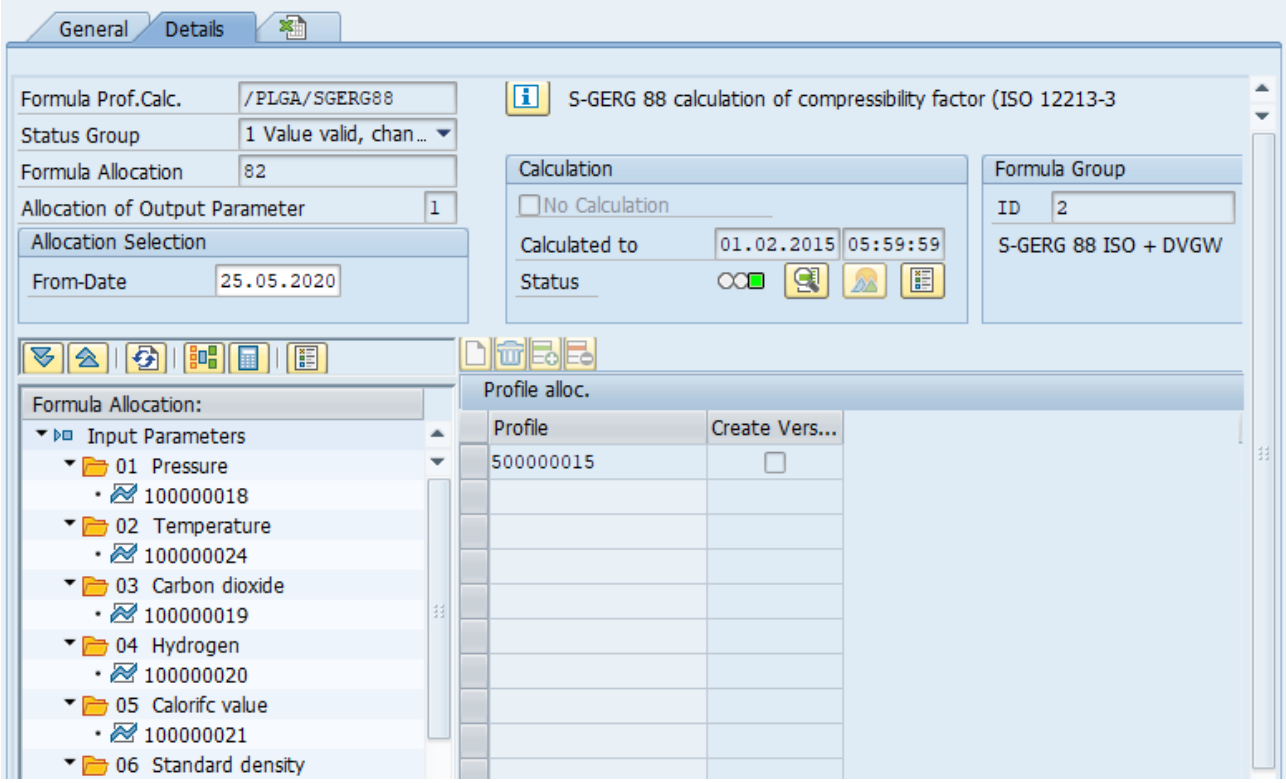


Figure 95: S-GERG 88 formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are eight inputs and one output for the formula shown here.

The first is the pressure (profile).

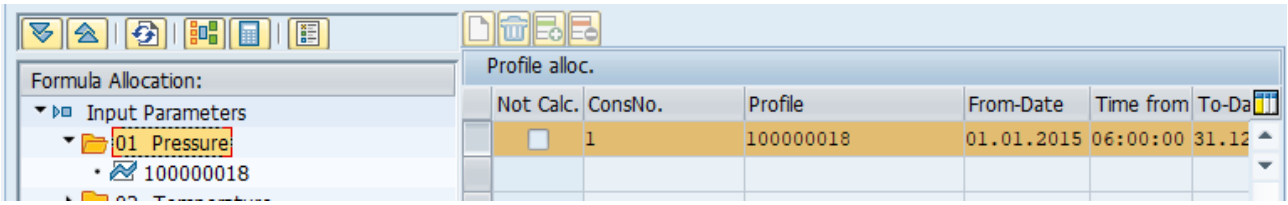


Figure 96: S-GERG 88 formula profile input 1

The second is the temperatur (profile).

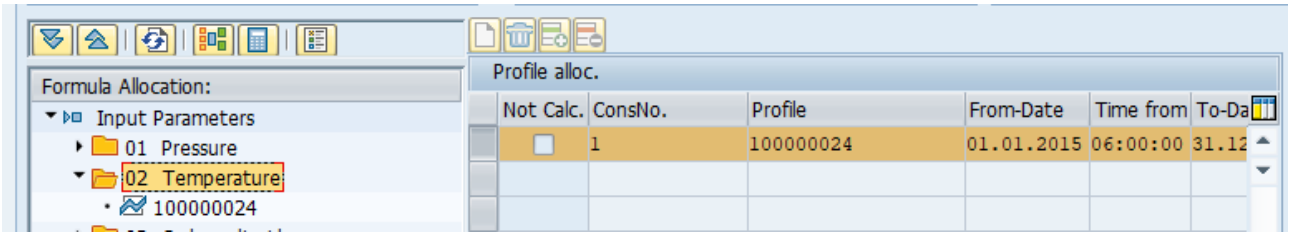


Figure 97: S-GERG 88 formula profile input 2

The third is the carbon dioxide (profile).

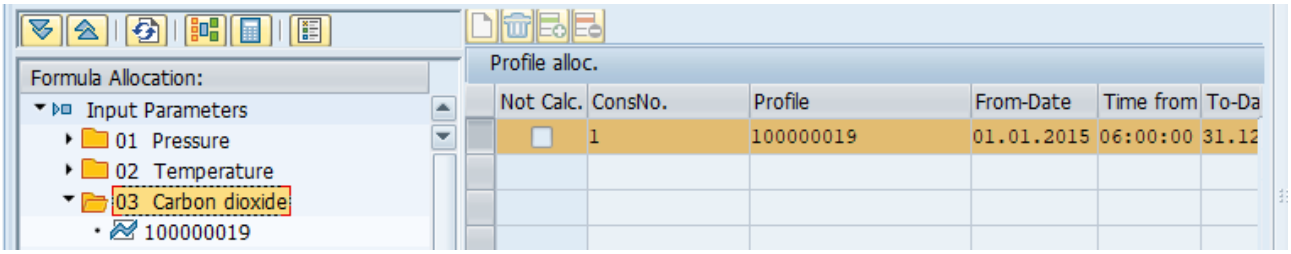


Figure 98: S-GERG 88 formula profile input 3

The fourth is the hydrogen (profile)

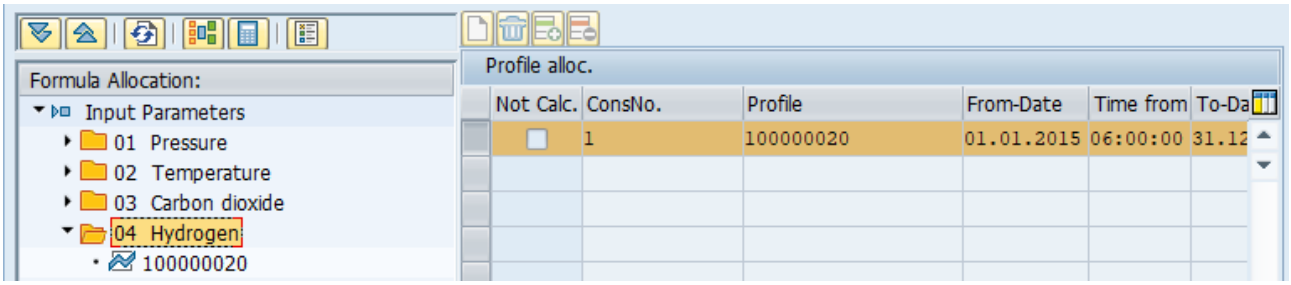


Figure 99: S-GERG 88 formula profile input 4

The fifth is the calorific value (profile)

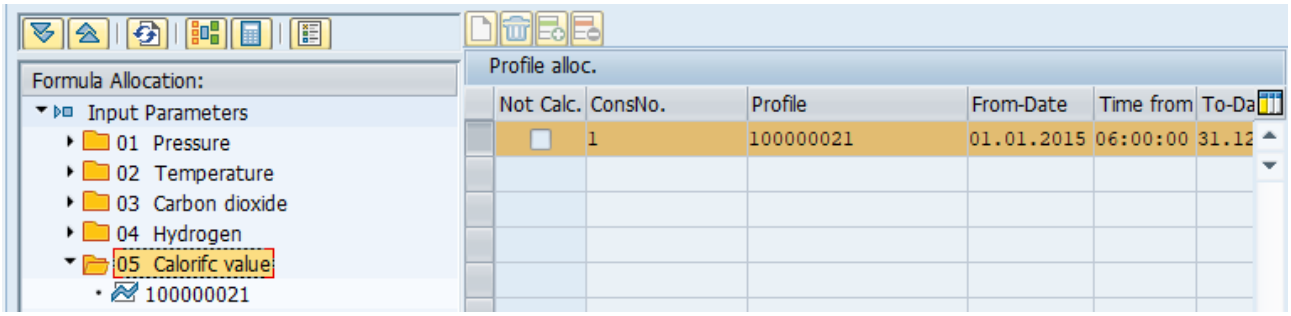


Figure 100: S-GERG 88 formula profile input 5

The sixth is the standard density (profile)

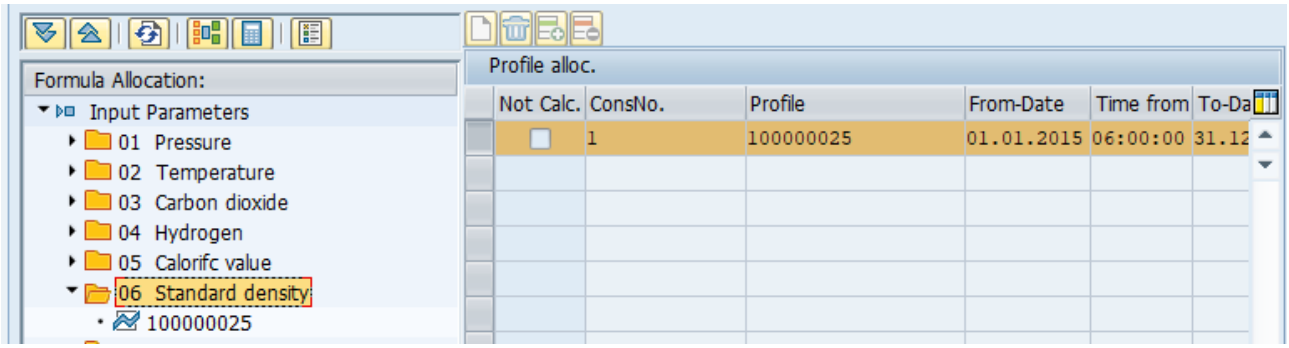


Figure 101: S-GERG 88 formula profile input 6

The seventh is the %-basis (constant value)

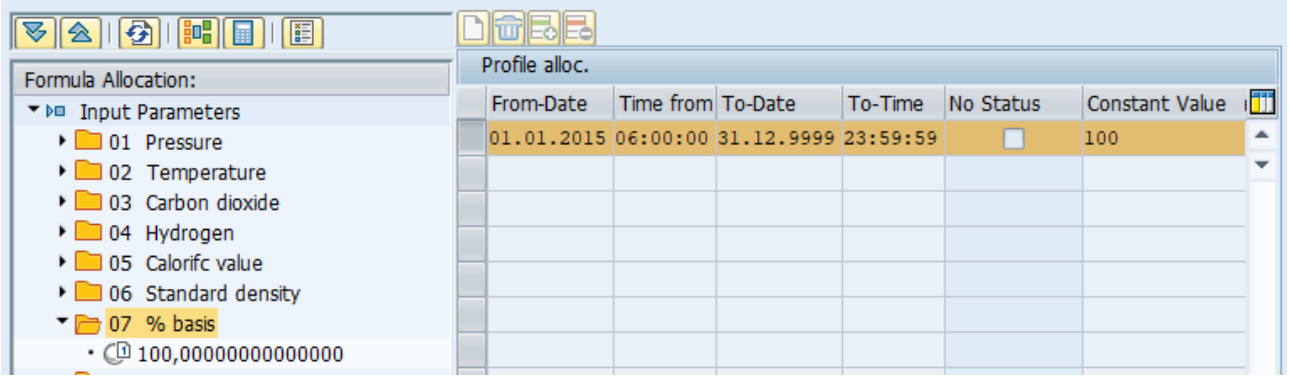


Figure 102: S-GERG 88 formula profile input 7

The eighth is the conversion density (constant value)

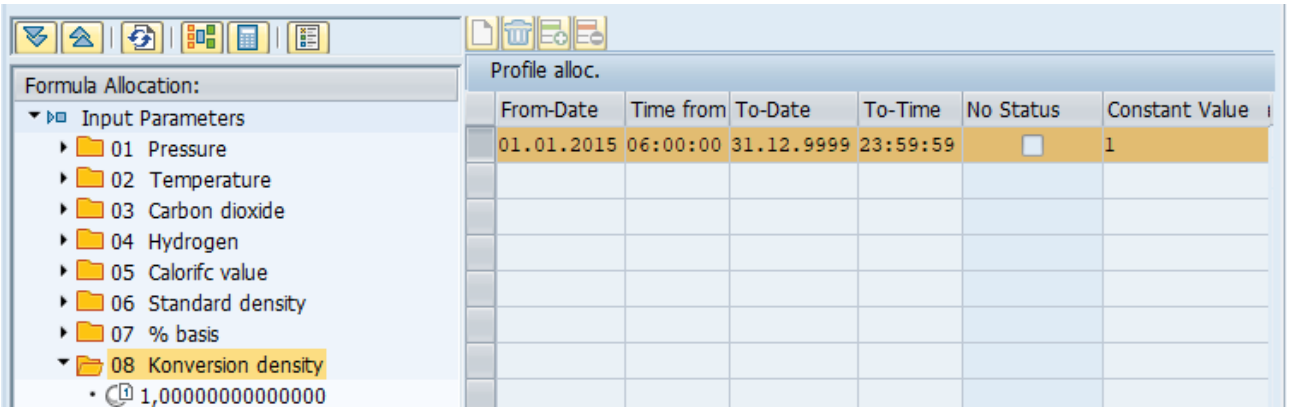


Figure 103: S-GERG 88 formula profile input 8

The output parameter is filled out automatically since it is the currently created/edited formula profile.

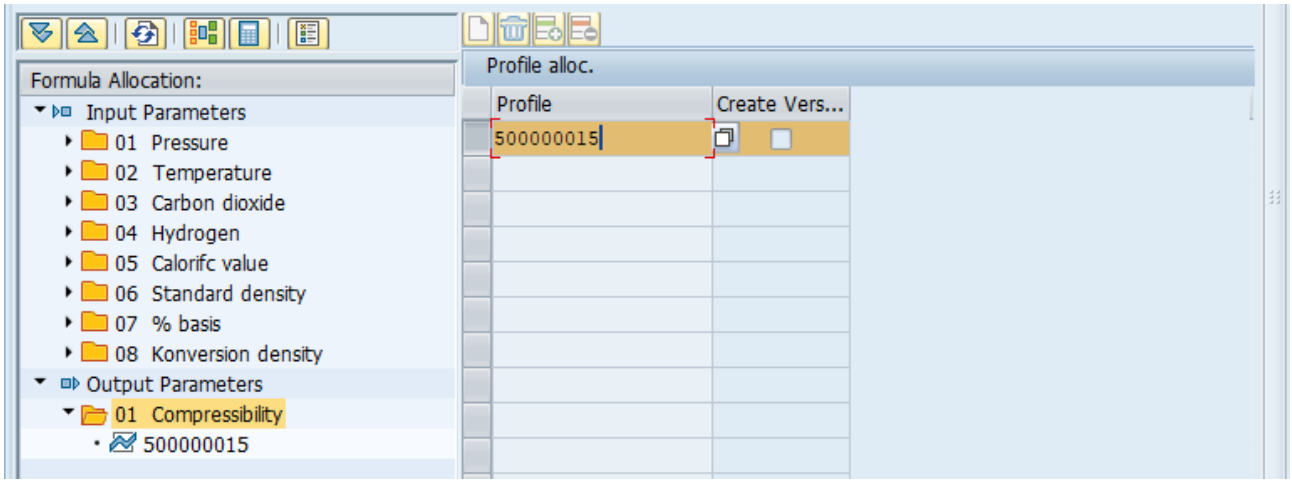


Figure 104: S-GERG 88 formula profile output

6.5 Determination of correction factor according to G486

According to G 486, depending on the underlying pressure range, there are different criteria for determining the correction factor for determining to correct the standard volume if necessary.

A volume correction can be carried out using the formula profiles for the correction factor calculation based on the data read out from the measuring device and the target correction factor based on the parameters set on the measuring device. A corresponding formula profile must be created for this.

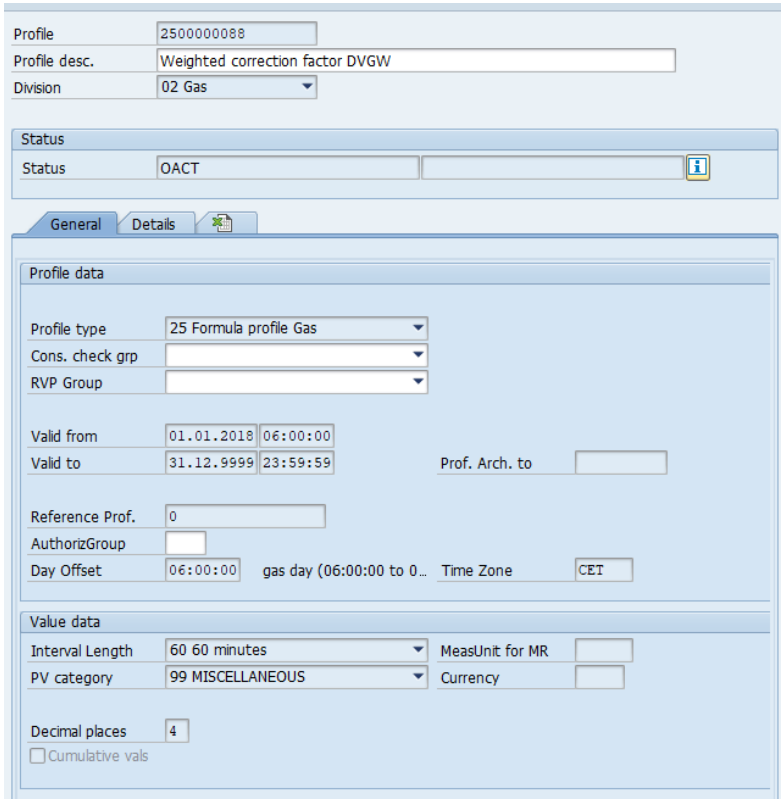


Figure 105: Correction factor formula-profile - exemplary

After the parameters have been defined on the "General" tab, the detailed information on the formula profile is then determined. The following input variables are processed as input parameters for this profile:

- compressibility factor (calculated)
- compressibility factor (metering device)
- Volume
- Switch calculation Mode (this parameter is controlling which threshold needs to be used (0 = 0.001; 1 = 0.1 <= x <= 0.0025) and which type of calculation to be used. See DVGW G486 sections 6.6.2 and 6.6.3 for details). In mode "1" the mean values are calculated based on the calculation period (e.g. month). Otherwise it gets calculated on a daily base.

The following assumptions apply to parameter 04 (calculation limit switch):

- If 04 = 1 is set, a limit of 0.25% is assumed and a K number correction is carried out if the condition | 1- F_(corr, m) | ≤0.0025 is not fulfilled.
- If 04 = 0 is set, then a limit of 0.1% is assumed and a K number correction is carried out if the condition | 1- F_(corr, d) | ≤0.001 is not fulfilled.

Where

- F_(corr, m) = monthly correction factor for volume
- F_(corr, d) = daily correction factor for volume

The calculation provides the following values as output parameters:

- • Standard Volume (Vn) corrected
- • Weighted correction factor (optional)

The time-dependent weighted correction factor is only output if this has been previously stored in the corresponding formula. The correction factor is a formula profile to be set up with the identical formula assignment. It is important to note that the correction factor is determined depending on the selected calculation period. If the calculation is carried out from 01.01.2019 / 06:00:00 a.m. to 02.01.2019 05:59:59 a.m., the daily correction factor is determined. For the calculation period from 01.01.2019 06:00:00 a.m. to 01.02.2019 05:59:59 a.m., the monthly correction factor is determined.

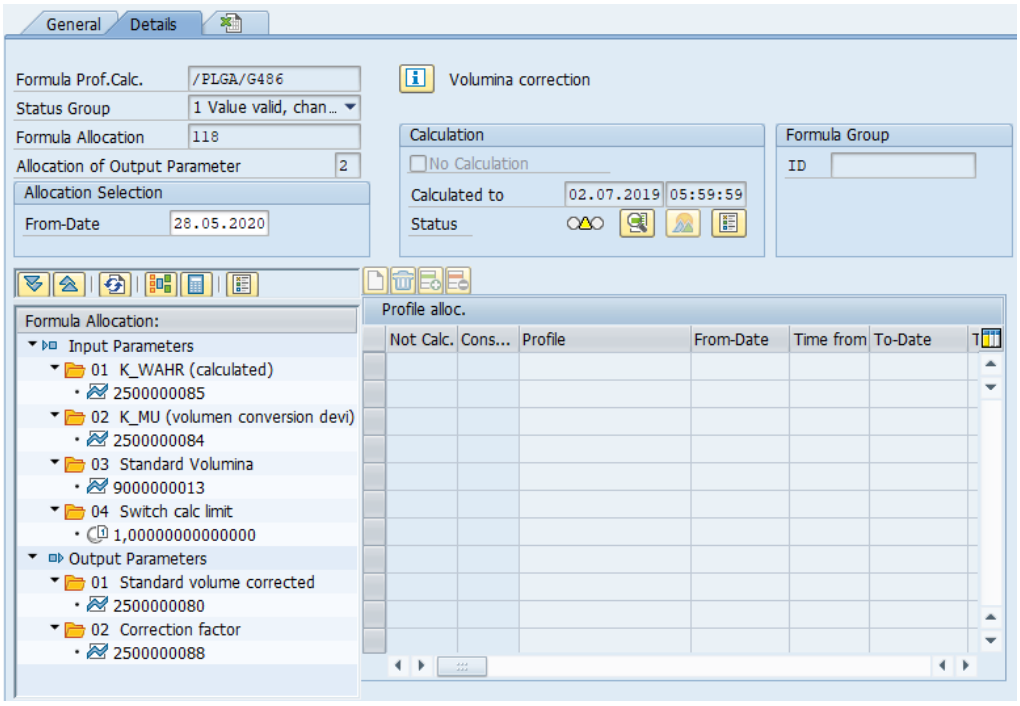


Figure 106: Correction factor -formula profile details

It is also possible to set a different limit. For this, a corresponding formula must be defined in the system, to which an additional input parameter 05 - limit value can be stored.

The following assumptions apply:

- Parameter 04 must be set to 1
- Parameter 05 can be any, but must be within the interval 0.1% ≤ x ≤ 0.25%. For example, parameter 05 is specified as 0.11 for 0.001 or for 0.25% as 0.0025.

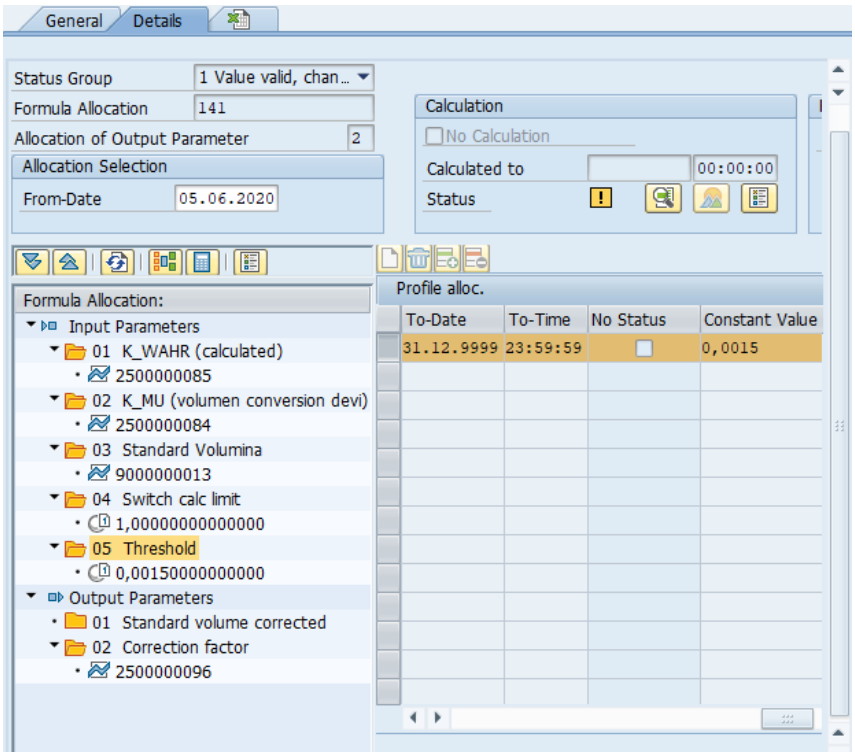


Figure 107: Correction factor formula profile details

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- PV category

Before these data can be entered, some must be customized (i.e. measurement units). Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula. After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are four inputs and two outputs for the formula shown here.

The first is K_WAHR (calculated) (profile)

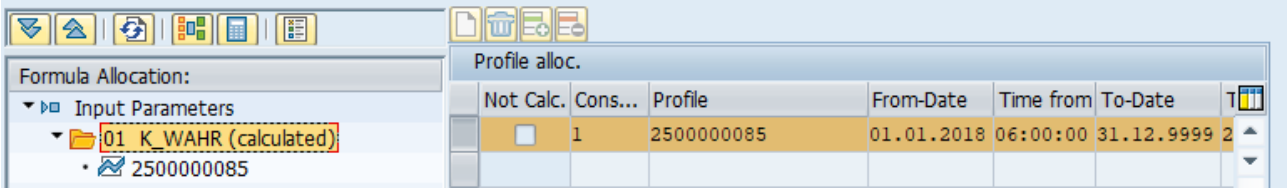


Figure 108: Correction factor formula profile input 1

The second is K_MU (metering devise) (profile)

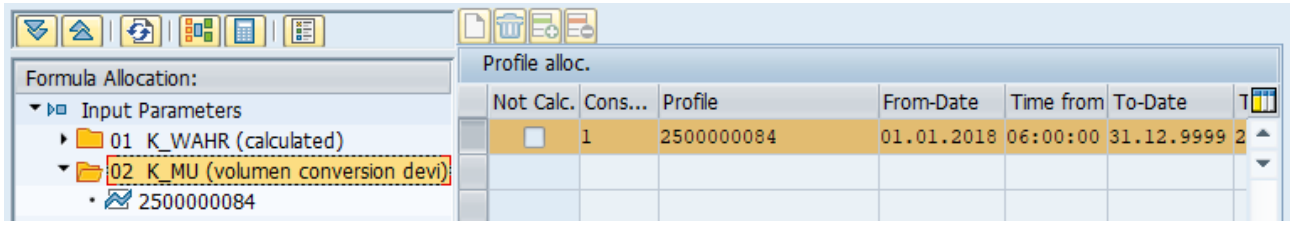


Figure 109: Correction factor formula profile input 2

The third is standard volumina (profile)

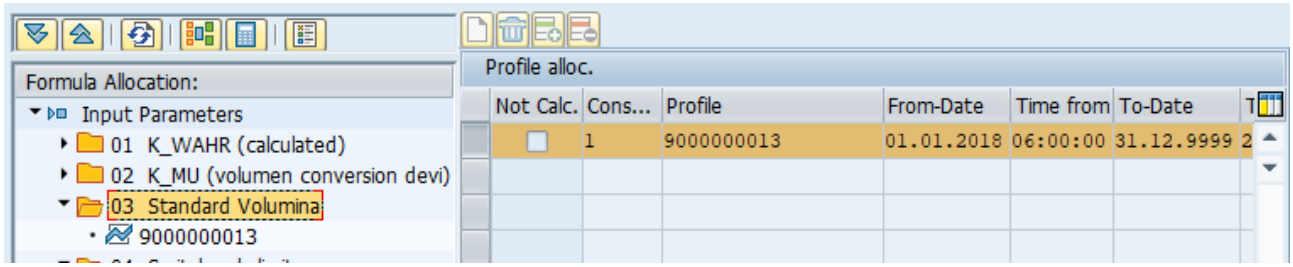


Figure 110: Correction factor formula profile input 3

The fourth is switch calc limit (constant value)

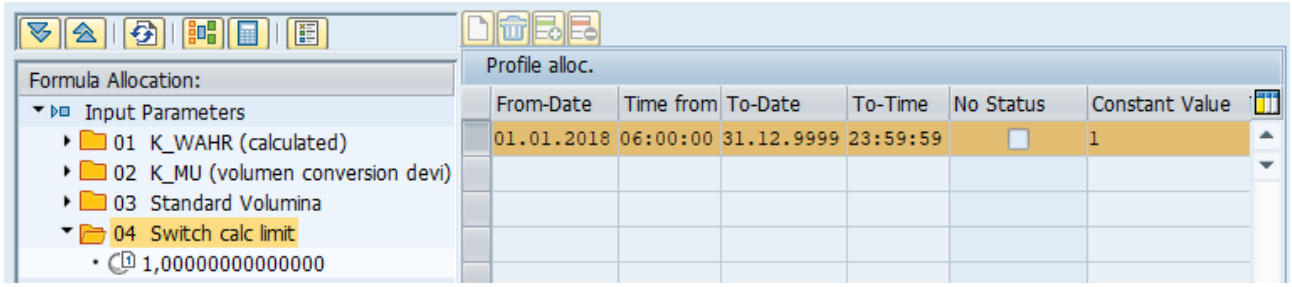


Figure 111: Correction factor formula profile input 4

The first output parameter is the standard volume corrected

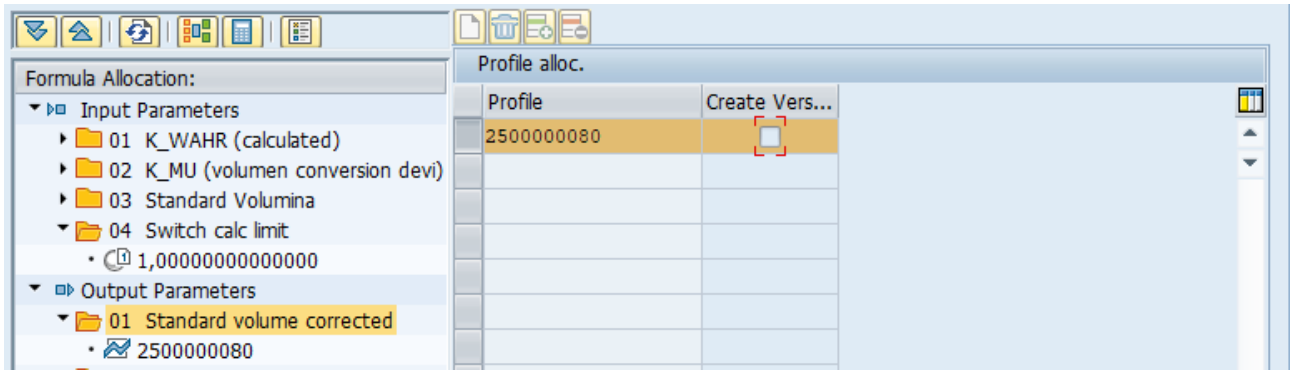


Figure 112: Correction factor formula profile output 1

The second output parameter is the correction factor. For the second parameter a new formula profile must be created.

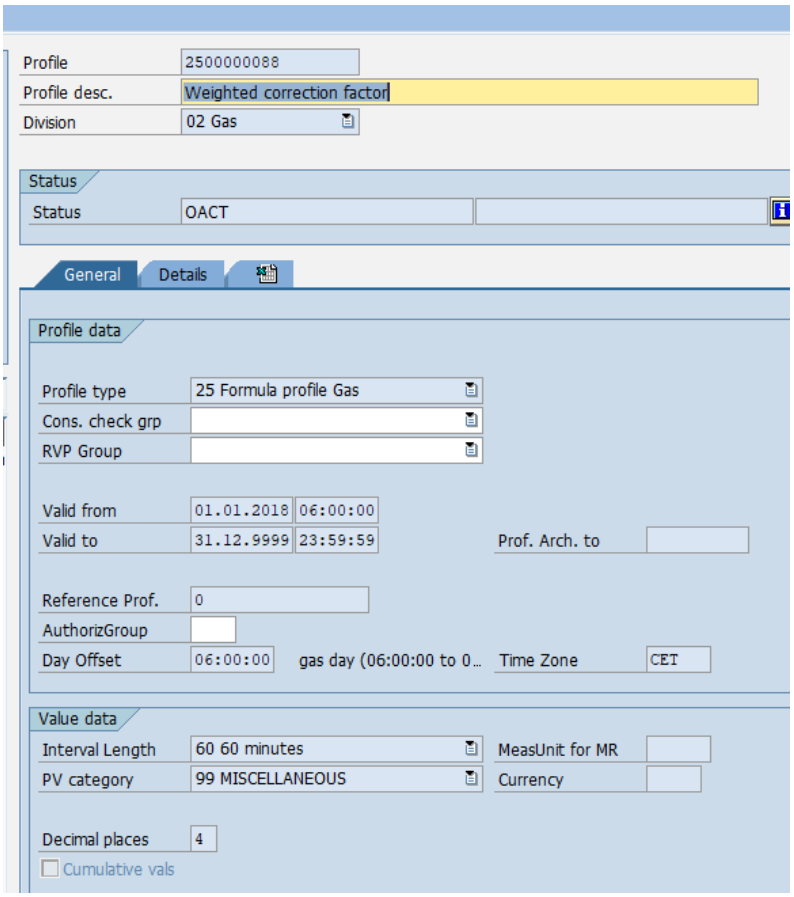


Figure 113: Correction factor formula profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- PV category

Before these data can be entered, some must be customized (i.e. measurement units). Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

Here the relevant information for:

- Formula Proc. Calc
- Status Group
- Formula Allocation, from created profile above
- Allocation of Output Parameter = 02

must be entered.

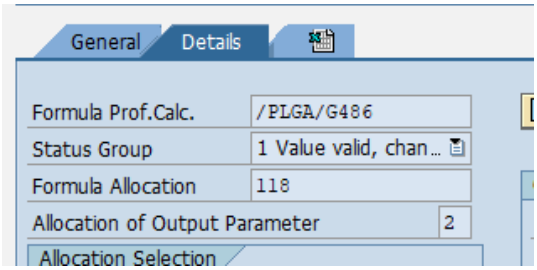


Figure 114: Correction factor formula profile details

The Output profile is automatically entered.

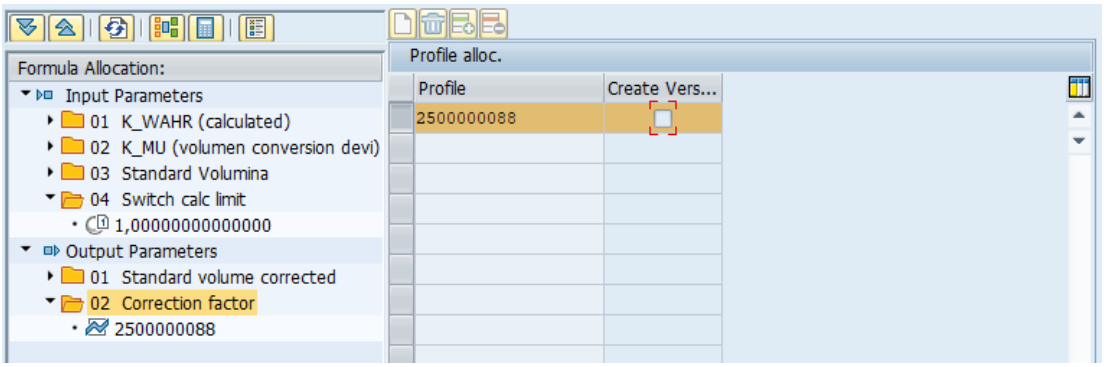


Figure 115: Correction factor formula profile output 02

6.6 Amount-based average calculation

The actual calculation, according to the formulas described above, is performed by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by using formula profiles. This function calculated the amount-based average value for the calculation period. The second output parameter sums all input amounts.

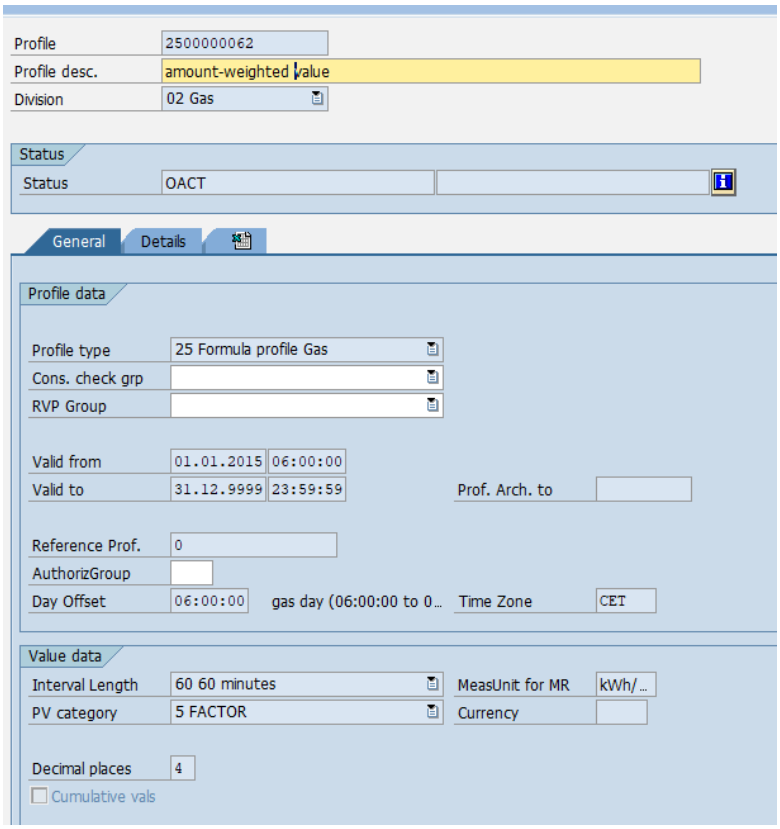


Figure 116: Amount based average formula profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

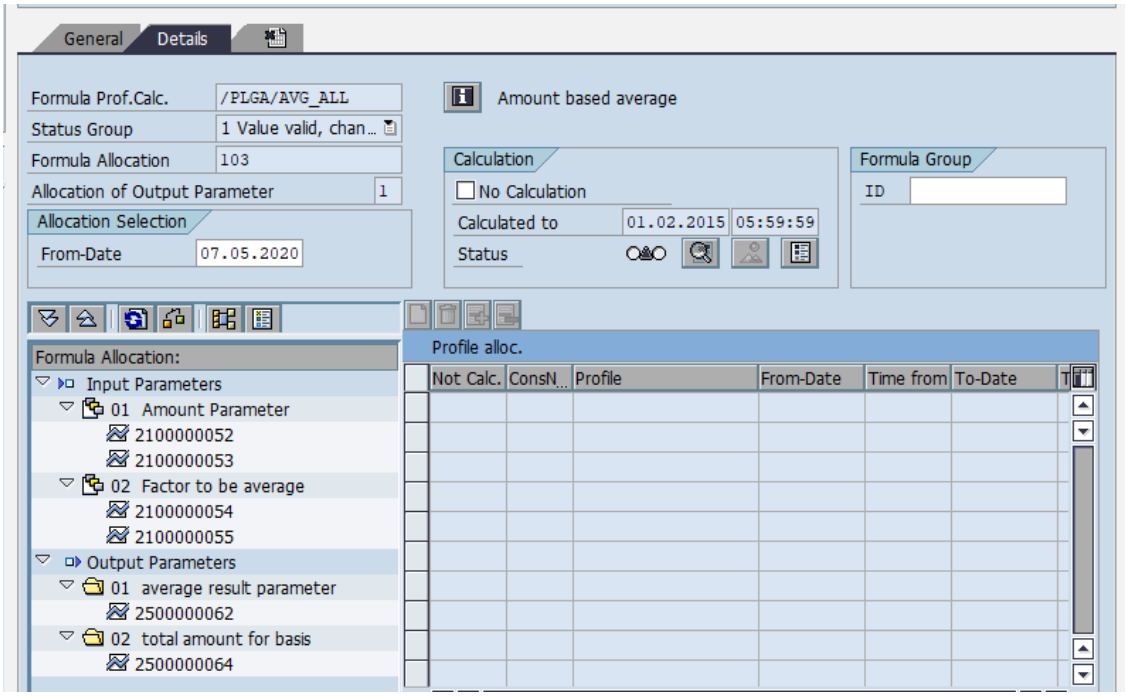


Figure 117: Amount-weighted average formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are two inputs and output for the amount weighted average formula shown here.

The first input parameter is for the amount profile.

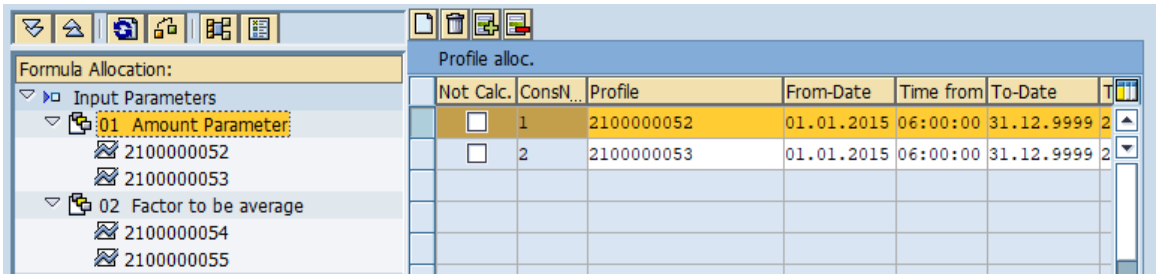


Figure 118: Amount-weighted average formula profile input 1

The second input parameter are the factor profile.

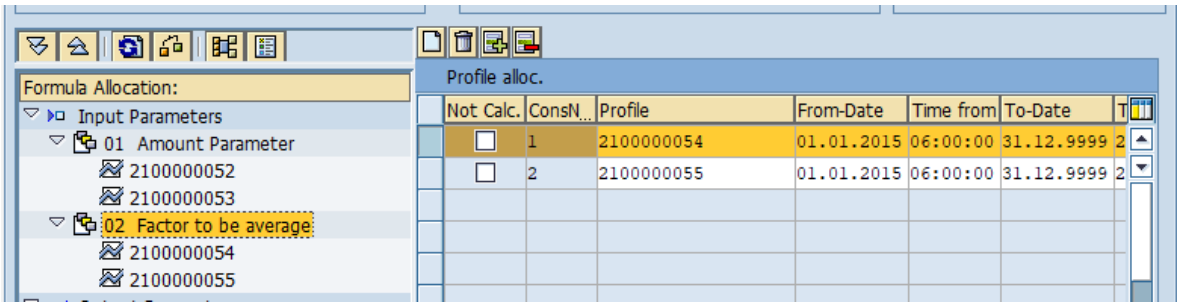


Figure 119: Amount-weighted average formula profile input 2

The output parameter is filled out automatically, since it is the current created/edited formula profile.

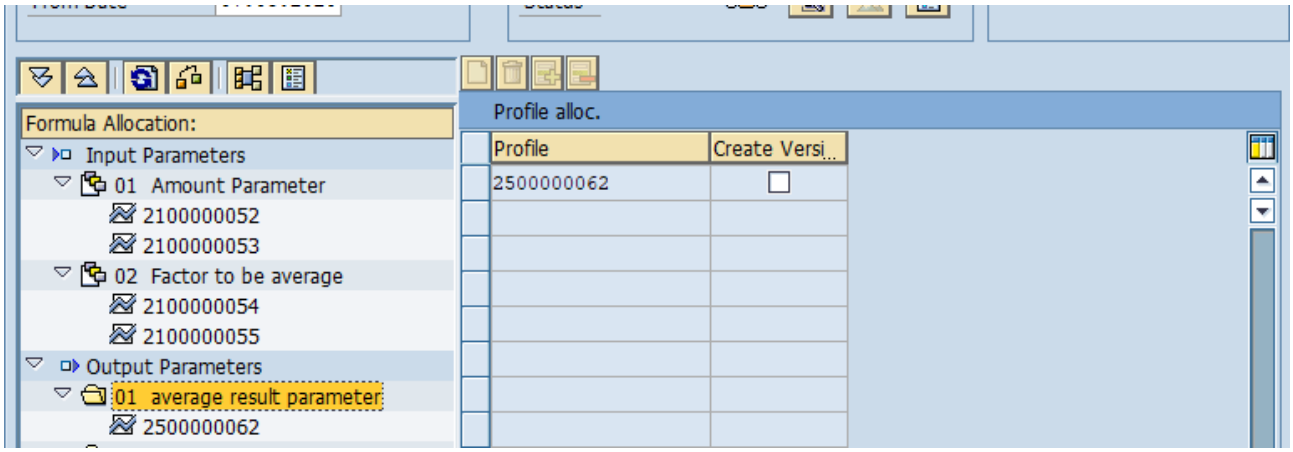


Figure 120: Amount-weighted average formula profile output 1

After saving, the profile you must create a second formula profile for the second output parameter. First you must create the profile header.

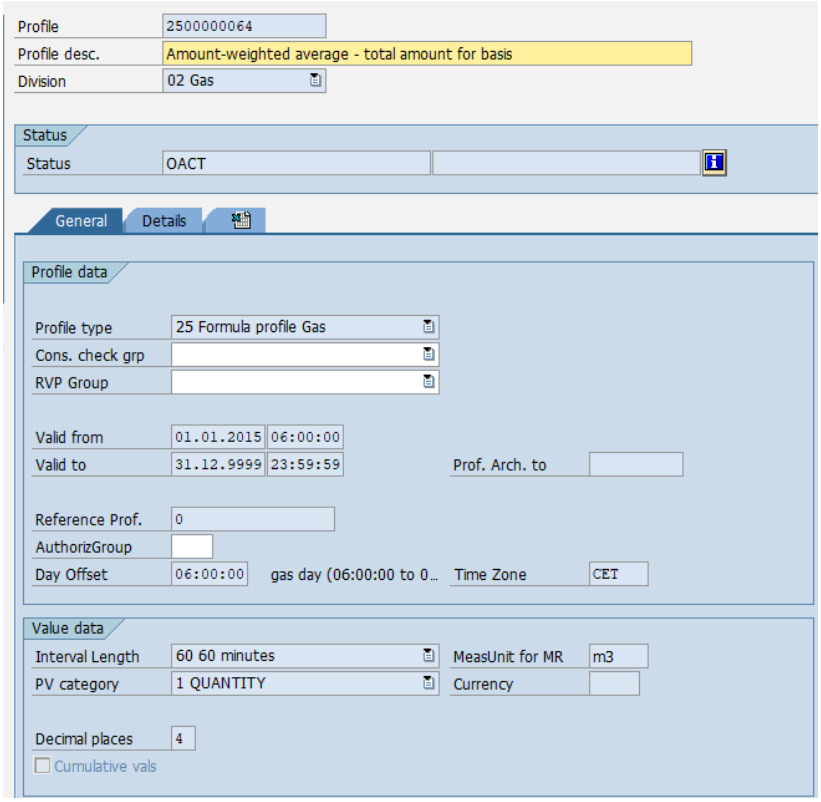


Figure 121: Amount-weighted average formula profile – amount profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units).

Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula. On the tab "Details" you must enter Formula Prof.Calc, Status Group, as well as the formula allocation from created formula profile before and the Allocation of Output Paramter to 2. Afterwards press enter and the coresponding input and output parameter are filled automatically.

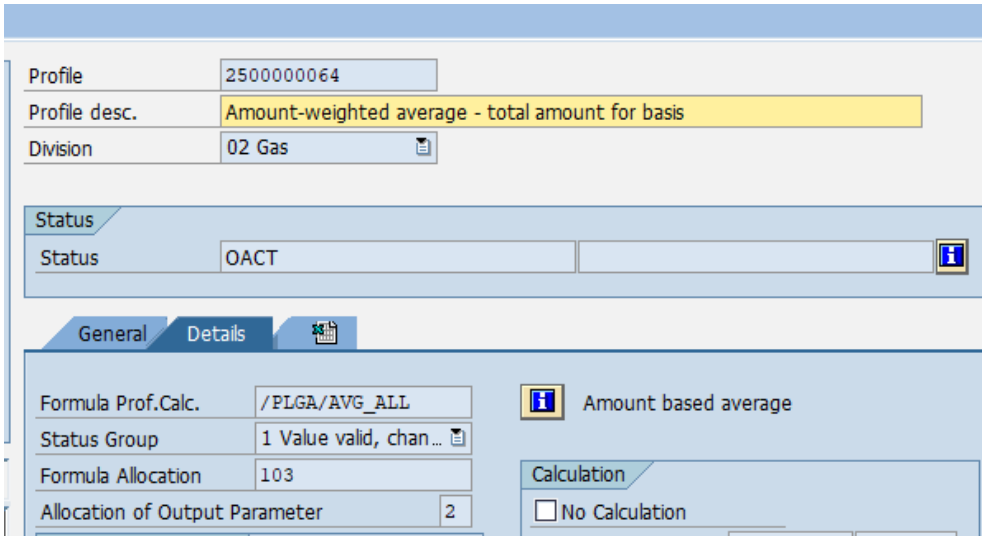


Figure 122: Amount-weighted average formula profile output 2

Afterwards pleas save the profile.

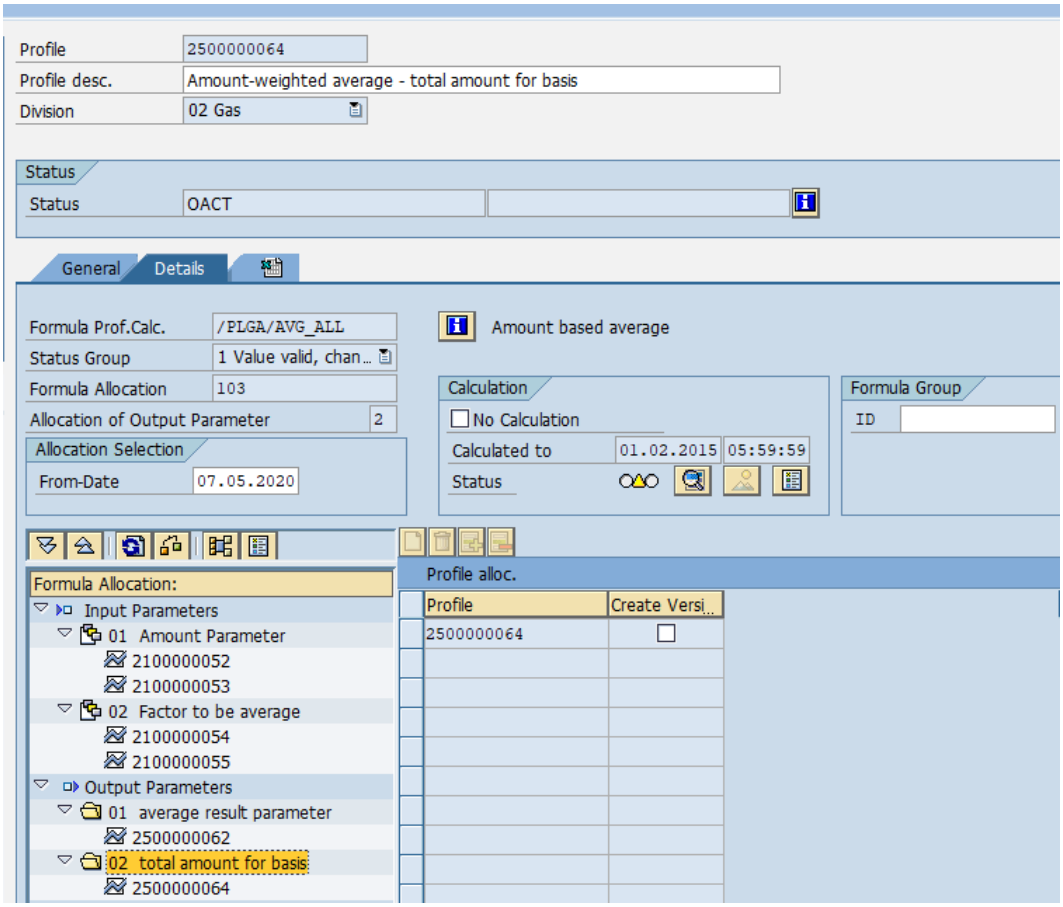


Figure 123: Amount-weighted average formula profile output 2

7 Functions according to calorific values and calorific value districts

According to perform settlement within SAP® IS-U /EDM for e.g. IMC, *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* provides functionalities for management of calorific values based on time series. To these belong:

- Recording calorific values for settlement and billing,
- Checking compliance of 2%-rule according to G 685 and
- Determination of quantity-weighted calorific values.

7.1 Maintenance for assignment from calorific value to calorific value district

Transaction: */N/PLGA/ECV_PROF_ST*

In order to maintain profiles to a calorific value district, the transaction /PLGA/ECV_PROF_ST should be used. For mapping the billing calorific value to the correct CV district there's an assignment table. By that table the different calorific value districts are assigned to their calorific value profiles for billing and reference.

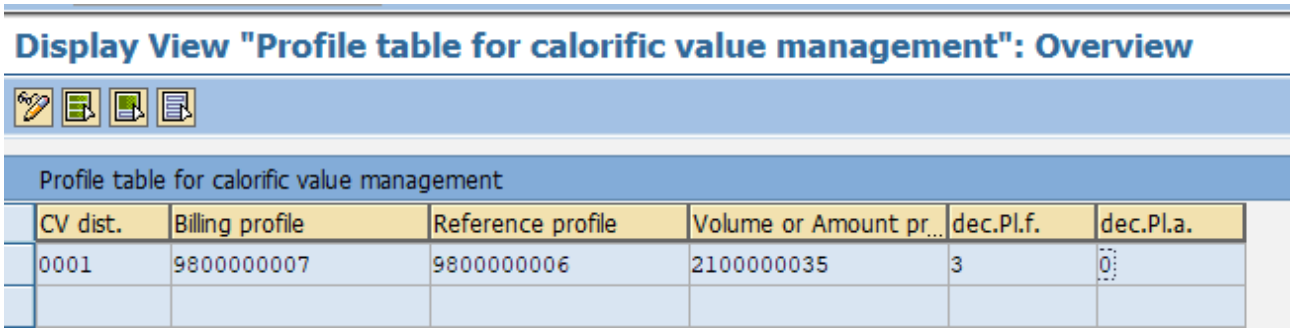


Figure 124: Profile table for calorific value management

The following information are available:

Element	Description
CV dist.	CV district
Billing profile	Profile containing the calorific value used for billing
Reference profile	Profile containing the reference profile for calorific value
Volume or Amount profile	Profile containing the volume for calorific value
Dec. Pl. f. calorific value	Number of decimal places for calorific values, by default 3
Dec. Pl. f. for amount	Number of decimal places for standard volume, by default 0

Table 12: Profile table for calorific value management - Details

7.2 Maintaining billing relevant tables from EDM

Transaction: */N/PLGA/ECV_MAINTBILL*

Within this functionality the possibilities for maintenance for billing relevant tables like TE449 or TE671 is given by using *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA*. For this it is necessary that the profile table for calorific value management is maintained within transaction */N/PLGA/ECV_PROF_ST*.

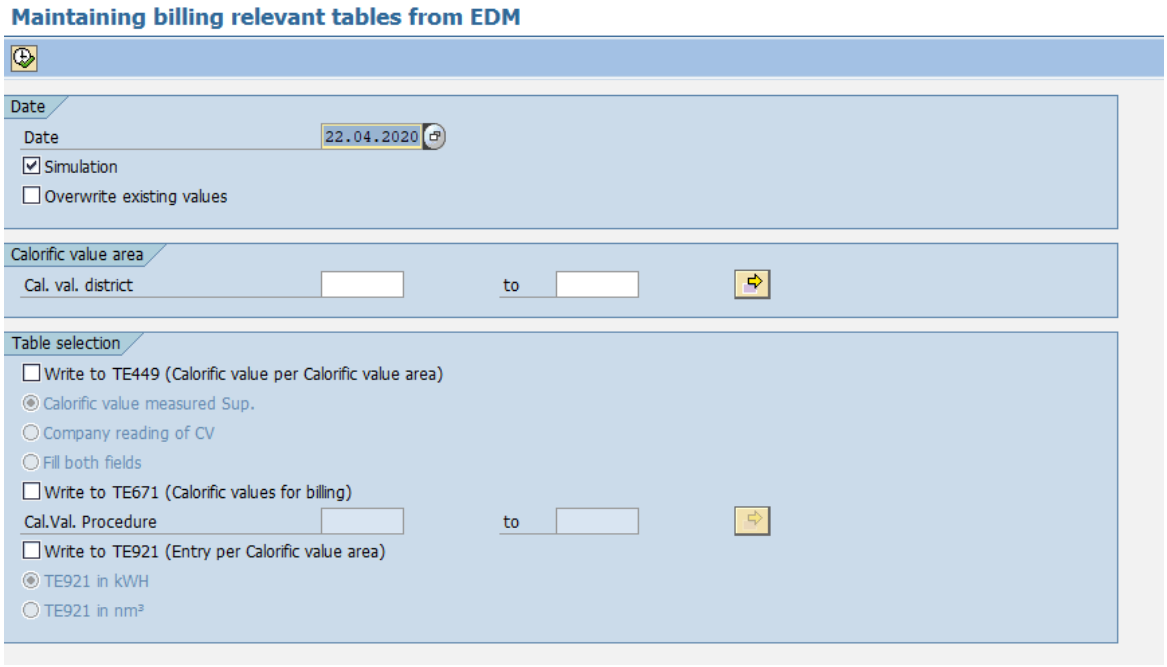


Figure 125: Maintaining billing relevant tables from EDM

The following information are available:

Element	Description
Section "Date"	
Date	Enter the relevant date, for which month the data should be updated.
Simulation	If the checkbox is active  all updates are simulated. Otherwise the changes are permanent.
Overwrite existing values	If the checkbox is active  existing values are overwritten. Otherwise no changes are taken place.
Section "Calorific value district"	
Calorific value district	Chose one more calorific value districts, for which the updates taken place. Note: if no calorific value district is chosen, all entries from master data "profile table for calorific value management" are selected.
Section "Table selection"	
Write to TE449 (Calorific value per Calorific value area)	Within this section, calorific value specifics for update table TE449 are selected. Changes could only be made, if the checkbox is active  . Furthermore combinations with "Write TE671 (Calorific values for billing)" and "Write TE921 (Entry per Calorific value area" are possible. If this option is active, then furthermore selection criteria for: - Calorific value measured Sup. - Company reading of CV - Fill both fields are available.
Calorific value measured Sup.	If this option is active  , then the calorific value is written in table TE449 within the field "CV by supplier" according to selection criteria in Section "Date" and "Calorific value area". Only one option for "calorific value measured Sup." or "Company reading of CV" or "Fill both fields" can be chosen.

Company reading of CV	If this option is active, then the calorific value is written in table TE449 within the field "CV by company" according to selection criteria in Section "Date" and "Calorific value area". Only one option for "calorific value measured Sup." or "Company reading of CV" or "Fill both fields" can be chosen.
Fill both fields	If this option is active, then the calorific value is written in table TE449 within the field "CV by company" and "CV by company" according to selection criteria in Section "Date" and "Calorific value area". Only one option for "calorific value measured Sup." or "Company reading of CV" or "Fill both fields" can be chosen.
Write to TE671 (Calorific values for billing)	Within this section, calorific value specifics for update table TE671 are selected. Changes could only be made, if the checkbox is active. Furthermore combinations with "Write TE449 (Calorific value per Calorific value area)" and "Write TE921 (Entry per Calorific value area)" are possible. If this option is active, then furthermore selection criteria for Cal. Val. Procedure Is available.
Cal. Val Procedure	Chose one more calorific value Procedure, for which the updates taken place.
Write to TE921 (Entry per Calorific value area)	Within this section, calorific value specifics for update table TE921 are selected. Changes could only be made, if the checkbox is active. Furthermore combinations with "Write TE671 (Calorific values for billing)" and "Write TE449 (Calorific value per Calorific value area)" are possible. If this option is active, then furthermore selection criteria for: - TE921 in kWH - TE921 in nm3 are available.
TE921 in kWH	If this option is active, then the Energy is written in table TE921. Only one option for "TE921 in kWH" or "TE921 in nm3" can be chosen.
TE921 in nm3	If this option is active, then the volume is written in table. Only one option for "TE921 in kWH" or "TE921 in nm3" can be chosen.

Table 13: Maintaining billing relevant tables from EDM - Details

After excecution the functionality by pressing F8 or a log with the results is displayed.

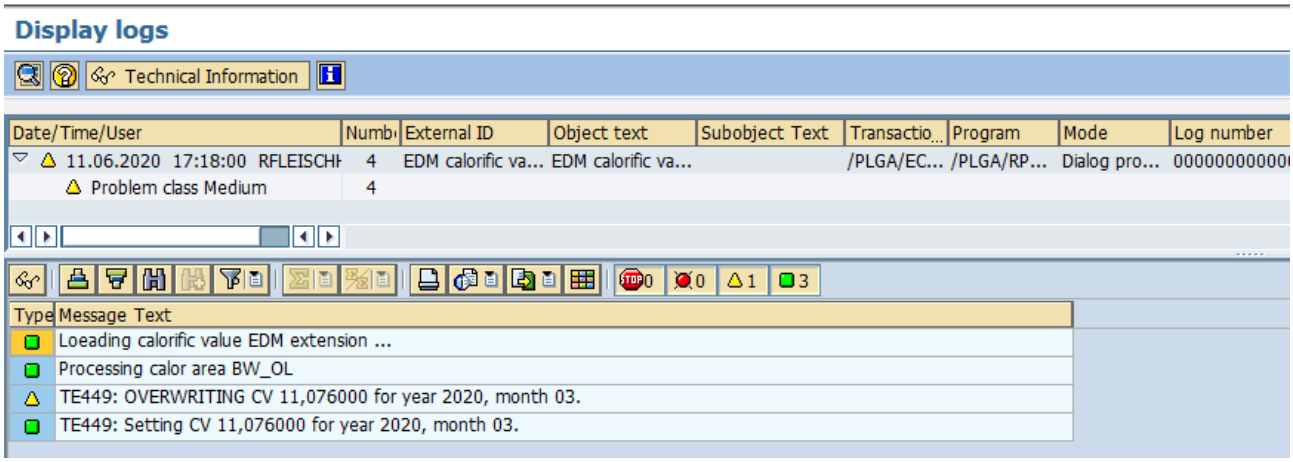


Figure 126: Maintaining billing relevant tables from EDM – display log

7.3 Calculate reference factor profile value

Transaction: */N/PLGA/ECV_REF_PV*

Within this product functionality from *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* it is possible to update reference calorific value profile from billing relevant calorific value profile. For this it is necessary that the profile table for calorific value management is maintained.

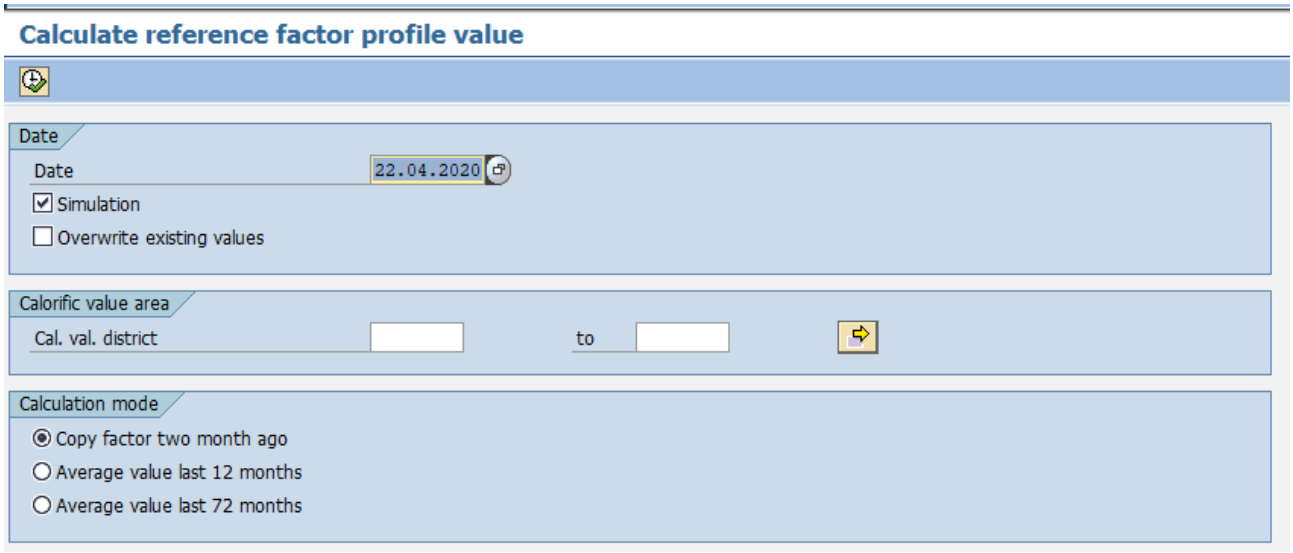


Figure 127: Calculate reference factor profile value

The following information are available:

Element	Description
Section "Date"	
Date	Enter the date for which month the reference factor profile should be updated
Simulation	If active then changes are simulated
Overwrite existing values	If active then existing values are overwritten
Section "Calorific value area"	
Cal. Val. district	Select calorific value district, multi selection is possible. Note: If no calorific value district is chosen then all entries within table "maintain profiles to a calorific value district" are selected.
Section "Calculation mode" – only one option is possible at a time	
Copy factor two month ago	Copy values from two month ago
Average value last 12 month	Calculate average value from the last 12 month
Average value last 72 month	Calculate average value from the last 72 month

Table 14: Details calculate reference factor profile value

After excecution the functionality by pressing F8 or a log with the results is displayed.

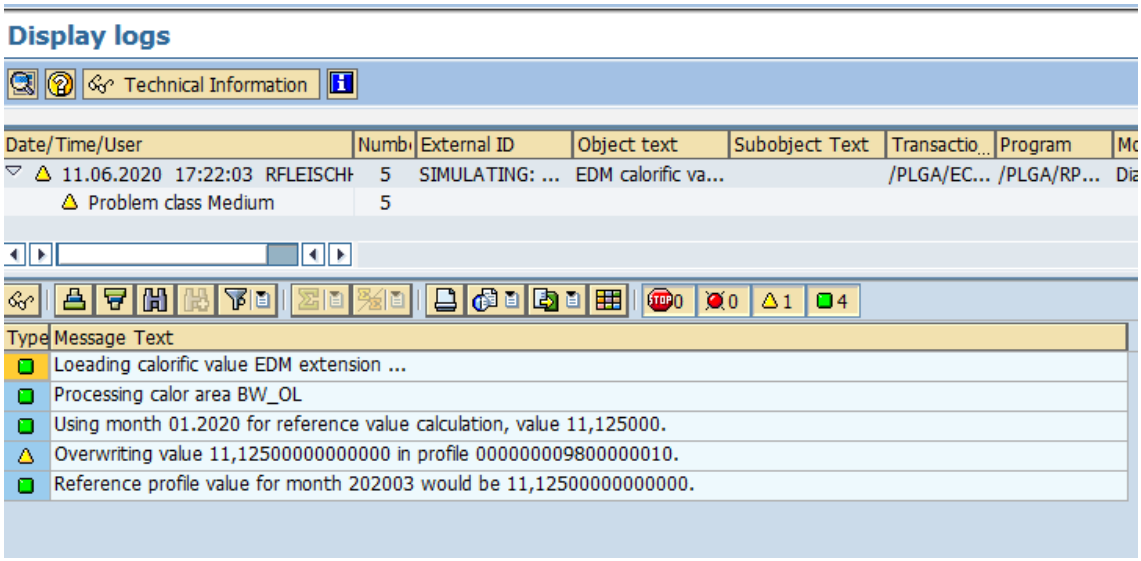


Figure 128: Calculate reference factor profile value – display log

7.4 Formula for amount-based average calorific value

The actual calculation for calculation of amount based average calorific value is performed by *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* by using formula profiles. This function calculated the amount-based average calorific value for billing purpose according the regulatory document G685. The second output parameter sums all input amounts.

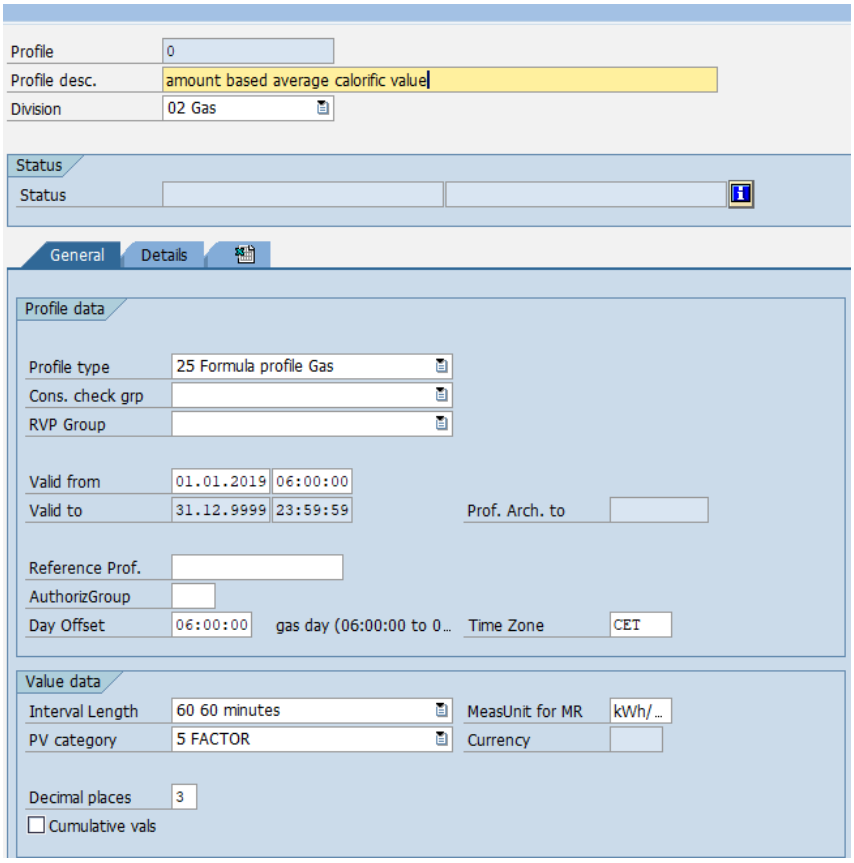


Figure 129: amount based average calorific value

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units). Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula.

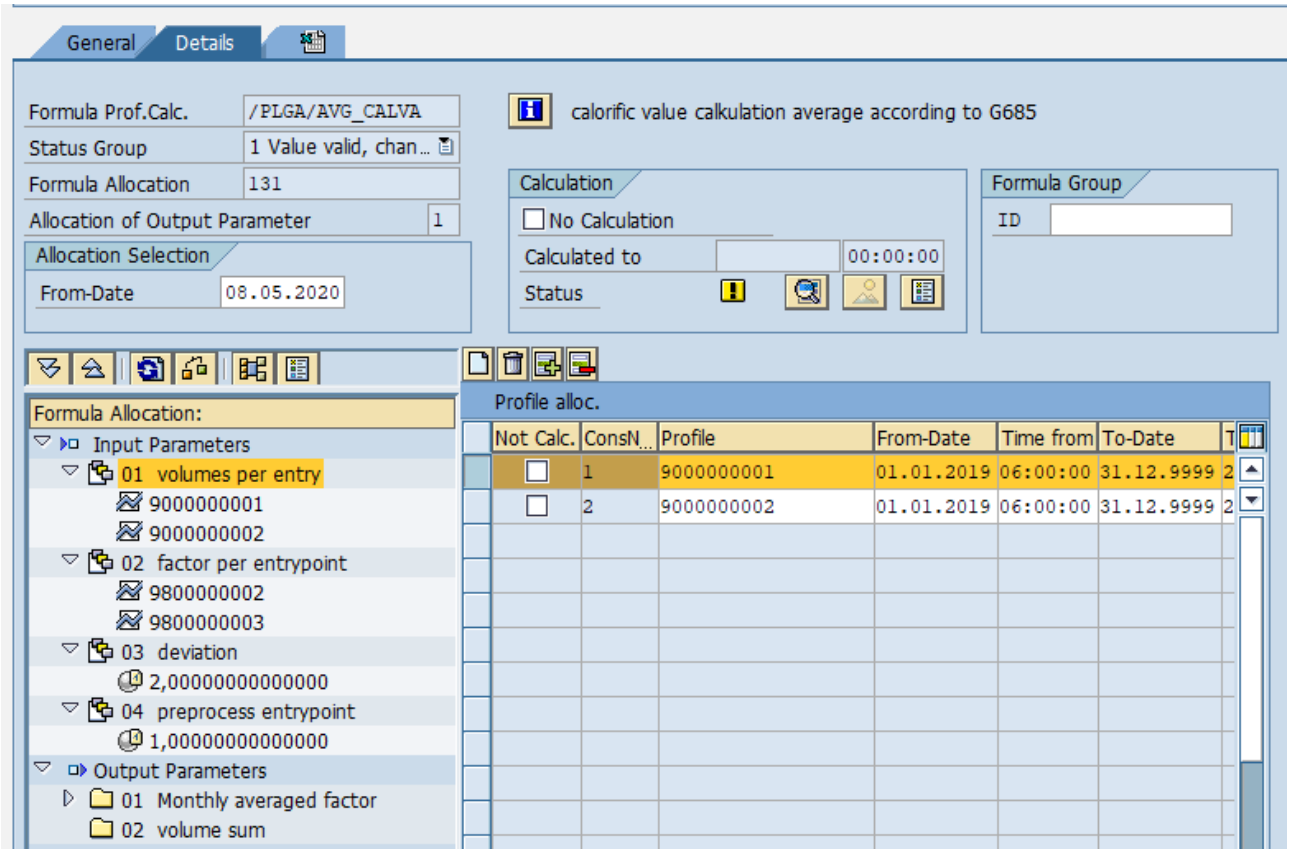


Figure 130: Amount-weighted average formula profile details

After entering the applicable formula and confirming by pressing the return key, the tree within the area "Formula Allocation" is presented. It represents all in-/output parameters of the formula. There are four inputs and two output for the amount weighted average calorific value formula shown here.

The first input parameter is for the amount profile.

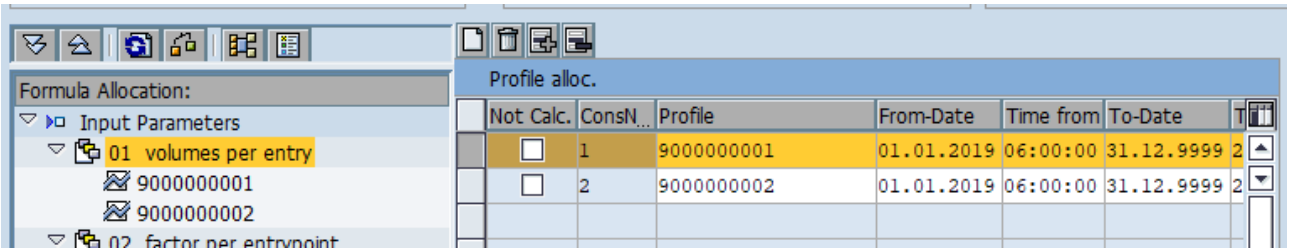


Figure 131: Amount-weighted average calorific value formula profile input 1

The second input parameter is for the calorific value profile.

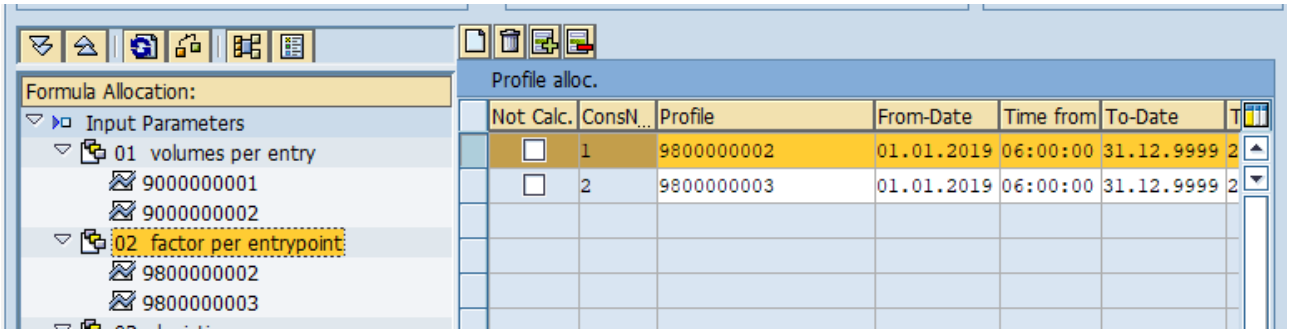


Figure 132: Amount-weighted average calorific value formula profile input 2

The third input parameter is for the deviation. Each input pair's average factor is checked versus the final result to this deviation. It has to be identical in each month of calculation

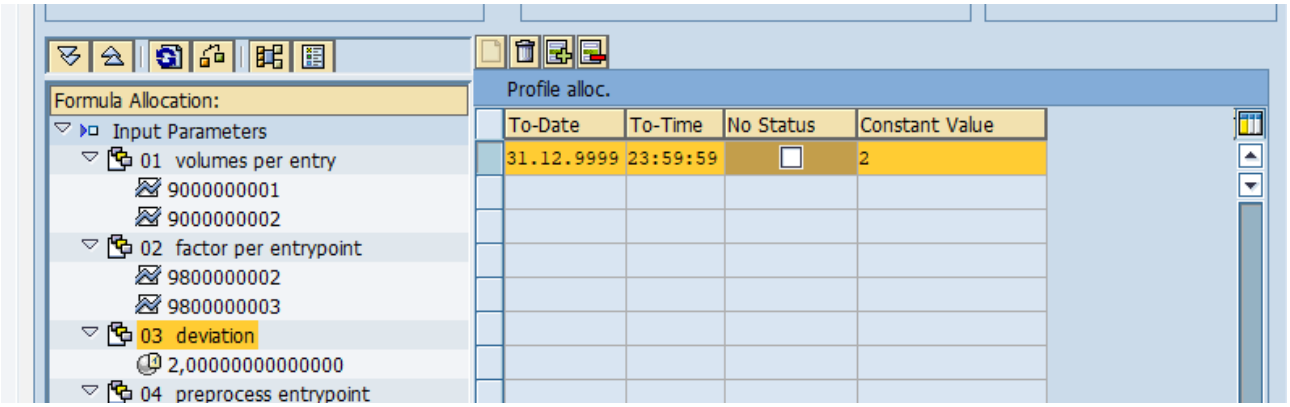


Figure 133: Amount-weighted average calorific value formula profile input 3

The four input parameter is for the preprocess entry point. Hereby 1 means the input parameter are already average mean based and 0 means that the input parameter are not amount average based.

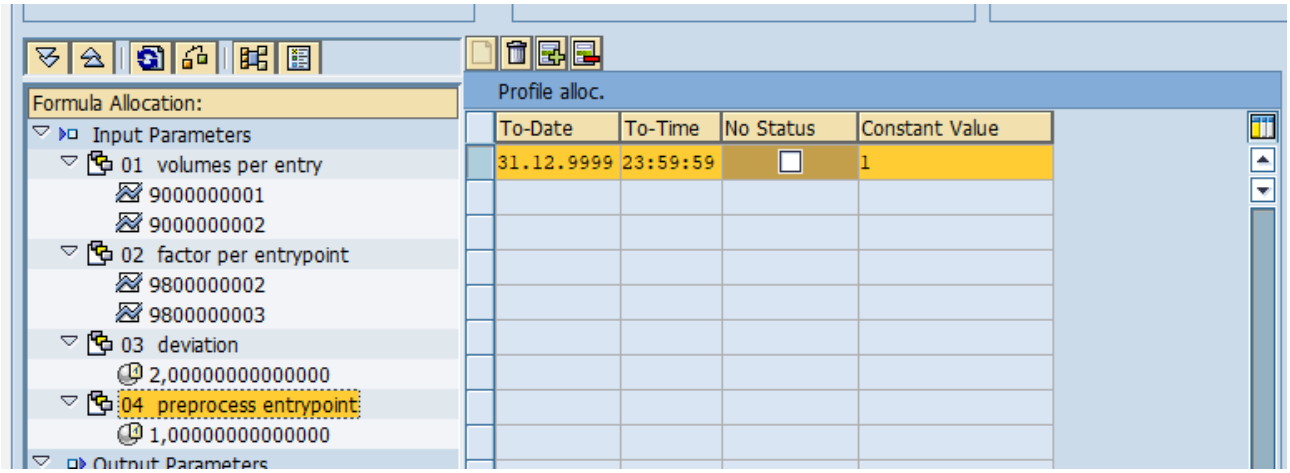


Figure 134: Amount-weighted average calorific value formula profile input 4

The output parameter is filled out automatically, since it is the current created/edited formula profile.

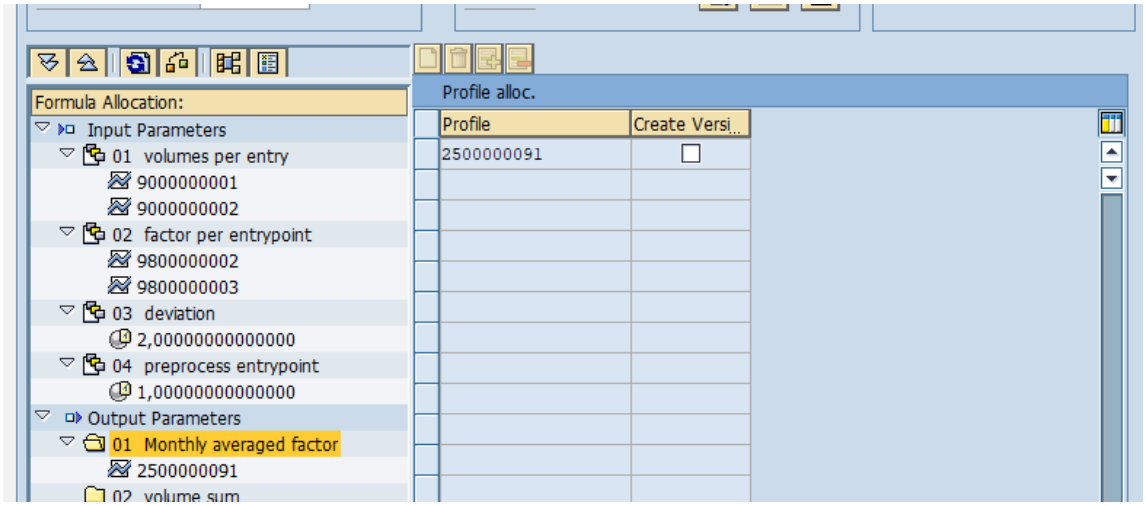


Figure 135: Amount-weighted average formula profile output 1

After saving, the profile you must create a second formula profile for the second output parameter. First you must create the profile header.

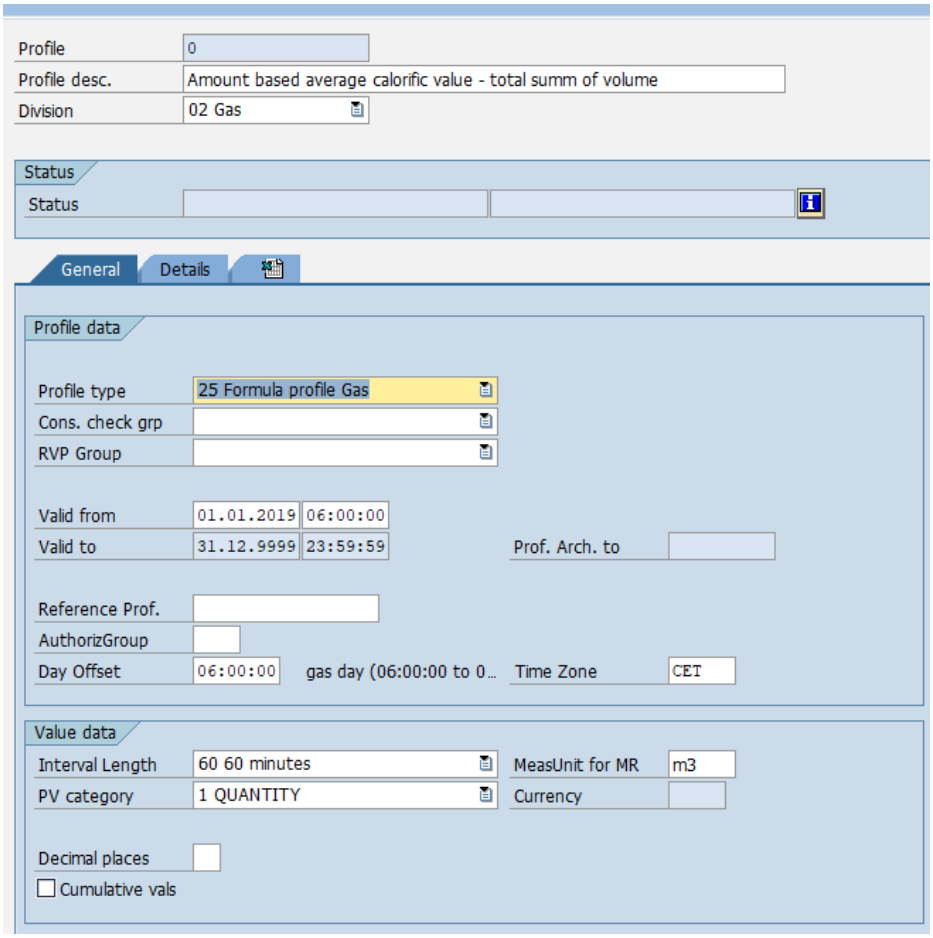


Figure 136: Amount-weighted average calorific value formula profile – amount profile

Within the "General" tab there is some general information that includes:

- Validity dates
- Day offset (gas day)
- Measurement unit

Before these data can be entered, some must be customized (i.e. measurement units). Besides this information, there is the "Details" tab that contains information about the calculation method, status group and the in-/output parameters of the formula. On the tab "Details" you must enter Formula Prof.Calc, Status Group, as well as the formula allocation from created formula profile before and teh Allocation of Output Paramter to 2. Afterwards press enter and the coresponding input and output parameter are filled automatically.

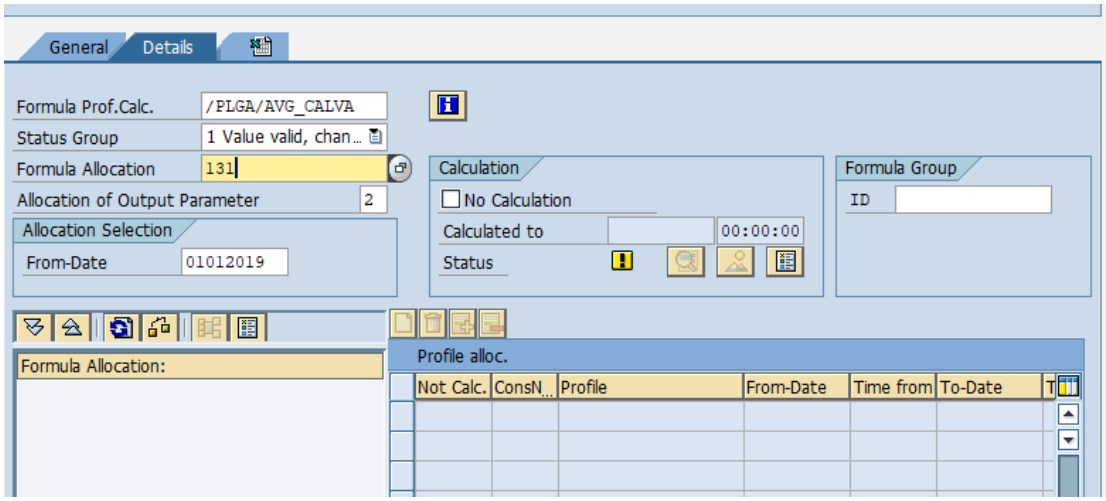


Figure 137: Amount-weighted average calorific value formula profile – amount profile 2

Afterwards please save the profile.

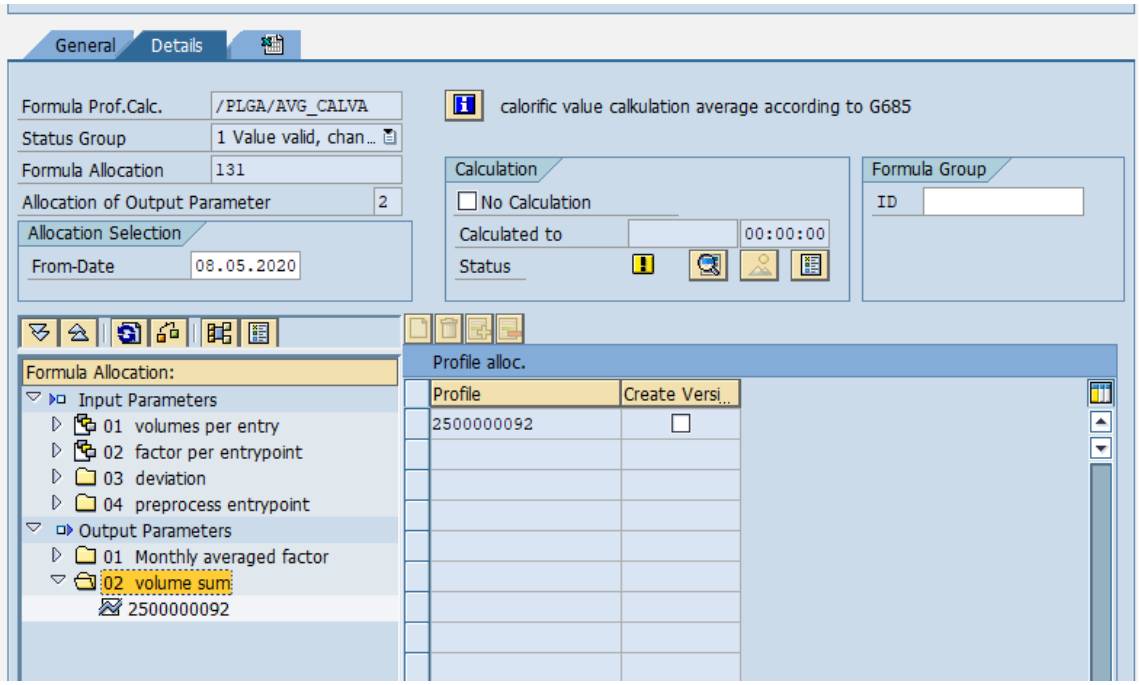


Figure 138: Amount-weighted average calorific value formula profile – amount profile 3

8 Functions supporting master data for network points

Transaction: */N/PLGA/EDM_MD_CHANGE*

Within this functionally from *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* supporting for creating of some master data specific data is given for network points.

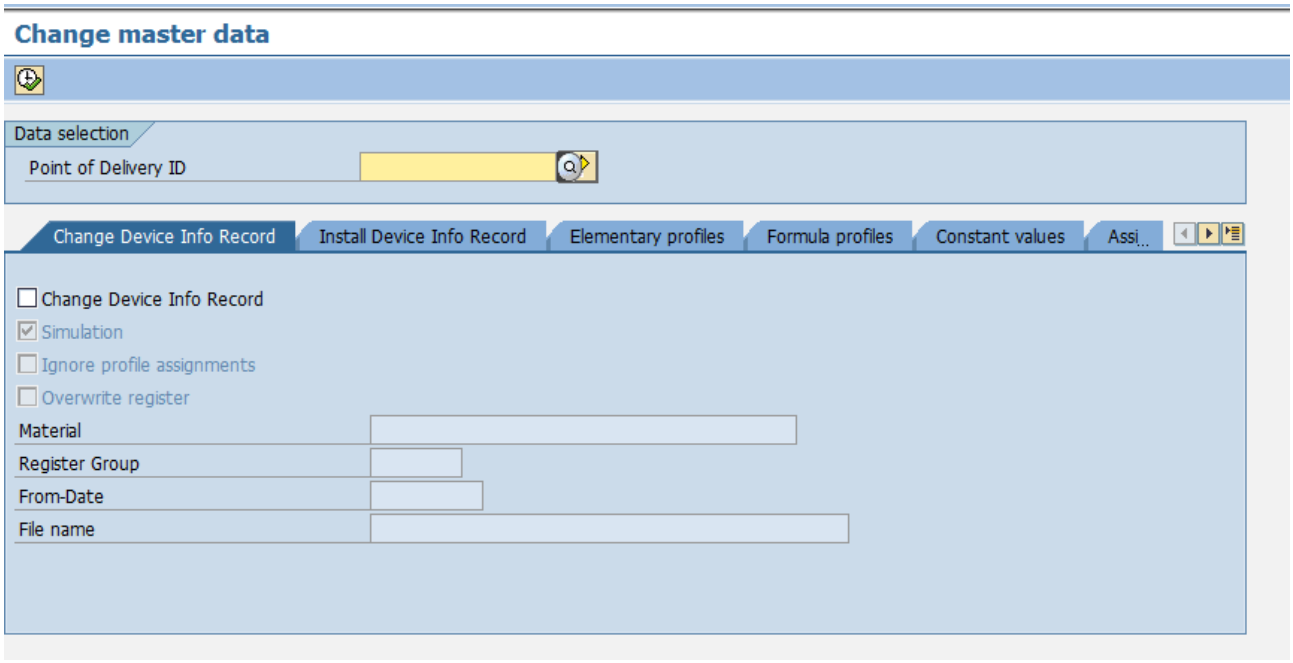


Figure 139: Change master data - overview

The following options are available

Element	Description
Change Device Info Record	It is possible to change existing device info records
Install Device Info Record	It is possible to billing relevant install of device info records
Elementary profiles	It is possible to create elementary profile including assignment to register
Formula profiles	It is possible to create formula profile including assignment to register
Constant Values	It is possible to change constant values within formula profile
Assign profile from formula	It is possible to assign profile from formula profile to register from the same device info record

Table 15: Change master data - overview

8.1 Change Device Info Record

Transaction: */N/PLGA/EDM_MD_CHANGE*

Within this functionality it is possible to change existing device info records regarding the data from the input list.

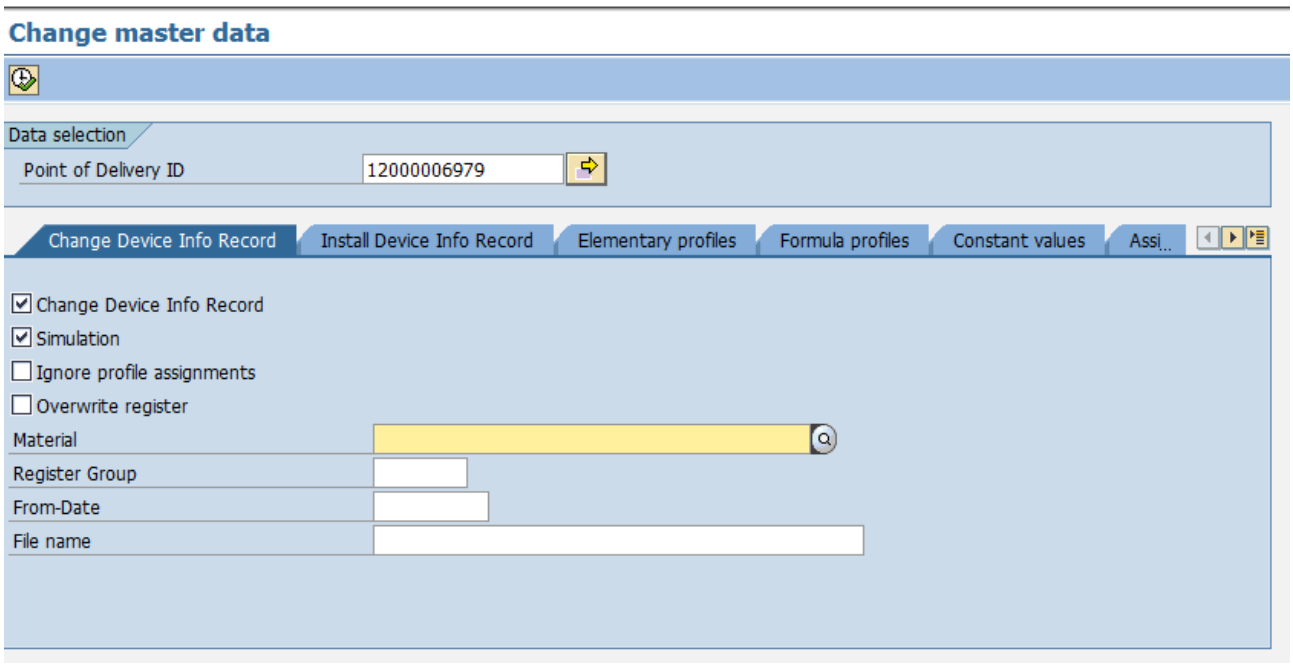


Figure 140: Change master data – Change Device Info Record

The following options are available

Element	Description
Section "Data Selection"	
Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Change Device Info Record"	
Change Device Info Record	If this option is active ☑ existing device info record could be changed. Note: If more then one functionality active then each functionality is carry out
Simulation	If this option is active ☑ then the changes are simulated.
Ignore profile assignments	If this option is active ☑ then existing profile assignments are ignored, otherwise a check of existing profile values are taken place.
Overwrite register	If this option is active ☑ then existing time slices are overwritten if change date equal to valid from.
Material	Define material from device info record which should be changed
Register Group	Define register group from device info record which should be changed
From-Date	From-Date for changes
File Name	Enter path for file which include changes in inputfile

Table 16: Change master data – Change Device Info Record

The necessary file (excel) must have been the following structure:

A	B	C	D	E	F	G	H	I	J
RG	RG-TYPE	PREDECIMAL	DECIMALS	INTERVA	MeReUn	BiMU	RG-ID	RG-CODE	INFOFIELD
4	4	1	4	60				7-20:99.33.17	Final

Figure 141: Change master data – Change Device Info Record - input list

The input file should have the following information:

Element	Description
RG	Please enter the register which should be changed
RG-TYPE	Please enter the register type which should be changed
PREDECIMAL	Please enter the number of predecimal places
DECIMALS	Please enter the number of decimal places
INTERVAL	Please enter the interval length
MeReUn	Please enter the unit of measurement for meter reading
BiMU	Please enter the unit of measurement for billing
RG-ID	Please enter the register id
RG-CODE	Please enter the register code
INFOFIELD	Please enter the info field

Table 17: Change master data – Change Device Info Record – input list

It is possible to execute the functionality with simulation mode or active. In active mode changes are made.

After executing by pressing F8 or  the functionality a log is displayed.

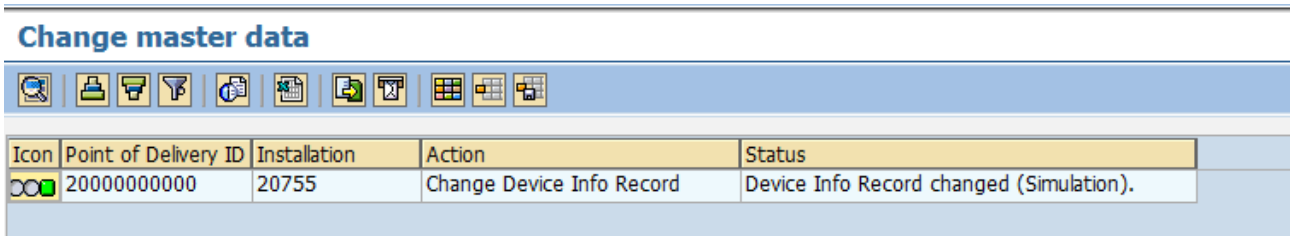


Figure 142: Change master data – Change Device Info Record – simulation log

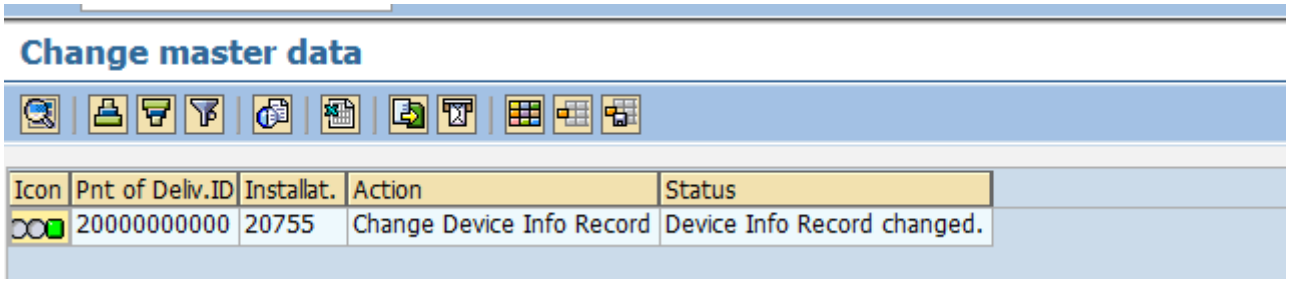


Figure 143: Change master data – Change Device Info Record - log

8.2 Install Device Info Record

Transaction: /n*/PLGA/EDM_MD_CHANGE*

Within this functionality it is possible to create and install device info records in network points.

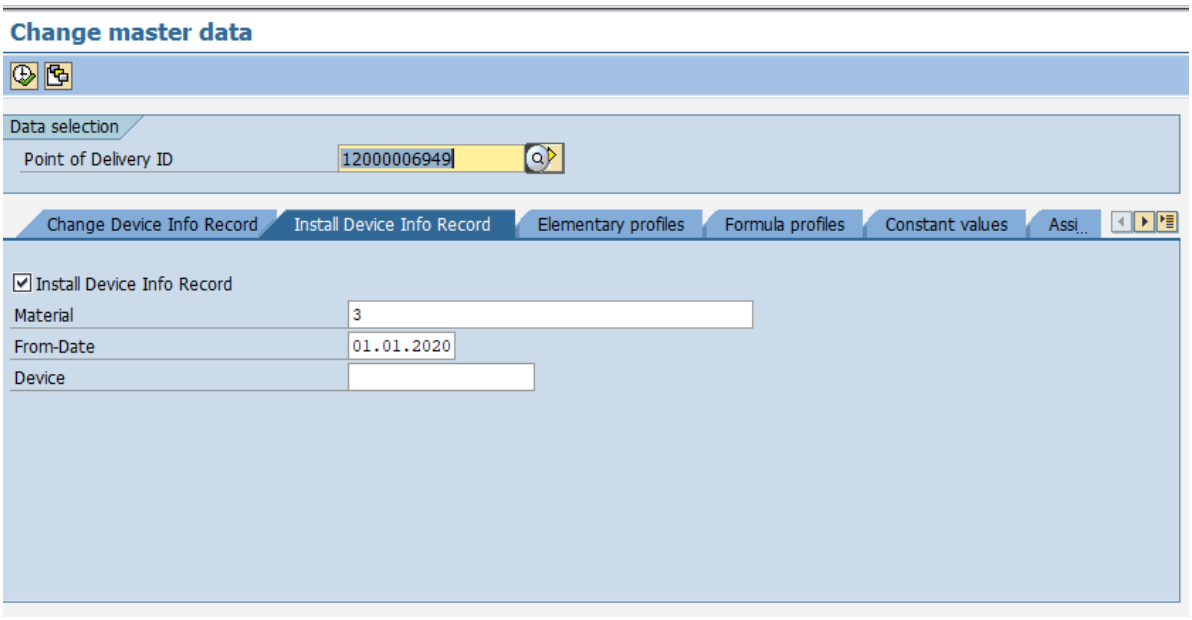


Figure 144: Change master data – Install Device Info Record

The following options are available

Element	Description
Section "Data Selection"	
Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Install Device Info Record"	
Install Device Info Record	If this option is active ☑ existing device info record could be changed. Note: If more then one functionality active then each functionality is carry out
Material	Please enter the material number for device info record
From-Date	Please enter From-Date for billing relevant installation
Device	This option is only relevant if there are no existing device info record from this material are existing und the first number should be given. Furthermore the device info record number is automatically given.

Table 18: Change master data – Install Device Info Record

After executing of this functionality a log is displayed.

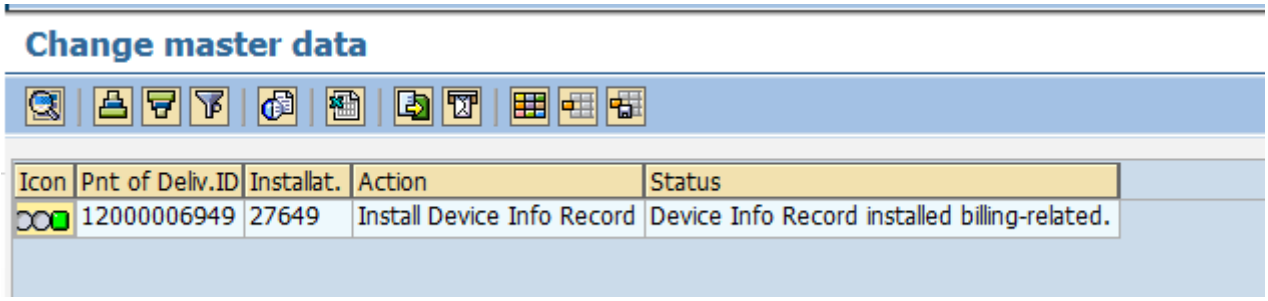


Figure 145: Change master data – Install Device Info Record - log

8.3 Elementary profiles

Transaction: /n*/PLGA/EDM_MD_CHANGE*

With this functionality it is possible to create and assign elementary profile to registers.

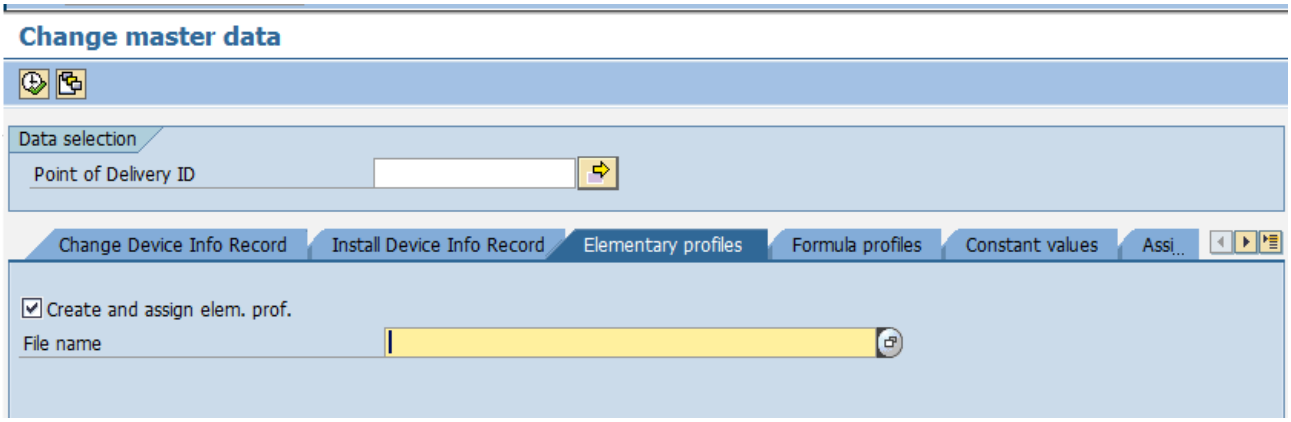


Figure 146: Change master data – Elementary profiles

The following options are available

Element	Description
Section "Data Selection"	
Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Install Device Info Record"	
Create and assign elem. Prof.	If this option is active ☑ elementary profile are created an assigned to register. Note: If more than one functionality active then each functionality is carry out
File Name	Enter path for file which include changes in input file

Table 19: Change master data – Install Device Info Record

The input file must have been the following structure:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Material	RG-Group	RG-Number	Role	Divisio	ProfType	PV category	Interval Length	MesUnit	DecPlace	Cons. Check grp	RVP group	Valid from	Valid to	Day Offset	Profile desc
3	G_IMC001	1	G015	02	21	1	60	m3	3			01.01.2020	060000	060000	volume

Figure 147: Change master data – Elementary profiles

The input file should have the following information:

Element	Description
Material	Please enter the material number
RG-Group	Please enter the Register group
RG-Number	Please enter the Register nummer
Role	Please enter the profile role for assignment
Division	Please enter the division
ProfType	Please enter the profile type
PV category	Please enter the profile value category

Interval Length	Please enter the interval length
MesUnit	Please enter the measurement unit for meter reading
DecPlace	Please enter the decimal places
Cons. Check group	Please enter the Consistence check group
RVP group	Please enter the replacement value procedure group
Valid from	Please enter the valid from date for the profile
Valid to	Please enter the valid from date for the profile assignment
Day Offset	Please enter the day offset date for the profile
Profile description	Please enter the profile description for the profile

Table 20: Change master data – Elementary profiles – input list

After executing the functionality a log is displayed.

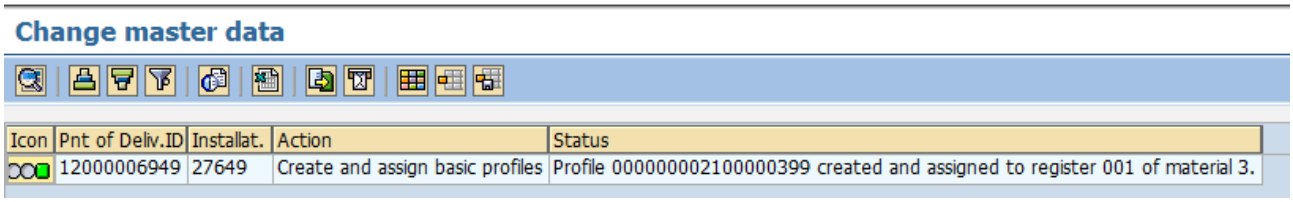


Figure 148: Change master data – Elementary profiles - log

8.4 Formula profiles

Transaction: /n*/PLGA/EDM_MD_CHANGE*

With this functionality it is possible to create and assign elementary profile to registers.

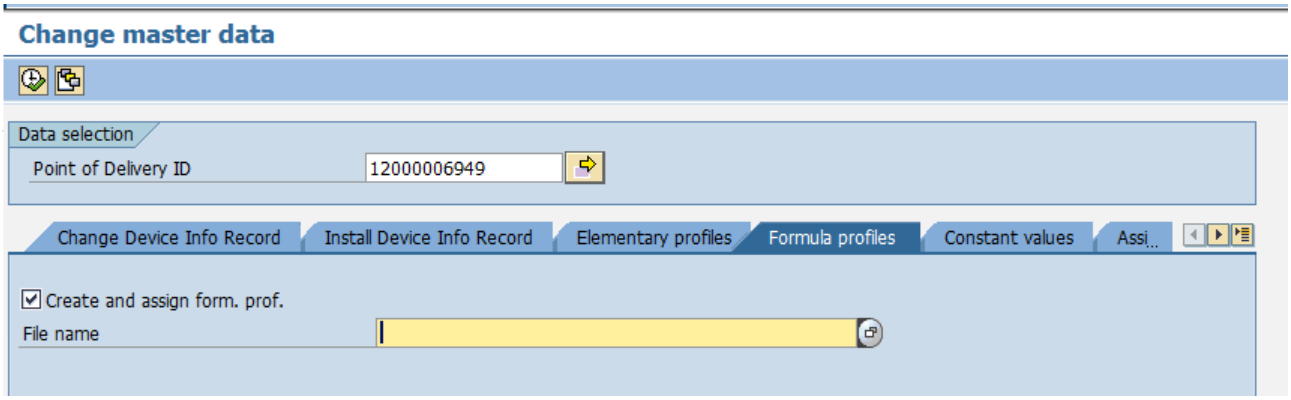


Figure 149: Change master data – Formula profiles

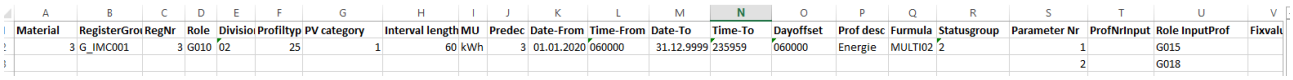
The following options are available

Element	Description
Section "Data Selection"	
Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Install Device Info Record"	
Create and assign form. Prof.	If this option is active ☑ formula profile are created and assigned to register.

	Note: If more then one functionality active then each functionality is carry out
File Name	Enter path for file which include changes in input file

Table 21: Change master data – Formula profile

The input file must have been the following structure:



Material	RegisterGro	RegNr	Role	Divisio	Profiltyp	PV category	Interval length	MU	Predec	Date-From	Time-From	Date-To	Time-To	Dayoffset	Prof desc	Furmula	Statusgroup	Parameter Nr	ProfNrInput	Role InputProf	Fixvalu
3	G_IMC001	3	G010	02	25	1	60	kWh	3	01.01.2020	060000	31.12.9999	235959	060000	Energie	MULTI02	2	1		G015	
																		2		G018	

Figure 150: Change master data – Elementary profiles

The input file should have the following information:

Element	Description
Material	Please enter the material number
RegisterGroup	Please enter the Register group
RegNr	Please enter the Register number
Role	Please enter the profile role for assignment
Division	Please enter the division
Profiltyp	Please enter the profile type
PV category	Please enter the profile value category
Interval length	Please enter the interval length
MU	Please enter the measurement unit for meter reading
Predec	Please enter the decimal places
Date-From	Please enter the valid from date for the profile as well as profile assignment
Time-From	Please enter the time from date for the profile as well as profile assignment
Date-To	Please enter the valid to date for the profile as well as the assignment
Time-To	Please enter the time to for the profile as well as the assignment
Timezone	Please enter the time zone for the profile
Dayoffset	Please enter the day offset date for the profile
Prof desc	Please enter the profile description for the profile
Furmula	Please enter the formula
Statusgroup	Please enter the status group
Parameter Nr	Please enter the number of the input profile
Role InputProf	Please enter the role of the input profile
Fixvalue	Please enter a fixed value if necessary
Date-From	Please enter the valid from date for the input profile assignment
Time-From	Please enter the time from date for the input profile assignment

Table 22: Change master data – Elementary profiles – input list

After executing the functionality a log is displayed.

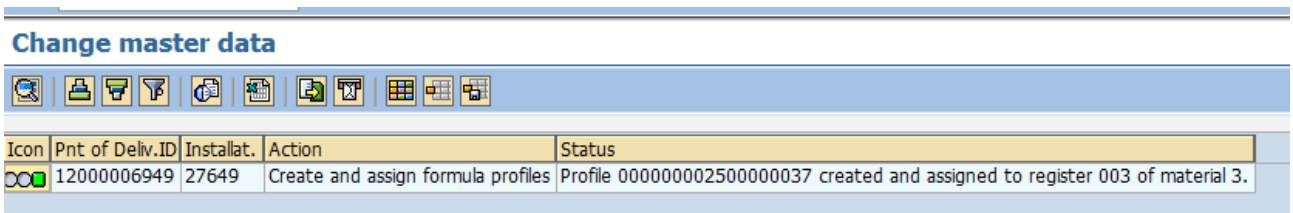


Figure 151: Change master data – Formula profiles - log

8.5 Constant values

Transaction: /n*/PLGA/EDM_MD_CHANGE*

With this functionality it is possible to change fixed values within formula profile.

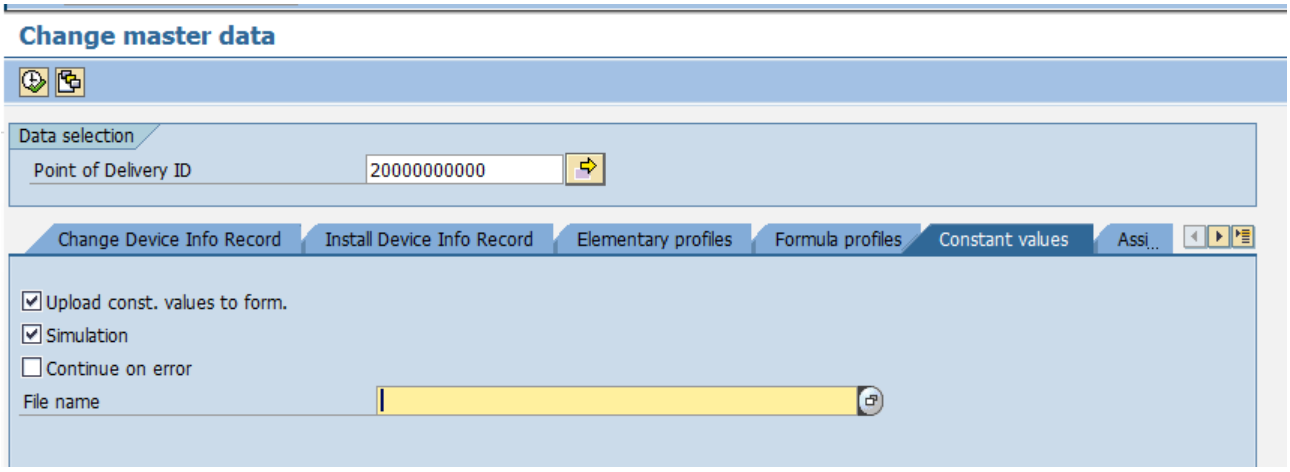


Figure 152: Change master data – Constant values

The following options are available

Element	Description
Section "Data Selection"	
Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Install Device Info Record"	
Upload const. values to form.	If this option is active ☑ constant values in formula profile can be updated. Note: If more then one functionality active then each functionality is carry out
Simulation	If this option is active ☑ then changes are simulated
Continue on error	If this option is active ☑ possible errors which occurred are ignored.
File Name	Enter path for file which include changes in input file

Table 23: Change master data – Formula profile

The input file must have been the following structure:

POD	Role	Formula	ParNumber	FixedValue	Date-From	Time-From
20000000000	G013	/PLGA/TQD	5	11	01.01.2020	060000
			6	1,12	01.01.2020	060000

Figure 153: Change master data – Constant values

The input file should have the following information:

Element	Description
POD	Enter the Point of Delivery

Role	Enter the profrole
Formula	Enter the formula
ParNumber	Enter the Number of input parameter
FixedValue	Enter the fixed values
Date-From	Enter the Date-From for fixed value
Time-From	Enter the Time-From for fixed value

Table 24: Change master data – Constant value – input list

After executing the functionality a log is displayed.

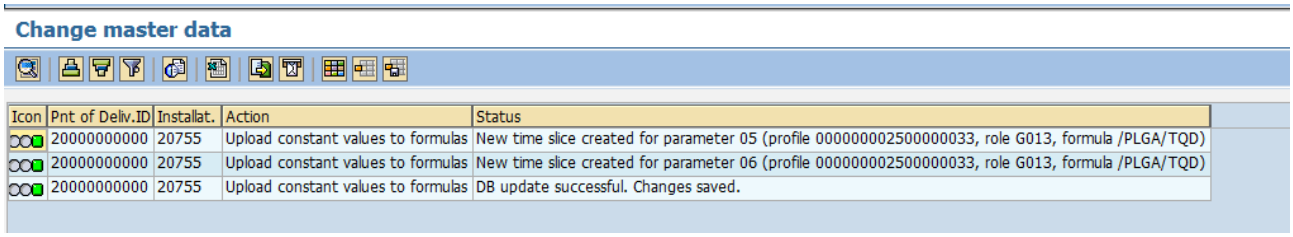


Figure 154: Change master data – Upload constant values - log

8.6 Assign profile from formula

Transaction: /n*/PLGA/EDM_MD_CHANGE*

Within this function it is possible to assing input profile from formula profile to register.

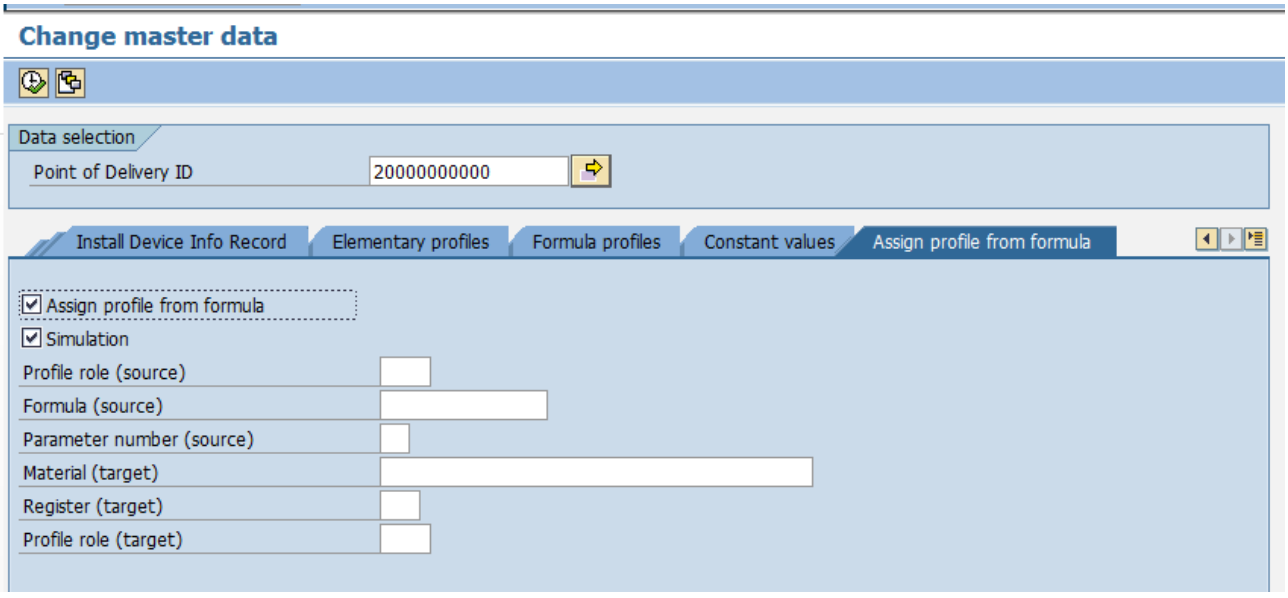


Figure 155: Change master data – Assign profile from formula

The following options are available

Element	Description
Section "Data Selection"	

Point of Delivery ID	Point of Delivery-ID, multi selection possible
Section "Assign profile form formula"	
Assign profile from formula	If this option is active ☑ it is possible to assign profile from formula profiles. Note: If more than one functionality active then each functionality is carry out
Simulation	If this option is active ☑ all changes are simulated
Profile role (source)	Enter source prof role
Parameter number (source)	Enter parameter number from formula profile
Material (target)	Enter target material number
Register (target)	Enter target register
Profile role (role)	Enter target profrole

Table 25: Change master data – Install Device Info Record

After executing of this functionality a log is displayed.

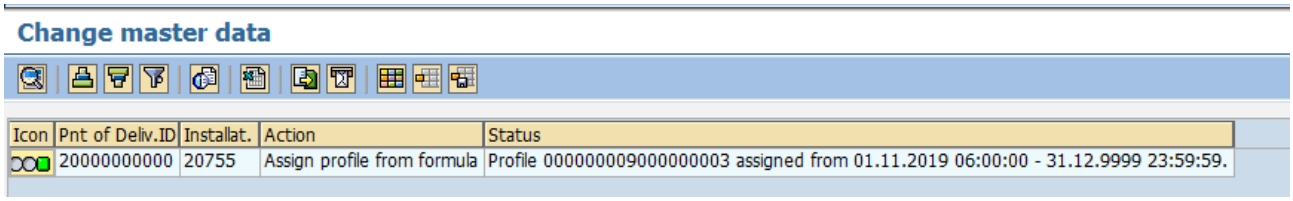


Figure 156: Change master data – Install Device Info Record - log

9 EDM Cluster Framework

Transaction: /n*/PLGA/ECF_RUN*

In order to correctly perform the day-to-day processes within the EDM, it is of prime importance to ensure the correctness and consistency of master data and transactional data. Since this data constitutes a huge number of data records across a multitude of database tables, whose content is - where applicable - constantly changing due to change of supplier and similar processes, manual supervision is a highly time-consuming task.

The purpose of the EDM Cluster Framework is to perform automated, recurring checks on large data sets. The framework allows user-configurable processes (so called clusters), which consists of an arbitrary number of individual check components, which are successively performed on a data set, which is provided by a finding component. The result is presented with the standard SAP system log, in order to quickly identify problems within the dataset.

Example: A simple cluster might consist of a finding component, which selects several EDM profiles within a certain range of profile numbers, and a check component, which checks the individual values of the EDM profile against user-defined thresholds.

The EDM Cluster Framework is delivered with a set of finding and checking components and in addition supports the usage of components developed in customer system in order to fulfill specific requirements not covered by the delivered components. Standard components and custom developed components can be arbitrarily combined into cluster configurations, provided the checks are suitable for the kind of data set provided by the finding component.

A properly defined cluster can either be executed directly by the user or be planned as a (possibly recurring) background job with the standard SAP background job capabilities.

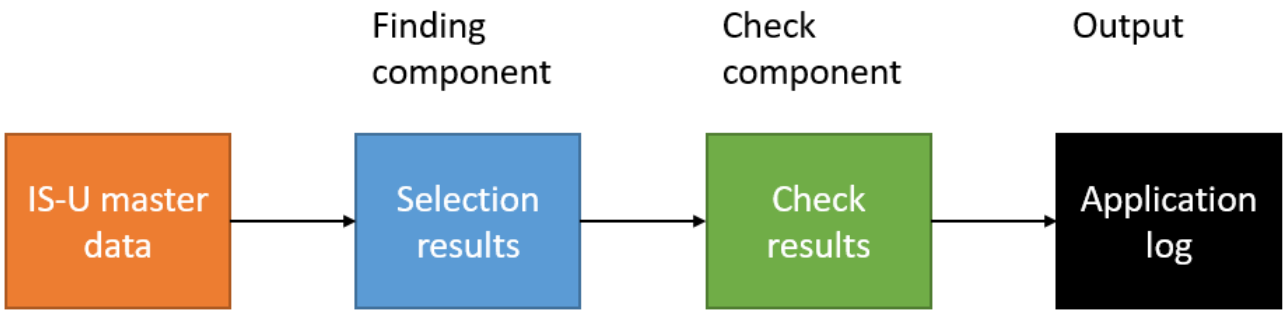


Figure 157: Schematic overview of EDM Cluster Framework Processing

To perform a check with the EDM Cluster Framework, it is necessary to define the relevant configuration for every cluster functionality.

9.1 Defining a Check Cluster configuration

Transaction: */N/PLGA/ECF_CFG*

The first step in creating a cluster configuration is to define the header data.

On the left side of the screen, select the folder "Clusters" and choose the "New Entries" option at the top:

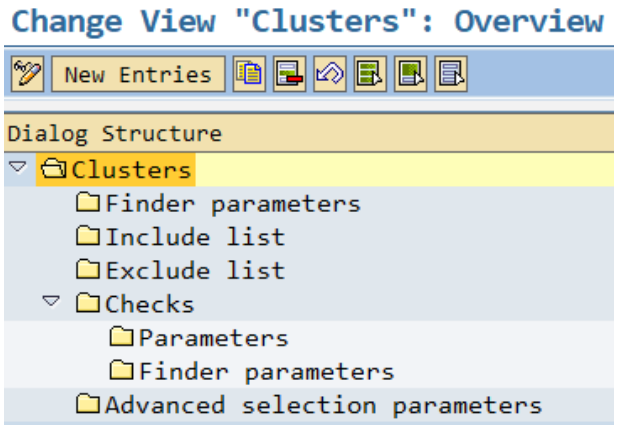


Figure 158: Cluster-configuration

On the right side of the screen, provide the details of the cluster. The following options are available:

Element	Description
Section "Clusters" – define a check cluster configuration	
Cluster ID	This is the ID, which uniquely identifies the cluster in the system
Cluster implementation	This is the ABAP class, which at runtime to orchestrates the execution of the individual finder and check components. The delivered default implementation is /PLGA/CL_ECF_CLUSTER. Customer specific variations must implement the interface /PLGA/IF_ECF_CLUSTER. The value help will list all suitable classes in the system
Finder ID	Each cluster can have one finder component, which selects the subsequently checked data set. The value help will list all Finder defined in this customizing
Description	Description of the cluster. This text is displayed in other value helps

Table 26: Clusters - details

Once the header data is complete, press Save and select the line:

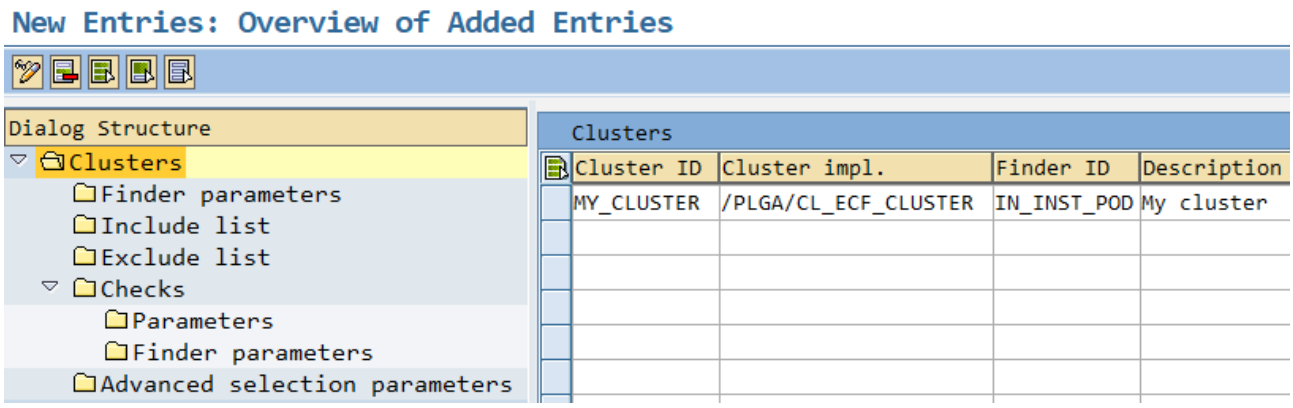


Figure 159: defining a cluster configuration

Now optionally provide additional properties of the cluster by double-clicking the corresponding sub-folders under Clusters.

9.1.1 Finder parameters

Most finder components have parameters, whose input must be provided in the configuration of the cluster, in which the finder component is used. In order to provide the parameters, select the cluster, double click "Finder parameters" on the left, and choose the "New Entries" option at the top:

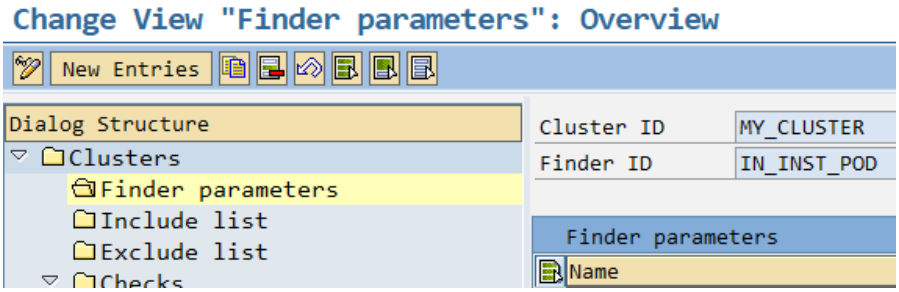


Figure 160: Cluster – finder parameters

On the right side of the screen, provide the necessary parameters as pairs of Name and Value. The value help of field "Name" will provide all possible parameters of the specific finder component:

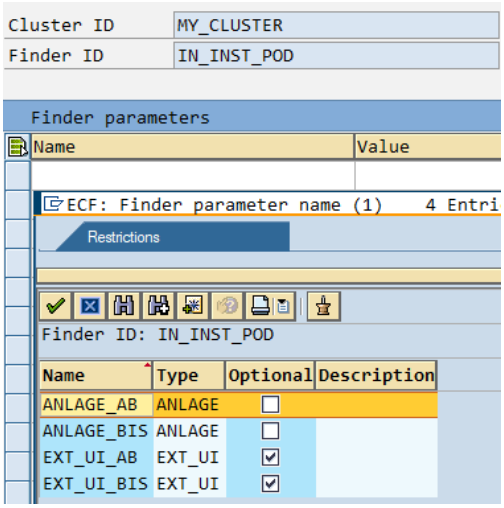


Figure 161: specific finder component – possible parameters

The value help displays the name of the parameter, the expected data type, an indicator whether this parameter is optional, and a descriptive text. Please check the individual help text of the relevant finder component for more details. When you are finished, save the parameters.

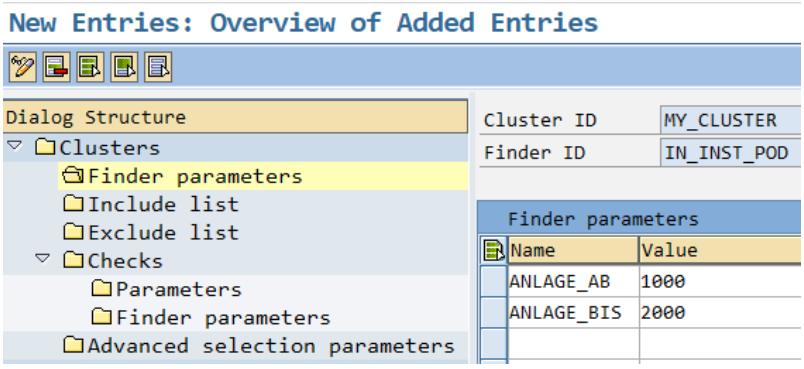


Figure 162: Finder parameters – filled with values

9.1.2 Include list/Exclude list

If there are certain objects, which shall not be checked, even though the finder component selects them, or if there are objects, which shall be checked, even though the finder component does not select them, you can use the Include list and the Exclude list.

In order to provide the IDs of these objects, select the cluster, double click "Include list" or "Exclude list" on the left, and choose the "New Entries" option at the top:

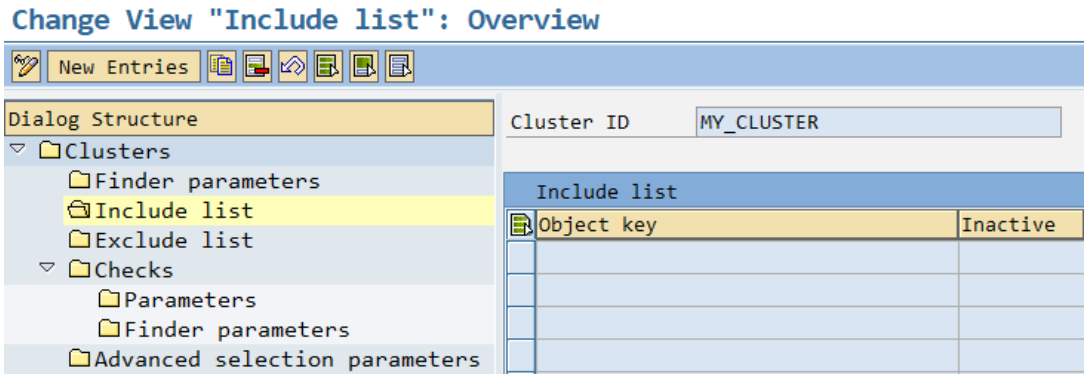


Figure 163: Cluster – include list

On the right side, enter the relevant object IDs. You can (temporarily) disable entries in this table via the "Inactive" checkbox on the right. When you are finished, save the entries.

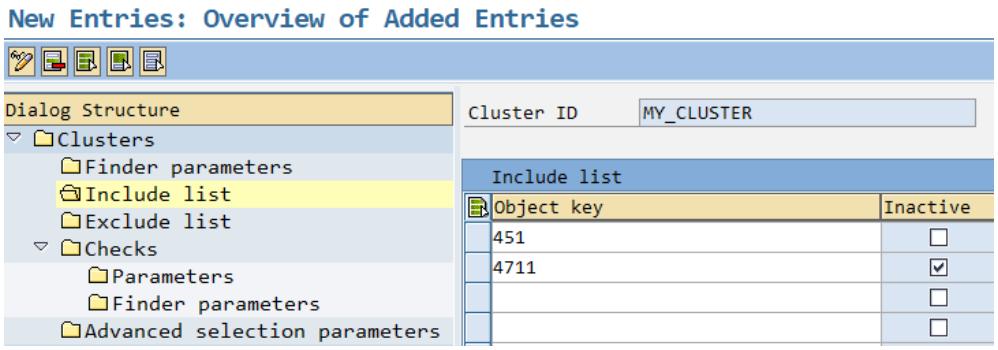


Figure 164: include list – filled with values

9.1.3 Checks

A cluster configuration can contain an arbitrary number of checks. To add a check to a cluster, select the cluster in the "Clusters" folder and then double-click "Checks" on the left and choose "New Entries" at the top.

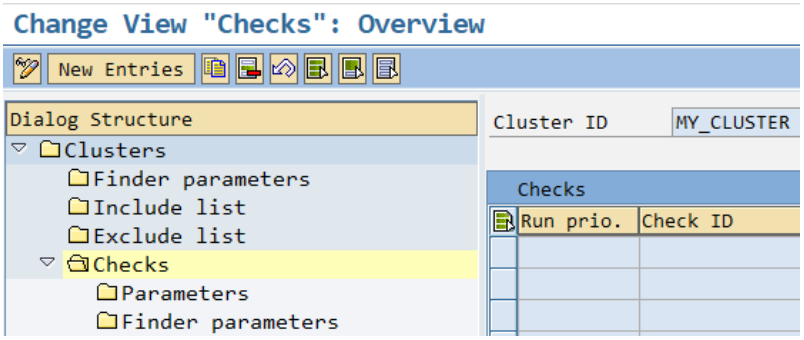


Figure 165: Cluster-add a check

The following options are available:

Element	Description
Section "Clusters-Checks" – definition of a check	
Run priority	Checks within in cluster are executed in ascending order according to their run priority. Example: a check with priority 7 is executed before a check with priority 10. The run priorities do not have to be consecutive, but each check within a cluster configuration must have a unique run priority
Check ID	The ID of the Check to be used in this step. The value help will list all Checks defined in this customizing

Finder ID	Optionally, each Check can have its own Finder. Some Checks require this additional Finder, since they compare the sets of objects determined by the Finder of the Cluster against a set of objects determined by its own finder. The value help will list all Finders defined in the customizing
Lower limit/Upper limit	In some Checks a value (for example a profile value) is checked against a value range. The upper and lower limits of this range can be entered here
Trigger yellow/Trigger red	In some Checks, the specific negative check result (warning/error) depends on these values. For example: In a Check, in which a deviation in calculated, the value in Trigger yellow and Trigger red could influence if a specific deviation value should cause a warning or an error
Inactive	Checks, which have this checkbox checked, are not executed

Table 27: Clusters-checks - details

On the right side, enter the relevant check details. When you are finished, save the check.

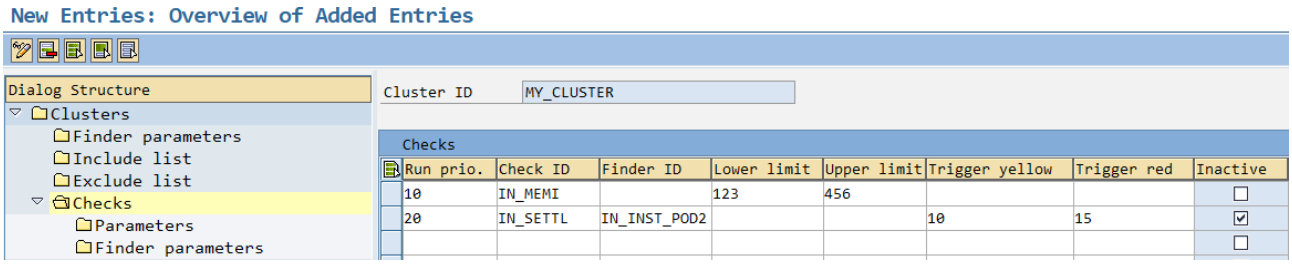


Figure 166: Cluster-check – filled with values

9.1.3.1 Check parameters

Some Checks require parameters. To define the parameter values, select a Check of the cluster, then double click on "Parameters" and the select "New Entries":

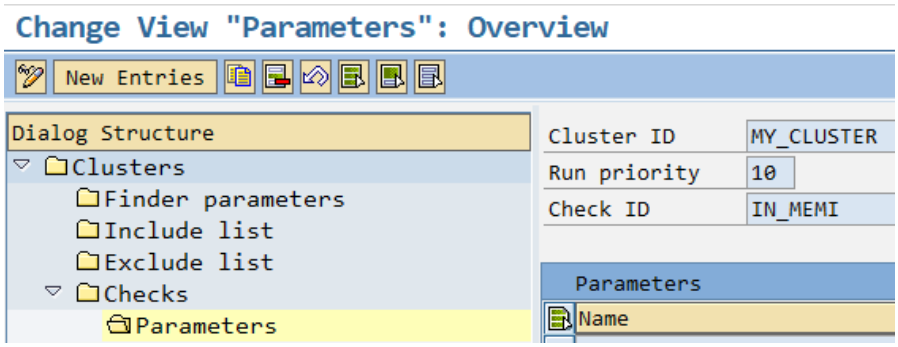


Figure 167: Cluster-check – check parameters

On the right side of the screen, provide the necessary parameters as pairs of Name and Value. The value help of field "Name" will provide all possible parameters of the specific check component:

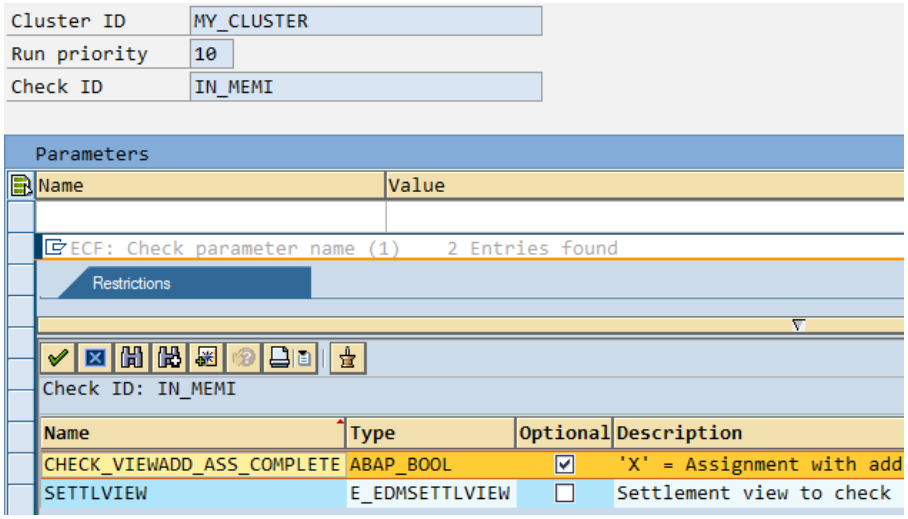


Figure 168: Cluster-Check – define check parameters details

The value help displays the name of the parameter, the expected data type, an indicator whether this parameter is optional, and a descriptive text. Please check the individual help text of the relevant check component for more details. When you are finished, save the parameters.

9.1.3.2 Check finder parameters

Setting parameters of a Finder of a Check works the same way as setting parameters for the Finder of a Cluster.

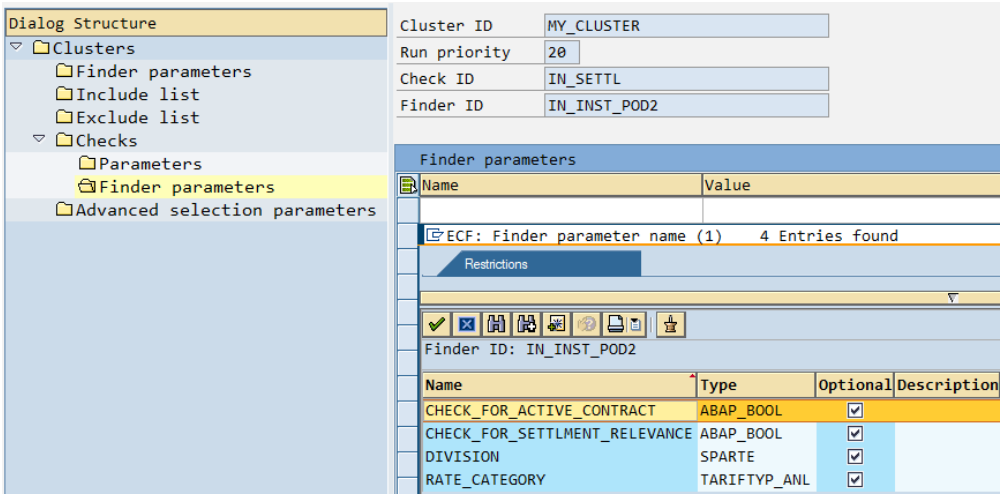


Figure 169: Cluster-Check – check finder parameters details

9.1.4 Advanced selection parameters

Some Finders support advanced selection parameters. Advanced selection parameters are multi-value parameters, i.e. an arbitrary number of values can be assigned to one parameter. For example, a Finder for selecting profiles could use an advanced selection parameter ROLE, which defines a number of profile roles, with which the to-be found profiles are assigned to registers. Each value can be specified as a range, i.e. it can be specified the same way a select option of a report would be specified. Advanced selection parameters can only be specified for the finder of a specific cluster. To do so, on the left side, go to "Clusters", select the cluster on the right side, and then double click on the "Advanced selection parameters" folder on the left side. Then choose "New Entries" at the top.

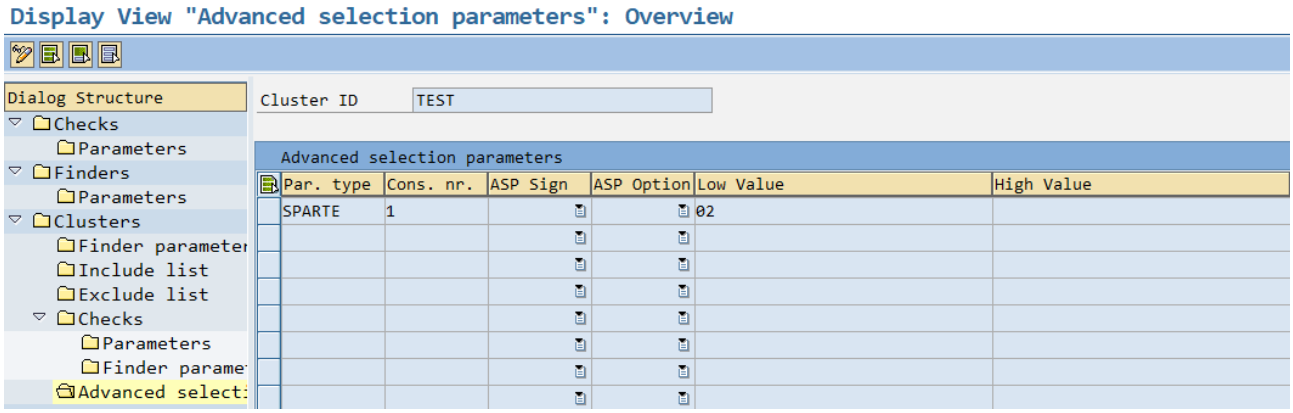


Figure 170: Advanced selection parameters – define parameters details

On the right side of the screen, provide the necessary parameters. The following selection are available:

Element	Description
Section "Clusters-Checks-Advanced selection parameters" – definition of a check	
Parameter type	The ID of the parameter
Consecutive number	A consecutive number to support multiple values for the same parameter type
ASP Sign	Choose a value from the dropdown. "I" means "Include values which satisfy the following condition", "E" mean "exclude values which satisfy the following condition"
ASP Option	Chose a value from the dropdown. This defines the comparison operator, which is used, when comparing a value to the value in the following fields
ASP Low	The value to which a checked value is compared to. Depending on the ASP Option, a pattern like G0* can be specified
ASP High	Some comparison options (like BT) require two values for comparison. This field holds the second value

Table 28: Advanced selection parameters - details

If ASP Sign and ASP Option are not specified, they default to I and EQ respectively, i.e. it will behave as if the entry was not a range.

Examples:

- ASP Sign: I, ASP Option: GT: Value: 13 -> Include all values greater than 13
- ASP Sign: I, ASP Option: CP: Value G00* -> Include all values which start with G00

When you are finished, save the advanced selection parameters.

9.2 Executing a Check Cluster

Transaction: */N/PLGA/ECF_RUN*

To execute a Check Cluster, the necessary parameters must be provided in the selection screen:

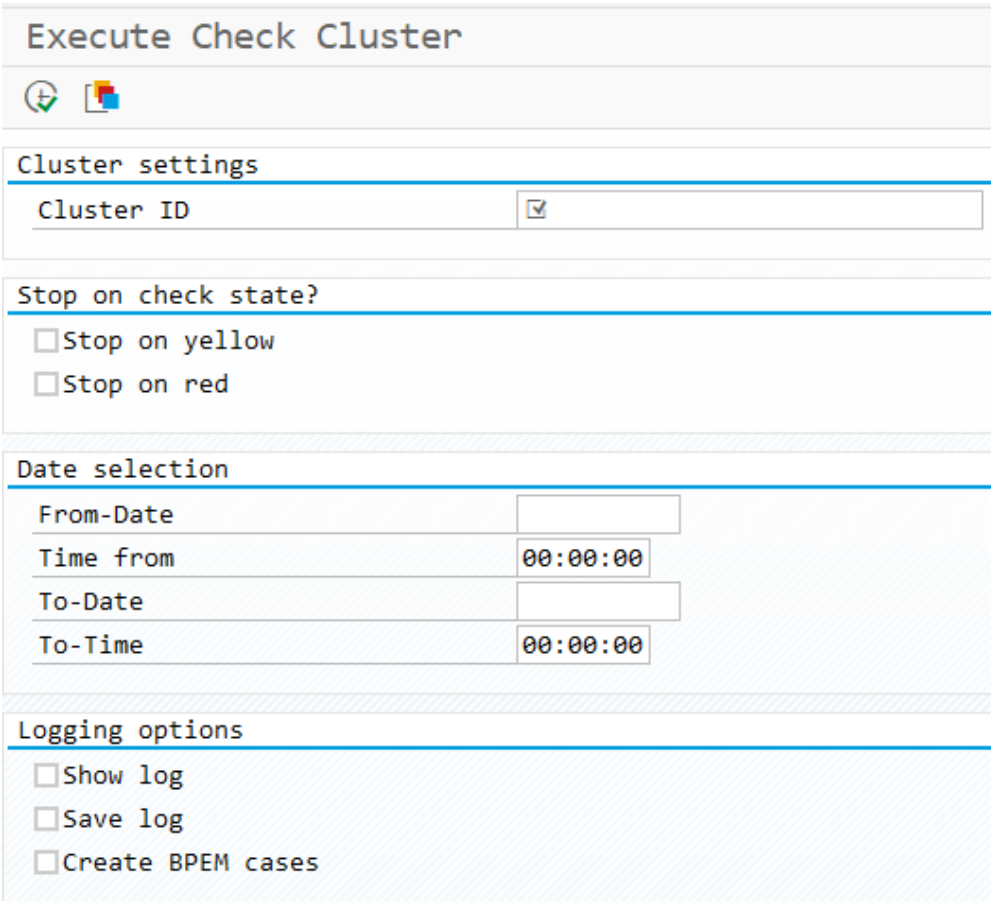


Figure 171: Cluster-Check – execute check cluster

The following selection are available:

Element	Description
Section "Check" – definition of a check	
Cluster ID	The ID of the Cluster configuration to execute. Use the value help to get a list of all available Cluster configurations
Stop on yellow	This flag determines, whether the execution of a Cluster will be terminated, if a warning or an error has occurred in a Check
Stop on red	This flag determines, whether the execution of a Cluster will be terminated, if an error has occurred in a Check
From-Date/Time from	The delivered Finders and Checks use these parameters as the starting point in time when handling time-dependent data
To-Date/To-Time	The delivered Finders and Checks use these parameters as the ending point in time when handling time-dependent data
Show log	If this checkbox is checked, the application log, which is created during the execution of a Cluster Check, will be displayed, after the execution of the Cluster has finished
Save log	If this checkbox is checked, the application log, which is created during the execution of a Cluster Check, will be stored in the database
Create BPEM cases	If this checkbox is checked, the application log will include the necessary entries to create BPEM cases. Note: This setting is only effective when the "Save log" checkbox is checked, and if the Check is assigned a BP Code in customizing (see section "Defining a Check")

Table 29: Cluster-Check – execute check cluster - details

After exceution the cluster check by pressing F8 or  a log with the results is displayed.

Cluster Check results

Technical Information

Date/Time/User	Numb	External ID	Object text	Subobject Text	Transactio...	Program	Mode
11.06.2020 18:46:14 RFLEISCH	29	CHECK_PROFIL...	PROLOGA Che...		/PLGA/EC...	/PLGA/CL_...	Dialog pr

0 1 1 27

Type	Check ID	Object key	Message Text
			External log id 'CHECK_PROFILE_STATUS2_20200611_184614'
			Cluster 'CHECK_PROFILE_STATUS2' (runtime: 1,157533 seconds)
			Checked period: 01.01.2020 06:00:00 - 02.01.2020 05:59:59
			Checked objects: 1 error(s), 1 warning(s), 6 no error
			Task data: 8 objects found by finder 'PRP_ADV' (runtime 0,836291 seconds)
	PRP_STAT_0_C		Check 'PRP_STAT_0_C' (runtime 0,30554 seconds)
	PRP_STAT_0_C		Parameters:
	PRP_STAT_0_C		"CHECK_ADD_STAT_ONLY": "X"
	PRP_STAT_0_C		"INTERVAL_LENGTH": "1"
	PRP_STAT_0_C		"INTERVAL_TYPE": "D"
	PRP_STAT_0_C		"STATUS_1": "IU015"
	PRP_STAT_0_C		Checked objects: 1 error(s), 1 warning(s), 6 no error
	PRP_STAT_0_C		Number of task data objects before/after check: 8/8
	PRP_STAT_0_C	000000002100000005	Checking profile '2100000005' at PoD 'DE000001261230000000000000000004'.
	PRP_STAT_0_C	000000002100000005	6 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000006	Checking profile '2100000006' at PoD 'DE000001261230000000000000000005'.
	PRP_STAT_0_C	000000002100000006	0 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000016	Checking profile '2100000016' at PoD ''.
	PRP_STAT_0_C	000000002100000016	0 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000017	Checking profile '2100000017' at PoD 'DE000001000000000000000000000001'.
	PRP_STAT_0_C	000000002100000017	14 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000019	Checking profile '2100000019' at PoD 'DE00000126123000000TEST000003681'.
	PRP_STAT_0_C	000000002100000019	0 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000020	Checking profile '2100000020' at PoD 'DE00000126123000000SDA0000003681'.
	PRP_STAT_0_C	000000002100000020	0 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000127	Checking profile '2100000127' at PoD 'DE00000126123000000FDA0000000815'.
	PRP_STAT_0_C	000000002100000127	0 values with check status between 01.01.2020 06:00:00 and 02.01.2020 05:59:59.
	PRP_STAT_0_C	000000002100000128	Checking profile '2100000128' at PoD 'DE00000126123000000SDA0000003675'.

Figure 172: Cluster-Check – execute check cluster log - exemplary

9.2.1 Executing a Check Cluster as a background job

Cluster Checks can be executed as a background job with the SAP standard functionalities, like any other report, for example via transaction SM36, using */PLGA/ECF_EXECUTE_CLUSTER* as the report name. For recurring jobs, the best practice is to schedule the report with a single variant, in which the From-Date and To-Date fields are dynamically determined.

To get on overview of the status of the job instances, use SAP standard transaction SM37.

9.3 Display Cluster Framework logs

Transaction: */N/PLGA/ECF_LOG*

The application logs created during the execution of a Check Cluster can optionally be saved to the database (see section "Executing a Check Cluster"). This transaction can be used in order to review one or more logs at a later point in time.

The standard transaction for displaying application logs (SLG1) can theoretically be used as well, but it lacks certain features like displaying the additional context columns.

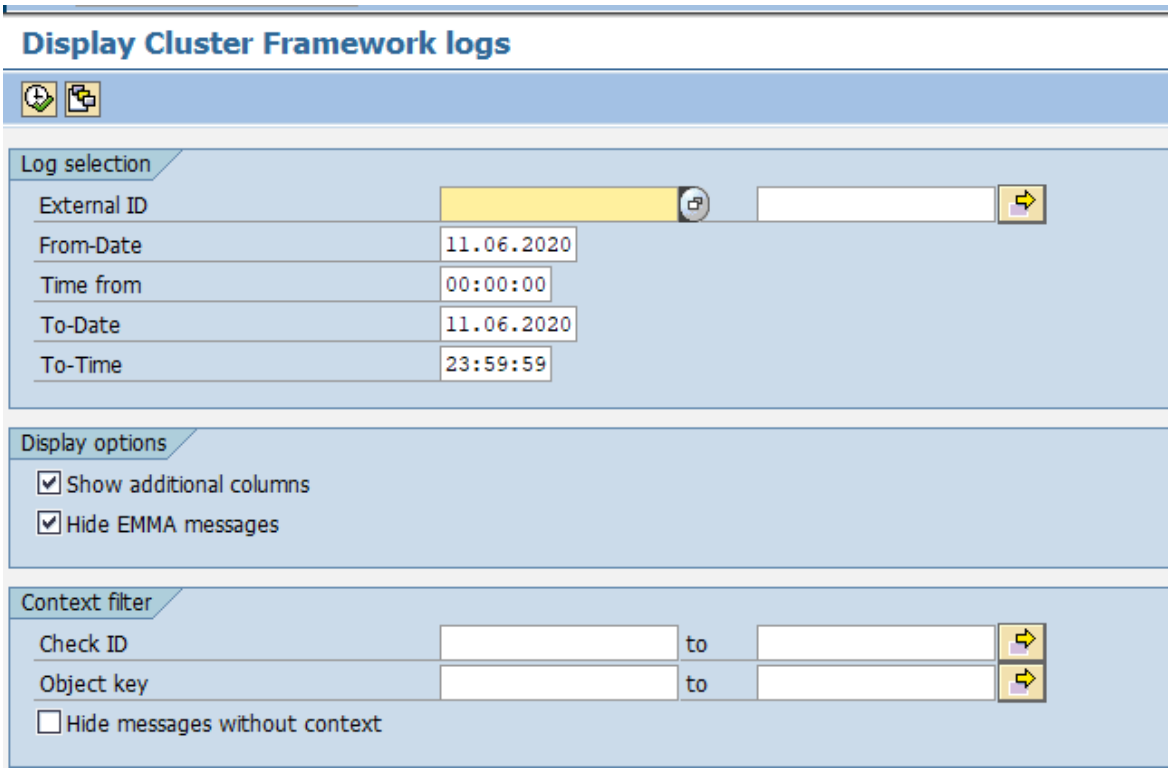


Figure 173: Display Cluster Frameworks logs

The following options are available:

Element	Description
Section "Check" – definition of a check	
External ID	The external ID of a cluster is by default in the pattern <CLUSTER_ID>_YYYYMMDD_HHMMSS. For example, a Cluster Configuration DEMO_CLUSTER, executed on 13th of January 2020 at 09:15:00 would create a log with the external ID DEMO_CUSTER_20200113_091500. Use the value help to choose from the available logs. This field is a multi-selection, i.e. you can view more than one log at the same time
From-Date	Selection for the date from for which the log was created and saved.
Time from	Selection for the time from for which the log was created and saved.
To-Date	Selection for the date to from for which the log was created and saved.
To-Time	Selection for the time to for which the log was created and saved.
Show additional columns	The application logs created by the Cluster Framework contain data for two additional columns, one for the ID of the Check, which created the message and one for the key of the checked objects. If this check box is checked ☑, these additional columns will be displayed
Hide EMMA messages	The application logs created by the Cluster Framework optionally contain certain marker entries, which are processed when creating BPEM cases. This can clutter

	up the output. If this checkbox is checked ☑, these messages are filtered out and will not be displayed
Check ID	With this fields you can filter the displayed messages by the value of the CHECK_ID field of their context. You could for example display multiple logs and only see the results of a specific check. You can use the value help for picking the check ID
Object key	With this fields you can filter the displayed messages by the value of the OBJECT_KEY field of their context. You could for example display multiple logs and only see the results of a specific object. You must provide the values with leading zeros, since they cannot be added automatically, since the object key is generic and thus the length of the key of the specific object is not available
Hide messages without context	If this checkbox is checked ☑, messages without any context information (e.g. statistical values like runtime etc.) will not be displayed

Table 30: Display Cluster Freamework logs

After execution all logs with are matched to the selection criteria are shown.

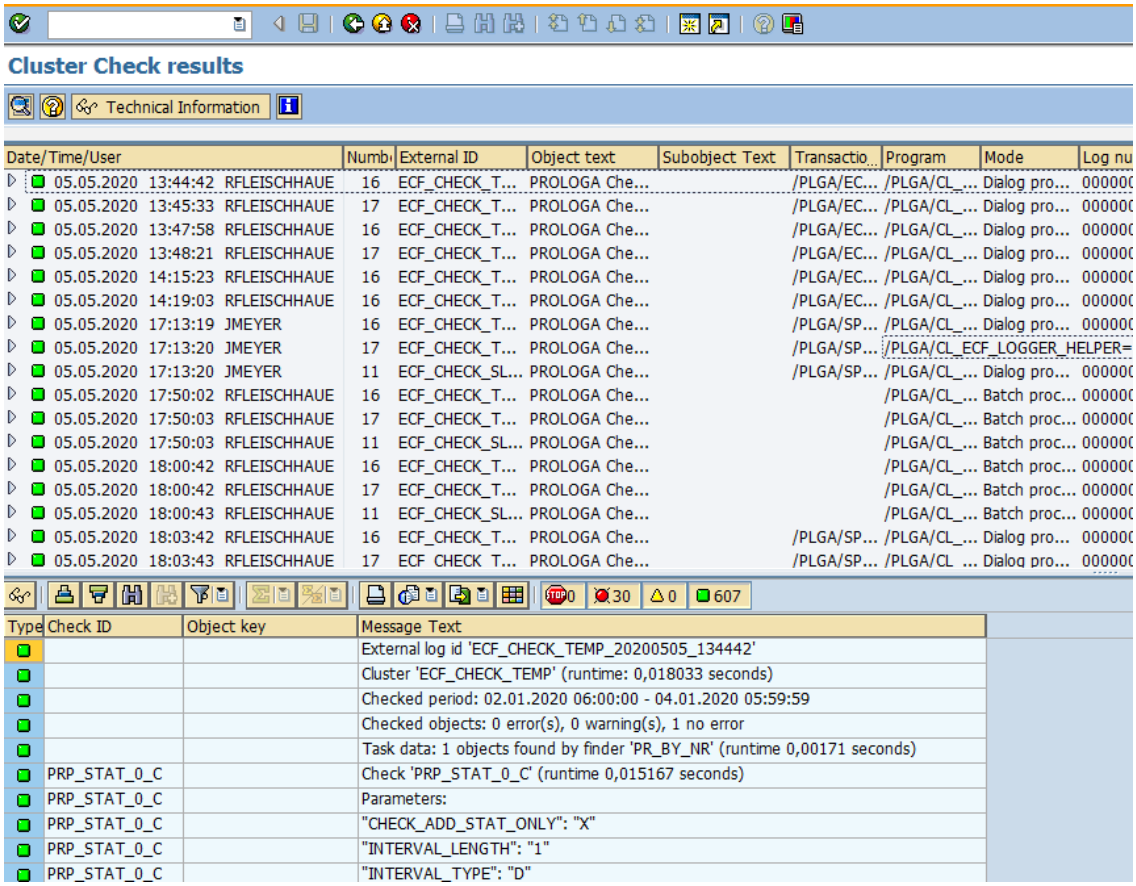


Figure 174: Display Cluster Frameworks logs - details

9.4 Check specific configuration

Transaction: */N/PLGA/ECF_CHK*

Some Checks require additional configuration information, beyond what is provided via the parameters. This information is stored within master data tables, which can be maintained with the aforementioned transaction.

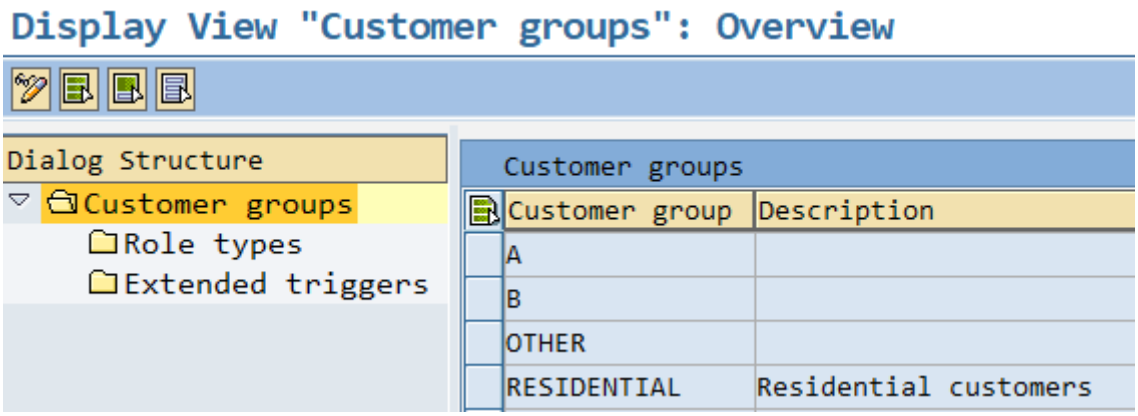


Figure 175: Cluster-Check – define check parameters details

The following configuration tables are included in the view cluster:

Element	Description
Customer groups	Customer groups allow to partition customers into groups of customers, which share common attributes, such as load profile.
Role types	Stores information about load profile assignments per customer group. For each combination of grid operator and profile assignment role this table stores whether this is an assignment for actual consumption or forecast, the division, the profile number of the load profile and the temperature area
Extended triggers	A Cluster Configuration by default defines "trigger" values for Checks, which are used to determine whether a Check should issue a Warning or an Error. Some checks use extended triggers, which define a negative and a positive threshold for warnings and errors. Extended triggers are defined per customer group.

Table 31: Cluster Framework – master data

Customer groups allow to partition customers into groups of customers, which share common attributes, such as load profile.

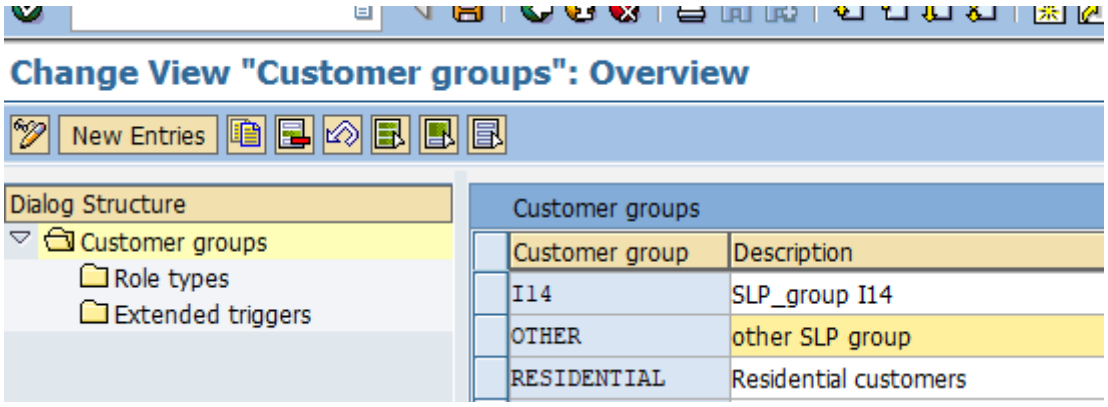


Figure 176: Customer groups

The following information are available.

Element	Description
Customer gropu	Enter unique ID for the customer group
Description	Enter descripstion for customer group

Table 32: Cluster Framework – customer groups master data

Role types stores information about load profile assignments per customer group. For each combination of grid operator and profile assignment role this table stores whether this is an assignment for actual consumption or forecast, the division, the profile number of the load profile and the temperature area.

To maintain role types to customer groups it is necessary to mark the line within the customer groups and then click twice on the section Role types.

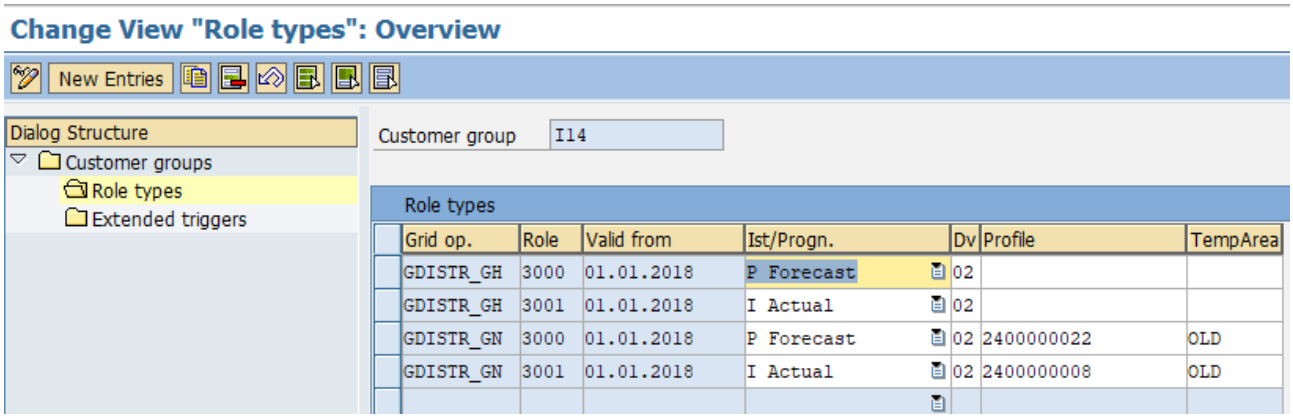


Figure 177: Role types for Customer groups

The following information are available.

Element	Description
Grid operator	Enter the grid operator
Role	Enter the specific profile role for the allocation on installation
Valid from	Enter the valid from date, for which the entry is valid
Ist/Prog	Enter P = Forecast or I = Actual for the type of profile assignment
Division	Enter the division
Profile	Enter the SLP profile
Temperature area	Enter the temperature area

Table 33: Cluster Framework – role types master data

Extended triggers: A Cluster Configuration by default defines "trigger" values for Checks, which are used to determine whether a Check should issue a Warning or an Error. Some checks use extended triggers, which define a negative and a positive threshold for warnings and errors. Extended triggers are defined per customer group.

To maintain extended triggers to customer groups it is necessary to mark the line within the customer groups and then click twice on the section Role types.

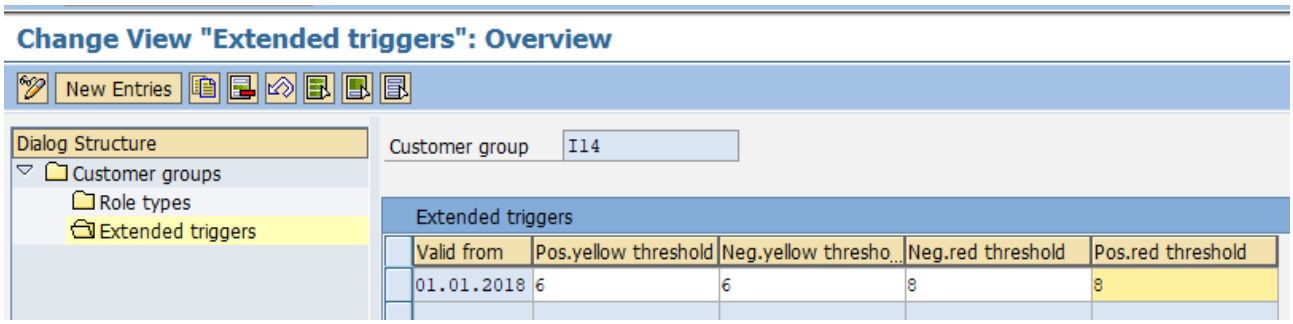


Figure 178: Extended triggers for Customer groups

The following information are available.

Element	Description
Valid from	Enter the date for which the threshold are relevant
Pos. yellow treshold	Enter the limit for the positiv yellow threshold
Neg. yellow threshold	Enter the limit for the negativ yellow treshold
Pos. red treshold	Enter the limit for the positiv red threshold
Neg. red threshold	Enter the limit for the negativ red treshold

Table 34: Cluster Framework – extended triggers master data

9.5 Delivered content

The EDM Cluster Framework is delivered with a set of Finders and Checks. This content can be categorized as follows:

- Finder/Checks for installations
- Finder/Checks for EDM profiles
- Finder/Checks for load profiles (SLP)

The business logic of these component is based on the components of the AllocationGuard Clusterframework of the ECC addon "SAP Energy Data Management, add-on for gas regulatory compliance by PROLOGA", thus (manually) migrating already existing cluster configuration from ECC to S/4HANA should be possible with little effort.

The following sections give a short overview of the content.

9.5.1 Content for installations

For checking installations, three Finder and four Checks are delivered. They all work on the same kind of data and can thus be combined in any way.

¤	IN_INST_POD¤	IN_INST_POD2¤	IN_POD_ADV¤
IN_MEMI¤	X¤	X¤	X¤
IN_SETTL¤	X¤	X¤	X¤
IN_TEMPAREA¤	X¤	X¤	X¤
IN_VOLTLVL¤	X¤	X¤	X¤

Figure 179: Combination matrix for installation components

9.5.1.1 Finder: IN_INST_POD - Finder for installation based on installation number and pod description

Description: Finder for installation based on installation number and pod description

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
ANLAGE_AB	No	Select Installation from
ANLAGE_BIS	No	Select Installation to
EXT_UI_AB	Yes	Select external PoD description from
EXT_UI_BIS	Yes	Select external PoD description to

Table 35: Parameters of Finder IN_INST_POD

Finder IN_INST_POD selects installation in two steps: First, all installations are selected from table EANL which are in the range between the parameter values ANLAGE_AB and ANLAGE_BIS. Then, if parameters EXT_UI_AB and EXT_UI_BIS were supplied, all installations, which are associated with the Points of Delivery in the range between EXT_UI_AB and EXT_UI_BIS are selected. The time slices involved in the association (in tables EUITRANS and EUIINSTLN) are not considered.

The Include list may contain additional installation numbers. These are added to the result of the Finder. The exclude list may contain installation numbers. Installation in the result of the Finder are removed, if they are present in the exclude list. An installation present in both include list and exclude list will not be in the result of the finder.

9.5.1.2 Finder: IN_INST_POD2 - Finder for installation based on rate type and division

Description: Finder for installation based on rate type and division

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_FOR_ACTIVE_CONTRACT	Yes	X for check for active contract
CHECK_FOR_SETTLMENT_RELEVANCE	Yes	X for check for active settlement relevance
RATE_CATEGORY	Yes	Enter rate type
DIVISION	Yes	Chose division

Table 36: Parameters of Finder IN_INST_POD2

Finder IN_INST_POD2 selects installations based on the following criteria:

If parameter CHECK_FOR_ACTIVE_CONTRACT is set to X, only installations with an active contract are selected. An active contract is a contract for this installation (table EVER), for which the move-in date (column EINZDAT) is not after the beginning of the check period and the move-out date (column AUSZDAT) is either empty or not before the end of the check period.

If the parameter CHECK_FOR_SETTLMENT_RELEVANCE is set to X, only installations, which have at least one register assigned (table EASTS), which is not marked as "not settlement relevant" (column ZWNSETTL). The assignment of the register must not start after the beginning of the check period and must not end before the end of the check period.

If a rate category was supplied in parameter RATE_CATEGORY, only installations which have an installation time slice (table EANLH) with this rate category (column TARIFTYP) are selected. The installation time slice must not start after the beginning of the check period and must not end before the end of the check period.

If a division was supplied in parameter DIVISION, only installations of this division are selected.

The include list may contain additional installation numbers. These are added to the result of the Finder. The exclude list may contain installation numbers. Installation in the result of the Finder are removed, if they are present in the exclude list. An installation present in both include list and exclude list will not be in the result of the finder.

9.5.1.3 Finder: IN_POD_ADV - Finder for installation based on rate type, division and active contract

Description: Finder for installation based on rate type, division and active contract

Advanced selection parameters: Yes

The following parameters are available:

Paramter name	Is Optional	Description
CONTRACT_SELECTION	Yes	X for active contract, B contract start within time range, E contract ends within time range
CHECK_FOR_SETTLMENT_RELEVANCE	Yes	X for check of settlement relevance
RATE_CATEGORY_ADV_SEL_TYPE	Yes	Enter rate type
DIVISION	Yes	Select division

Table 37: Parameters of Finder IN_POD_ADV

Possible values for CONTRACT_SELECTION parameter:

- X: A single contract must cover the complete check period
- B: A contract must start during the check period
- E: A contract must end during the check period

Parameter RATE_CATEGORY_ADV_SEL_TYPE can specify an advanced selection type. All values assigned to this parameter type must be compatible to type TARIFTYP_ANL.

If parameter CONTRACT_SELECTION is provided, only installations with the specified contract situation will be selected. This means in detail: If X is chosen, the move-in must not be after the beginning of the check period, and the move-out must not be before the end of the check period or there must not be a move-out yet. If B is chosen, the move-in date must be between beginning and end of the check period. The move-out date is not considered. If E is chosen, the move-out date must be between beginning and end of the check period. Contracts without a move-out date will not be considered. Furthermore, the date of the move-in is not considered.

If the parameter CHECK_FOR_SETTLMENT_RELEVANCE is set to X, only installations, which have at least one register assigned (table EASTS), which is not marked as "not settlement relevant" (column ZWNSETTL). The assignment of the register must not start after the beginning of the check period and must not end before the end of the check period.

If parameter DIVISION is provided, only installations of the division will be selected.

Parameter RATE_CATEGORY_ADV_SEL_TYPE is special, as it serves as the selection criteria for the Advanced Selection Parameters. All entries in the Advanced Selection Parameters, which have the same type as the value of this parameter will be considered, and thus, only installations which have a rate category, which was specified in the Advanced Selection Parameters will be considered. Other than having the rate category, the rate category time slice (EANLH) must cover the whole check period.

Entries in the Include List will also be checked regarding the contract situation, if parameter CONTRACT_SELECTION was supplied. Rate category and Division will not be considered.

The Exclude List works normally, i.e. all installation in that list will not be in the Finder result.

9.5.1.4 Check: IN_MEMI - Checker for settlement view of installations

Description: Checker for settlement view of installations

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
SETTLVIEW	No	Enter settlement view
CHECK_VIEWADD_ASS_COMPLETE	Yes	X for run check

Table 38: Parameters of Check IN_MEMI

For an installation, this Check examines, whether its associated Point of Delivery is assigned to a settlement unit with the view specified in parameter SETTLVIEW. This settlement unit must specify an additional settlement view (table EEDMSETTLUNIT, column SETTLVIEWADD), and the Point of Delivery must also have a settlement unit assignment with the additional view.

The following time slices are considered:

The association from installation and Point of Delivery (table EUIINSTLN) must be valid for the whole check period.

- The assignment of the Point of Delivery to the settlement unit (table EEDMUISETTLUNIT) with the view from the parameter SETTLVIEW must be valid for the whole check period
- The assignment with the additional settlement view must not start after beginning of the check period. If parameter CHECK_VIEWADD_ASS_COMPLETE is set to X, the assignment must not end before the end of the check period, otherwise it may end before.

9.5.1.5 Check: IN_SETTL - Checker for settlement assignment of installations

Description: Checker for settlement assignment of installations

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
SERVICE_TYPE	No	Enter Service Type from Service Provider
CHECK_DEADLINE	Yes	X for run check
DEADLINE_NUM_DAYS	Yes	Number of Days for calculation for deadline
REVERSE_LOGIC	Yes	X for reverse check

Table 39: Parameters of Check IN_SETTL

This check has two modes of operation. The mode to be used is determined by the value of parameter REVERSE_LOGIC.

If REVERSE_LOGIC is not set to X, there must be a contract for the installation, covering the complete check period. The check will then examine if the Point of Delivery associated to this installation, has the correct assignments to settlement units, i.e. the assignment must be for the correct period and to a settlement unit, which has the correct service providers.

The grid operator and supplier service providers are determined by the contract (table EVER, columns SERVICEID and INVOICING_PARTY), the settlement coordinator is taken from the service assignments at the Point of Delivery (table ESERVICE, column SERVICEID), with the service type being the one provided in parameter SERVICE_TYPE. The settlement coordinator must either be the service provider found with this service type, or a different service provider, which is assigned for the same time period, but with a different service type.

The time slice for the settlement unit assignment must either start not later than the contract, or at a date which is determined by parameters CHECK_DEADLINE and DEADLINE_NUM_DAYS. If CHECK_DEADLINE is set to X, 1 month and the number of days specified in parameter DEADLINE_NUM_DAYS are added to the move-in date. The resulting date is furthermore corrected by setting it to the last day of the month it is in.

Besides the time slice for the settlement unit assignment, other time slices are considered as well:

- The association between installation and Point of Delivery (table EUIINSTLN) must be valid for the whole check period
- The assignments of services to Points of Delivery (table ESERVICE) must be valid at some point of the checked period, but can for example start or end in the middle of the check period

If REVERSE_LOGIC is set to X, the Check examines the check period for gaps between contracts and checks, if there are settlement unit assignment within these gaps. This reverse check also considers parameters CHECK_DEADLINE and DEADLINE_NUM_DAYS but does not consider any service type. Any settlement unit assignments will be an error.

9.5.1.6 Check: IN_TEMPAREA - Checker for temparea assignment of installations

Description: Checker for temparea assignment of installations

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
PROFROLE	No	Select profrole

Table 40: Parameters of Check IN_TEMPAREA

This Check examines the temperature area configuration of an installation and its associated standard load profile (SLP). It uses information from the check specific tables /PLGA/TECF_SLPT and from the temperature profile table /PLGA/TEDM_TAPR.

The check first tries to find the relevant SLP with via parameter PROFROLE. The SLP assignment must be for the complete check period. After that, the Check examines, whether the temperature area of the installation time slice (table EANLH, column TEMP_AREA) is also present at register level (table ETDZ, column TEMP_AREA).

The combination of Profile role, Profile number and temperature area must exist in table /PLGA/TECF_SLPT.

Starting from the SLP profile, the input profile of the formula profile is determined. This profile is checked to be one of the profiles defined in /PLGA/TEDM_TAPR for the specific temperature area.

All times slices considered by this Check must cover the whole check period.

9.5.1.7 Check: IN_VOLTLVL - Checker for grid level assignment of installations

Description: Checker for grid level assignment of installations

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
Not relevant	Not relevant	Not relevant

Table 41: Parameters of Check IN_VOLTVL

This Check examines whether the voltage level of the installation (table EANL, column SPEBENE) is the same as the grid level of the assignment of the Point of Delivery associated to the installation to its grid table EUIGRID, column GRID_LEVEL).

The time slices of the association of installation to Point of Delivery (EUIINSTLN) and Point of Delivery to grid (EUIGRID) must both cover the complete check period.

9.5.2 Content for EDM profiles

For checking EDM profiles, four Finder and 13 Checks are delivered. They all use the same format of the task data. This data structure contains the profile number, the profile description and the external ID of the Point of Delivery, the profile is associated to.

Not all Finder fill every field of this structure, and not all Checks use every field. Which component uses what is signified by the ID of the respective components:

- Components starting with PR_ only use field PROFILE
- Components starting with PRD_ use PROFILE and DESCR
- Components starting with PRP_ use PROFILE and EXT_UI

Since the same data structure is used, any Finder can technically be combined with any Check, and in most of the cases the Check will work fine, since the Description and Point of Delivery information is mostly used for output in the log, but the officially supported combinations are as follows:

	PRD_PROFILE	PR_BY_NR	PRD_ADV	PRP_ADV
PRD_STAT_0	X		X	
PRP_STAT_0				X
PRP_STAT_0_C				X
PRP_LIM				X
PRD_LIM	X		X	
PRP_LIMSUM				X
PRD_LIMSUM	X		X	
PRP_METER				X
PR_UNROLLED		X		
PRP_CMP				X
PRP_CMP_SUM				X
PRP_CMP_SU_A				X
PRP_CMP_SU_A2				X

Figure 180: Content for EDM profile

9.5.2.1 Finder: PRD_PROFILE - Finder for profiles based on division and profrole

Description: Finder for profiles based on division and profrole

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
SPARTE	Yes	Select division
PROFROLE	No	Select profrole
MATNR	Yes	Select equipment number

Table 42: Parameters of Finder PRD_PROFILE

This Finder selects all profiles which are assigned to a register with the profile role specified in parameter PROFROLE.

If parameter SPARTE is provided, the installation the register is associated with must be of that division.

If parameter MATNR is provided, the register the profile is assigned to must belong to a device info record with that material number.

The finder considers the time slice of the profile assignment itself (table EPROFASS, column DATEFROM and DATETO), but does not consider any other time slices. Installations in the Include List are added to the Finder result without further checks. Installations in the Exclude List will not be in the Finder result.

For each profile in the Finder result, the Profile Description field will be filled with the profile description in the current system language.

9.5.2.2 Finder: PR_BY_NR - Finder for profiles based on division and profile number from / to

Description: Finder for profiles based on division and profile number from / to

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
SPARTE	Yes	Select division
PROFILE_FROM	Yes	Select profile number from
PROFILE_TO	Yes	Select profile number to
PROFTYPE	Yes	Select proftype

Table 43: Parameters of Finder PR_BY_NR

This Finder selects all profiles, whose profile number is between the PROFILE_FROM and PROFILE_TO parameter values.

If Parameter SPARTE is provided, the Finder selects only profiles with this division (table EPROFHEAD, column SPARTE).

If Parameter PROFTYPE is provided, the Finder selects only profiles with this profile type (table EPROFHEAD, column PROFTYPE).

Installations in the Include List are added to the Finder result without further checks. Installations in the Exclude List will not be in the Finder result.

This finder only fills the PROFILE field of the task data structure.

9.5.2.3 Finder: PRD_ADV - Finder for profiles based on advanced selection criteria

Description: Finder for profiles based on advanced selection criteria

Advanced selection parameters: Yes

The following parameters are available:

Paramter name	Is Optional	Description
USE_ADV_SEL_PAR	Yes	"X" for use advance selection
PROFTYPE	Yes	Select proftype

Table 44: Parameters of Finder PRD_ADV

If parameter USE_ADV_SEL_PAR is set to X, the advanced selection parameters are checked for entries of the following type:

- GRID: Values must be of type GRID_ID (= grid id)
- EWG: Values must be of type E_REPLACEGRP (= replacement group)
- SPARTE: Values must be of type SPARTE (= division)
- PROFTYPE: Values must be of type PROFTYPE (= profile type)
- INTEGRAL: No values are read (the entry itself acts as a marker)

Note: The values for GRID currently do not influence the profile selection.

If parameter USE_ADV_SEL_PAR is set to X, the profiles are selected according to the values in the advanced selection parameters, parameter PROFTYPE will not be considered. If the advanced selection parameters do not contain values for replacement group or profile type, the advanced selection parameters are not specific enough and the Finder result will empty or only contain profiles from the include list.

If USE_ADV_SEL_PAR is not set to X, parameter PROFTYPE must be supplied.

This Finder selects the profiles from EPROFHEAD according to either the values of the advanced selection parameter ranges or the profile type. Thus, no time slices whatsoever are relevant here.

Installations in the Include List are added to the Finder result without further checks. Installations in the Exclude List will not be in the Finder result.

The Finder stores the profile ID and the profile description (in current system language) into the Finder result. If an advanced selection parameter of type INTEGRAL exists, the profile description is not the description of the profile, but the description of the associated (via table EEDMSYNPROF) integral profile.

9.5.2.4 Finder: PRP_ADV - Finder for profiles based on advanced selection criteria

Description: Finder for profiles based on advanced selection criteria

Advanced selection parameters: Yes

The following parameters are available:

Paramter name	Is Optional	Description
SPARTE	Yes	Select division
PROFROLE	Yes	Select profrole
MATNR	Yes	Select equipment number
USE_ADV_SEL_PAR	Yes	"X" for use advance selection

Table 45: Parameters of Finder PRP_ADV

If parameter USE_ADV_SEL_PAR is set to X, the advanced selection parameters are checked for entries of the following type:

- GRID: Values must be of type GRID_ID (= grid id)
- EWG: Values must be of type E_REPLACEGRP (= replacement group)
- PROFROLE: Values must be of type PROFROLE (= profile role)
- PROFTYPE: Values must be of type PROFTYPE (= profile type)

If parameter USE_ADV_SEL_PAR is set to X, the profiles are selected according to the values in the advanced selection parameters, Finder parameters SPARTE, PROFROLE and MATNR will not be considered.

If parameter USE_ADV_SEL_PAR is not set to X, the profiles are selected according to the values in the other Finder parameters. In this case, parameter PROFROLE must be specified.

The Finder starts with entries of EPROFASS, i.e. it will only find profiles, which are assigned to a register during the complete check period. This condition is also mandatory if the profile is in the include list. Profiles in the exclude list are obviously not selected.

All profiles, which are not in the include list, must satisfy the conditions of either the advanced selection parameters or the Finder parameters.

- Finder parameter SPARTE checks the division of the installation the profile is associated to
- Finder parameter/Advanced selection parameter PROFROLE checks the profile role, with which the profile is assigned to the register (EPROFASS)
- Finder parameter MATNR checks the material number of the device info record to which the register, to which the profile is assigned to, belongs to (ETDZ -> EGERR).
- Advanced selection parameter GRID checks the ID of the grid, the Point of Delivery is assigned to (EUIGRID)
- Advanced selection parameters EWG and PROFTYPE check the replacement value procedure group and profile type defined in the profile header (EPROFHEAD).

The register, which the profile is assigned to, can be connected to a Point of Delivery either directly (EUILZW) or via an installation (EASTS -> EUIINSTLN). Similarly, the installation, the grid and the external Point of Delivery description are accessed via one of those two paths.

The time slices between the various objects and relationships are considered. Every time slice must be valid for the complete check period.

The Finder stores the profile ID and the external ID of the Point of Delivery in the Finder Result. Since it is possible for a profile to be connected to more than one Point of Delivery, and each profile is supposed to be found only once, only one result per profile is kept.

9.5.2.5 Check: PRD_STAT_0 - Checker of profile values based on status or zero values

Description: Checker of profile values based on status or zero values

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_ZERO_VALUES	Yes	"X" for check of zero values
STATUS_1	Yes	Select optional status
STATUS_2	Yes	Select optional status
STATUS_3	Yes	Select optional status

Table 46: Parameters of Check PRD_STAT_0

This Check checks whether a profile has profile values with one of the status specified in parameters STATUS_1, STATUS_2 and STATUS_3.

If parameter CHECK_ZERO_VALUES is set to X, it is additionally checked, whether the profile values itself are zero. If the parameter is not set to X, status IU010 is also considered to be a status to check for.

The Check result will consist of continuous date/time ranges, in which the profile values have either one of the checked status or have the value zero.

9.5.2.6 Check: PRP_STAT_0 - Checker of profile values based on status or zero values

Description: Checker of profile values based on status or zero values

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_ZERO_VALUES	Yes	"X" for check of zero values
STATUS_1	Yes	Select optional status
STATUS_2	Yes	Select optional status
STATUS_3	Yes	Select optional status

Table 47: Parameters of Check PRP_STAT_0

This Check checks whether a profile has profile values with one of the status specified in parameters STATUS_1, STATUS_2 and STATUS_3.

If parameter CHECK_ZERO_VALUES is set to X, it is additionally checked, whether the profile values itself are zero. If the parameter is not set to X, status IU010 is also considered to be a status to check for.

The Check result will consist of continuous date/time ranges, in which the profile values have either one of the checked status or have the value zero.

9.5.2.7 Check: PRP_STAT_0_C - Checker of profile values (status/zero values) with counting

Description: Checker of profile values (status/zero values) with counting

Reference Data: No

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_ADD_STAT_ONLY	Yes	"X" for check only optional status
INTERVAL_TYPE	No	Chose Interval type (D = Day, M = Month, Y = Year)
INTERVAL_LENGTH	No	Chose Interval length
STATUS_1	Yes	Optional status
STATUS_2	Yes	Optional status

Table 48: Parameters of Check PRP_STAT_0_C

Possible values for INTERVAL_TYPE parameter:

- D: Interval period type Day
- M: Interval period type Month
- Y: Interval period type Year

Value for parameter INTERVAL_LENGTH must be positive.

This Check divides the check period into check intervals and counts the number of profile values in each interval, which have one of the status to check for. This number is compared to the yellow and red trigger values.

If the number is greater than 0 but less than the yellow trigger, an information message is issued. If the number is greater than or equal to the yellow trigger, but less than the red trigger, a warning message is issued. If the number if greater than or equal to the red trigger, an error message is issued.

The subdivision of the check period into multiple check intervals is done with the parameters INTERVAL_TYPE and INTERVAL_LENGTH. The interval type can be Day, Month or Year and the interval length must be a positive integer. These two values define the target duration of one check interval. The first check interval starts at the beginning of the check period, the last check interval ends at the end of the check period, i.e. it is possibly shorter than the others, depending on the length of the check period and the chosen interval type and length.

The set of status to check for consists of the status in parameter STATUS_1 and STATUS_2 and – if parameter CHECK_ADD_STAT_ONLY is set to X – status IU020 and IU021.

9.5.2.8 Check: PRP_LIM - Checker of profile values against limits

Description: Checker of profile values against limits

Reference Data: No

Limits: Yes

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_LOWER_LIMIT	Yes	"X" for run check lower limit
CHECK_UPPER_LIMIT	Yes	"X" for run check upper limit
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data

Table 49: Parameters of Check PRP_LIM

This Check compares all profile values in the check period against the defined Limits and if rquired, removes the profile from the task data.

The parameters CHECK_LOWER_LIMIT and CHECK_UPPER_LIMIT define, against which of the Limits the profile values are compared to. At least one of the two parameters must be set to X.

All profile values, which are not between the lower and upper limit will be individually logged with an error message.

If parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data, if it contains values outside the limits. This means, that it will not be checked by any subsequent Checks of the Cluster.

9.5.2.9 Check: PRD_LIM - Checker of profile values against limits

Description: Checker of profile values against limits

Reference Data: No

Limits: Yes

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description

CHECK_LOWER_LIMIT	Yes	"X" for run check lower limit
CHECK_UPPER_LIMIT	Yes	"X" for run check upper limit
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data

Table 50: Parameters of Check PRD_LIM

This Check compares all profile values in the check period against the defined Limits and, if required, removes the profile from the task data.

The parameters CHECK_LOWER_LIMIT and CHECK_UPPER_LIMIT define, against which of the Limits the profile values are compared to. At least one of the two parameters must be set to X.

All profile values, which are not between the lower and upper limit will be individually logged with an error message.

If parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data, if it contains values outside the limits. This means, that it will not be checked by any subsequent Checks of the Cluster.

9.5.2.10 Check: PRP_LIMSUM - Checker of profile values against limits with summation

Description: Checker of profile values against limits with summation

Reference Data: No

Limits: Yes

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_LOWER_LIMIT	Yes	"X" for run check lower limit
CHECK_UPPER_LIMIT	Yes	"X" for run check upper limit
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data
INTERVAL_TYPE	No	Select interval type (D=Day, M=Month, Y=Year)
INTERVAL_LENGTH	No	Select interval length

Table 51: Parameters of Check PRP_LIMSUM

Possible values for INTERVAL_TYPE parameter:

- D: Interval period type Day
- M: Interval period type Month
- Y: Interval period type Year

Value for parameter INTERVAL_LENGTH must be positive.

This Check divides the check period into check intervals and sums up the values of the checked profile in each interval. This sum is then compared to the lower and/or upper Limit. If an interval is outside the limits, the profile can optionally be removed from the task data.

The parameters CHECK_LOWER_LIMIT and CHECK_UPPER_LIMIT define, against which of the Limits the profile value sums are compared to. At least one of the two parameters must be set to X.

Depending on what was chosen for parameter INTERVAL_TYPE, some restrictions to the check period must be observed:

D: No restrictions

M: The check period must exactly cover one or multiple months. This means: Date-From of the check period must be the first day of a month and the start of the time slice starting directly after the check period must also be the first day of a month.

- Example 1: Check period 01.01.2020 00:00:00 – 31.01.2020 23:59:59 is ok, since the start is on the first day of January and the time slice starting directly after the check period (01.02.2020 00:00:00) starts on the first day of February.
- Example 2: Check period 01.01.2020 06:00:00 – 01.02.2020 05:59:59 is also ok, since start is on 01.01. and the start of the time slice after the end is still 01.02.

- Example 3: Check period 01.01.2020 06:00:00 – 01.02.2020 23:59:59 is not ok, since the start of the time slice after the check period is on the second day of February

Y: The check period must exactly cover one or multiple years. This means: This means: Date-From of the check period must be the first day of a year and the start of the time slice starting directly after the check period must also be the first day of a year.

- Example 1: Check period 01.01.2020 00:00:00 – 31.12.2020 23:59:59 is ok
- Example 2: Check period 01.01.2020 06:00:00 – 01.01.2021 05:59:59 is ok
- Example 3: Check period 01.01.2020 06:00:00 – 01.01.2021 23:59:59 is not ok

The Check will stop checking at the first interval which is outside of the Limits.

If parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data, if it contains an interval in which the sum of its profile values is outside the limits. This means, that it will not be checked by any subsequent Checks of the Cluster.

9.5.2.11 Check: PRD_LIMSUM - Checker of profile values against limits with summation

Description: Checker of profile values against limits with summation

Reference Data: No

Limits: Yes

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
CHECK_LOWER_LIMIT	Yes	"X" for run check lower limit
CHECK_UPPER_LIMIT	Yes	"X" for run check upper limit
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data
INTERVAL_TYPE	No	Select interval type (D=Day, M=Month, Y=Year)
INTERVAL_LENGTH	No	Select interval length

Table 52: Parameters of Check PRD_LIMSUM

Possible values for INTERVAL_TYPE parameter:

- D: Interval period type Day
- M: Interval period type Month
- Y: Interval period type Year

Value for parameter INTERVAL_LENGTH must be positive.

This Check divides the check period into check intervals and sums up the values of the checked profile in each interval. This sum is then compared to the lower and/or upper Limit. If an interval is outside the limits, the profile can optionally be removed from the task data.

The parameters CHECK_LOWER_LIMIT and CHECK_UPPER_LIMIT define, against which of the Limits the profile value sums are compared to. At least one of the two parameters must be set to X.

Depending on what was chosen for parameter INTERVAL_TYPE, some restrictions to the check period must be observed:

D: No restrictions

M: The check period must exactly cover one or multiple months. This means: Date-From of the check period must be the first day of a month and the start of the time slice starting directly after the check period must also be the first day of a month.

- Example 1: Check period 01.01.2020 00:00:00 – 31.01.2020 23:59:59 is ok, since the start is on the first day of January and the time slice starting directly after the check period (01.02.2020 00:00:00) starts on the first day of February.
- Example 2: Check period 01.01.2020 06:00:00 – 01.02.2020 05:59:59 is also ok, since start is on 01.01. and the start of the time slice after the end is still 01.02.
- Example 3: Check period 01.01.2020 06:00:00 – 01.02.2020 23:59:59 is not ok, since the start of the time slice after the check period is on the second day of February

Y: The check period must exactly cover one or multiple years. This means: This means: Date-From of the check period must be the first day of a year and the start of the time slice starting directly after the check period must also be the first day of a year.

- Example 1: Check period 01.01.2020 00:00:00 – 31.12.2020 23:59:59 is ok
- Example 2: Check period 01.01.2020 06:00:00 – 01.01.2021 05:59:59 is ok
- Example 3: Check period 01.01.2020 06:00:00 – 01.01.2021 23:59:59 is not ok

The Check will stop at the first interval which is outside of the Limits.

If parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data, if it contains an interval in which the sum of its profile values is outside the limits. This means, that it will not be checked by any subsequent Checks of the Cluster.

9.5.2.12 Check: PRP_METER - Checker of profile values against meter reading

Description: Checker of profile values against meter reading

Reference Data: No

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
MISSING_MR_IS_ERROR	Yes	"X" for red flag for missing value
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data
UNIT_OF_MEASUREMENT	Yes	Select unit of measurement

Table 53: Parameters of Check PRP_METER

This Check compares the meter reading difference for a register associated with an installation, which is associated with the Point of Delivery in the task data with the profile sum in the check period. The deviation in percent is compared to the yellow and red Trigger values. If the deviation is not lower than the yellow Trigger value, the profile can optionally be removed from the task data.

The determination of the meter readings works as follows: First, the installation for the external Point of Delivery ID in the task data is determined with SAP standard function module BAPI_ISUPOD_GETINSTALLATION. The date of the start of the check period is used as the key date. It is possible for multiple installations to be found at this point, but only the first installation is considered by the Check.

If an installation was determined, its meter readings are determined with SAP standard function module ISU_DB_EABL_CHECK_INSTALL. This function module requires a date range which is given as: From Date = (Date at which the check period starts – 3 days), To Date = (Date at the which the check period ends + 3 days). The additional 3 days added at both ends of the check period compensate for the usual variances in the meter reading process.

If no meter readings were found, a warning message or an error message is issued, depending whether parameter MISSING_MR_IS_ERROR is set to X or not.

Only meter reading results for the Unit of Measure specified in parameter UNIT_OF_MEASUREMENT are considered.

If no meter reading could be found, the Check results in an error message. Additionally, if parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data.

The meter reading difference is calculated by taking the first and the last meter reading found and subtracting the latter from the former. This calculation does not consider the decimals.

The metering reading difference is then compared to the profile sum in the check period in the following way:

The absolute difference between meter reading difference and profile sum is divided by the profile sum

Example:

- Meter reading difference = 234
- Profile sum = 123
- Absolute difference = |(123 – 234)| = 111

- Deviation in % = ((111 / 123) * 100) = ~90,2%
- Meaning: The difference between consumption according to meter readings and consumption according to the profile values is ~90,2% of the profile sum
- Perfect result would be 0%

Since the calculation involves dividing by the profile sum, no deviation can be calculated if the profile sum is zero. If it is, this result in an error message

If the deviation in % is greater than or equal to the red Trigger value, an error message is written to the log. Additionally, if parameter REMOVE_FROM_TASKDATA is set to X, the profile is removed from the task data. If the deviation in % is greater than or equal to the yellow Trigger value, but lower than the red Trigger value, a warning message is written to the log.

9.5.2.13 Check PR_UNROLLED - Checker of profile values against initial status

Description: Checker of profile values against initial status

Reference Data: No

Limits: No

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
LOG_INDIVIDUAL_TS	No	"X" for run check

Table 54: Parameters of Check PR_UNROLLED

This Check checks if there are profile values in the check period, which have an initial status, i.e. a status which indicates, that the profile has not been calculated yet. Periods in which profile values have such a status are considered "unrolled".

The set of initial status consists of status IU010 and all initial user status (= all status from table TJ30 for profile values, which have the initial flag (column INIST) set to X).

The Check logs, whether the profile has unrolled periods or not. If parameter LOG_INDIVIDUAL_TS is set to X, all unrolled time slices will be logged individually.

All profiles with unrolled time slices are removed from the task data.

9.5.2.14 Check: PRP_CMP - Checker of profile values against other profile values

Description: Checker of profile values against other profile values

Reference Data: Yes

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
REF_PROFILE_MUST_EXIST	Yes	"X" for check of reference profile
NUM_DAYS_FOR_REF_CALC	Yes	Number of days
USE_AVERAGE	Yes	"X" for use average
CHECK_ABSOLUTE_DEVIATION	Yes	"X" for use absolute deviation

Table 55: Parameters of Check PRP_CMP

Value for parameter NUM_DAYS_FOR_REF_CALC must be positive.

This Check can use the reference data found by a Finder directly assigned to this Check. The reference data must be of the same type as the task data (structure /PLGA/SECF_PR_DESCR_POD).

If parameter REF_PROFILE_MUST_EXIST is set to X a reference profile must be provided. Otherwise an offset must be provided in parameter NUM_DAYS_FOR_REF_CALC, which allows comparing different time periods within the checked profile.

The profile from the task data is compared with all profiles from the reference data, which have the same Point of Delivery as the profile from the task data. If no such profile exists and parameter REF_PROFILE_MUST is not set to X, the profile is compared to itself. From here on, the profile from the task data is called check profile, and the profile it is compared against is called reference profile.

For the check profile, the values in the check period are considered. For the reference profile, the period is shifted into the past by an offset in days provided by parameter NUM_DAYS_FOR_REF_CALC.

If parameter USE_AVERAGE is set to X, the values of the reference profile are averaged per day, i.e. all values for one day are summed up, and each value of the day is replaced by the sum divided by the number summands. The averaging considers the profile offset and the profile local time zone of the profile (table EPROFHEAD, columns DAY_OFFSET and TIMEZONE). The sum is calculated from one offset hour until the right before the next offset hour.

The comparison aims to compare values for the same time in the local time zone, i.e. a value of the check profile for local time 06:00:00 is compared to a value in the reference profile for local time 06:00:00. Due to daylight saving time rules in the local time zone, this means on the one hand, that the profile values can have different UTC times, and on the other hand, profiles might have duplicate or missing values with regard to the profile time in local time compared to the other profile.

The following scenarios can potentially arise:

Scenario	Check profile	Reference profile
1	No duplicates or missing values	No duplicates or missing values
2	No duplicates or missing values	Duplicates
3	No duplicates or missing values	Missing values
4	Duplicates	No duplicates or missing values
5	Duplicates	Duplicates
6	Duplicates	Missing values
7	Missing values	No duplicates or missing values
8	Missing values	Duplicates
9	Missing values	Missing values

Figure 181: Overview

To make the two profiles comparable, the following strategy is applied:

Premises:

- The check profile values stay as they are
- The reference profile values are modified - if required – to allow a direct value to value comparison
- The modification strategy aims towards “smoothening” the curve, the profile sum may differ after modification

Scenario 1: Nothing needs to be done, value to value comparison can be done

Scenario 2: The duplicate values in the reference profile are pairwise merged into one value, whose value is the average of the two merged values.

- Example (15 minutes profile):
- Before merge:

01:45	02:00	02:15	02:30	02:45	02:00	02:15	02:30	02:45	03:00
…	12	16	14	8	16	10	20	18	…

Figure 182: Example Scenario 2 – before merge

- After merge:

01:45	02:00	02:15	02:30	02:45	03:00
…	((12+16)/2) ***14***	((14+8)/2) ***11***	((16+10)/2) ***13***	((20+18)/2) ***19***	…

Figure 183: Example Scenario 2 – after merge

Scenario 3: The missing values in the reference profile are inserted. The inserted value is the same as the last value before the "gap"

- Example (15 minutes profile):
- Check Profile:

01:45	02:00	02:15	02:30	02:45	03:00
10	12	16	14	8	18

Figure 184: Example Scenario 3

- Reference profile before insertion:

01:45		03:00
14		20

Figure 185: Example Scenario 3 – Reference profile before insertion

- Reference profile after insertion:

01:45	02:00	02:15	02:30	02:45	03:00
14	***14***	***14***	***14***	***14***	20

Figure 186: Example Scenario 3 – Reference profile after insertion

Scenario 4: Each value the reference value before the gap is duplicated to fill the gap. Duplicating a value shifts all other value one place to the right. Effectively, this is like an inverse of the strategy for scenario 2

- Example (15 minutes profile):
- Check profile:

01:45	02:00	02:15	02:30	02:45	02:00	02:15	02:30	02:45	03:00
6	12	16	14	8	16	10	20	18	22

Figure 187: Example Scenario 4 – Check profile

- Reference profile before insertion

01:45	02:00	02:15	02:30	02:45		03:00
6	10	12	16	11		12

Figure 188: Example Scenario 4 – Reference profile before insertion

- Reference profile after insertion

01:45	02:00	02:15	02:30	02:45	02:00	02:15	02:30	02:45	03:00
6	***10***	***10***	***12***	***12***	***16***	***16***	***11***	***11***	12

Figure 189: Example Scenario 4 – Reference profile after insertion

Scenario 5: Nothing needs to be done, value to value comparison can be done

Scenario 6: Basically, the same strategy as for scenario 3, additional values are added to the reference profile

- Example (15 minutes profile):
- Check profile:

01:45	02:00	02:15	02:30	02:45	02:00	02:15	02:30	02:45	03:00
6	12	16	14	8	16	10	20	18	22

Figure 190: Example Scenario 5 – Check profile

- Reference profile before insertion:

01:45		03:00
8		12

Figure 191: Example Scenario 5 – Reference profile before insertion

- Reference profile after insertion:

01:45	02:00	02:15	02:30	02:45	02:00	02:15	02:30	02:45	03:00
8	***8***	***8***	***8***	***8***	***8***	***8***	***8***	***8***	12

Figure 192: Example Scenario 5 – Reference profile after insertion

Scenario 7: The values in the reference profile, which are not in the check profile, are removed

- Example (15 minutes profile):
- Check profile

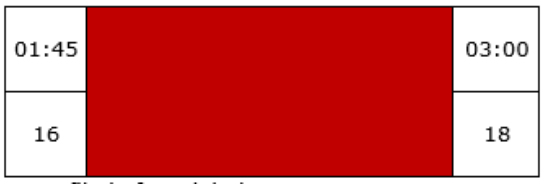


Figure 193: Example Scenario 7 – Check profile

- Reference profile before deletion

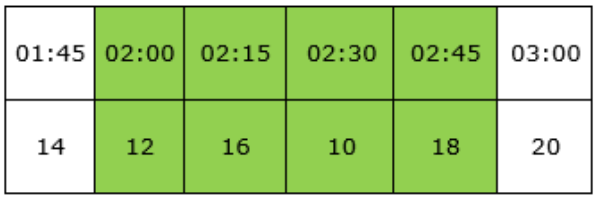


Figure 194: Example Scenario 7 – Reference profile before deletion

- Reference profile after deletion

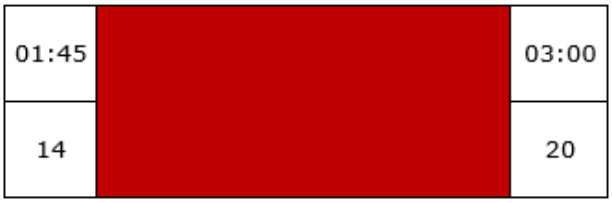


Figure 195: Example Scenario 7 – Reference profile after deletion

Scenario 8: Same strategy as in scenario 7, only more values are removed.

- Example (15 minutes profile):
- Check profile

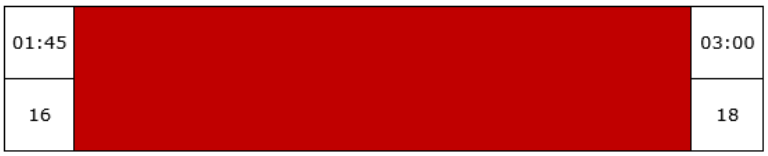


Figure 196: Example Scenario 8 – Check profile

- Reference profile before deletion

Figure 197: Example Scenario 8 – Reference profile before deletion

- Reference profile after deletion

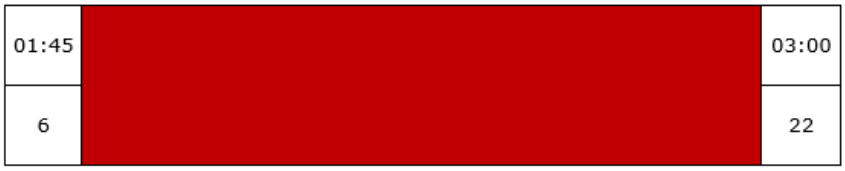


Figure 198: Example Scenario 8 – Reference profile after deletion

Scenario 9: Nothing needs to be done, value to value comparison can be done

Note: The process of transforming the reference values is generic and should work for any profile interval length and independent of the country-specific DST rule.

After this process has been applied to the reference profile, both check profile and reference profile have the same number of values and can be directly compared.

If the reference profile was not averaged (as per parameter USE_AVERAGE), an informational message it written to the log, if the current reference value is not "original", i.e. modified due to averaging as in scenario 2 or inserted as in scenario 4 and 6.

The comparison process will only compare values, if the reference value is not zero. Continuous ranges, in which the reference value is zero are logged as warnings.

The calculation of the difference between check profile value and reference profile value depends on parameter CHECK_ABSOLUTE_DEVIATION.

If it is set to X, the difference is:

- (reference value – check value)

Otherwise, the deviation in percent is calculated with the reference value acting as the base value, i.e.:

- (((reference value – check value) / reference value) * 100)

Whichever difference value was calculated, its magnitude is compared to the yellow and red Trigger values.

If the difference value is greater than or equal to the red Trigger value, an error message is written to the log. If the difference value is greater than or equal to the yellow Trigger value, but lower than the red Trigger value, a warning message is written to the log.

9.5.2.15 Check: PRP_CMP_SUM - Checker of profile values against other profile values summation

Description: Checker of profile values against other profile values summation

Reference Data: Yes

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
REF_PROFILE_MUST_EXIST	Yes	"X" for check of reference profile
NUM_DAYS_FOR_REF_CALC	Yes	Number of days
USE_AVERAGE	Yes	"X" for use average
CHECK_ABSOLUTE_DEVIATION	Yes	"X" for use absolute deviation

Table 56: Parameters of Check PRP_CMP_SUM

Value for parameter NUM_DAYS_FOR_REF_CALC must be positive.

This Check can use the reference data found by a Finder directly assigned to this Check. The reference data must be of the same type as the task data (structure /PLGA/SECF_PR_DESCR_POD).

If parameter REF_PROFILE_MUST_EXIST is set to X a reference profile must be provided. Otherwise an offset must be provided in parameter NUM_DAYS_FOR_REF_CALC, which allows comparing different time periods within the checked profile.

The profile from the task data is compared with all profiles from the reference data, which have the same Point of Delivery as the profile from the task data. If no such profile exists and parameter REF_PROFILE_MUST is not set to X, the profile is compared to itself. From here on, the profile from the task data is called check profile, and the profile it is compared against is called reference profile.

If parameter USE_AVERAGE is set to X, the values of the reference profile are averaged per day, i.e. all values for one day are summed up, and each value of the day is replaced by the sum divided by the number summands. The averaging considers the profile offset and the profile local time zone of the profile (table EPROFHEAD, columns DAY_OFFSET and TIMEZONE). The sum is calculated from one offset hour until the right before the next offset hour.

The comparison aims to compare values for the same time in the local time zone, i.e. a value of the check profile for local time 06:00:00 is compared to a value in the reference profile for local time 06:00:00. Due to daylight saving time rules in the local time zone, this means on the one hand, that the profile values can have different UTC times, and on the other hand, profiles might have duplicate or missing values with regard to the profile time in local time compared to the other profile.

The determination of which profile value in the check profile is compared to which profile in the reference profile is the same as for Check PRP_CMP. For a detailed description on how potential issues with DST are resolved, please to refer to that section.

For each value in the check profile a difference to the reference profile is calculated. Two different methods of calculation can be used: one to calculate the absolute difference (if parameter CHECK_ABSOLUTE_DEVIATION is set to X) and one to calculate the relative difference in percent (if parameter CHECK_ABSOLUTE_DEVIATION is not set to X).

The calculation is performed as follows:

- The smaller of check value and reference value is considered the base value
- The other of the two values is considered the comparison value
- The absolute difference is calculated as:
- (comparison value – base value)
- The relative difference is calculated as:
- (((comparison value – base value) / base value) * 100)

This calculation requires, that both check profile value and reference profile value are non-zero.

Whichever value is calculated, its magnitude is compared against the yellow and red Triggers.

While the profile values are checked individually, the errors are logged as consecutive ranges with the same error type.

The error types are:

- Check profile value is zero
- Reference profile value is zero
- Magnitude of calculated difference is equal to or greater than the yellow Trigger value, but less than the red Trigger value
- Magnitude of calculated difference is equal to or greater than the red Trigger value

9.5.2.16 Check: PRP_CMP_SU_A - Checker of profile values against other prof. val. sum. and time references

Description: Checker of profile values against other prof. val. sum. and time references

Reference Data: Yes

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
COMPARE_AGAINST_REF_PROF	No	"X" for check of reference profile
REF_PERIOD_TYPE	Yes	Reference period (D=Day, M=Month, Y = Year)
REF_PERIOD_LENGTH	Yes	Reference period length
SUM_TYPE	No	Sum type (D=Day, M=Month, Y = Year))
USE_AVERAGE	Yes	"X" for use average

Table 57: Parameters of Check PRP_CMP_SUM

Possible values for REF_PERIOD_TYPE and SUM_TYPE parameters:

- D: Interval period type Day
- M: Interval period type Month
- Y: Interval period type Year

This Check can use the reference data found by a Finder directly assigned to this Check. The reference data must be of the same type as the task data (structure /PLGA/SECF_PR_DESCR_POD).

Depending on what was chosen for parameter SUM_TYPE, some restrictions to the check period must be observed:

D: No restrictions

M: The check period must exactly cover one or multiple months. This means: Date-From of the check period must be the first day of a month and the start of the time slice starting directly after the check period must also be the first day of a month.

- Example 1: Check period 01.01.2020 00:00:00 – 31.01.2020 23:59:59 is ok, since the start is on the first day of January and the time slice starting directly after the check period (01.02.2020 00:00:00) starts on the first day of February.
- Example 2: Check period 01.01.2020 06:00:00 – 01.02.2020 05:59:59 is also ok, since start is on 01.01. and the start of the time slice after the end is still 01.02.
- Example 3: Check period 01.01.2020 06:00:00 – 01.02.2020 23:59:59 is not ok, since the start of the time slice after the check period is on the second day of February

Y: The check period must exactly cover one or multiple years. This means: This means: Date-From of the check period must be the first day of a year and the start of the time slice starting directly after the check period must also be the first day of a year.

- Example 1: Check period 01.01.2020 00:00:00 – 31.12.2020 23:59:59 is ok
- Example 2: Check period 01.01.2020 06:00:00 – 01.01.2021 05:59:59 is ok
- Example 3: Check period 01.01.2020 06:00:00 – 01.01.2021 23:59:59 is not ok

If parameter COMPARE_AGAINST is set to X a reference profile must be provided. Otherwise an offset must be provided with parameters REF_PERIOD_TYPE and REF_PERIOD_LENGTH and the profile is checked against itself. The value for REF_PERIOD_LENGTH must be positive. Both options can be combined, i.e. two different profiles can be compared, but an offset it used for the reference profile. The date modification is performed with standard SAP function module ISU_DATE_MODIFICATION.

From here on, the profile from the task data is called check profile, and the profile it is compared against is called reference profile.

The values of the check profile are individually compared against an aggregation value calculated from the values of the reference profile. The aggregation of the reference profile works as follows:

The period which contains the reference profile values is subdivided into smaller blocks, in accordance with parameter SUM_TYPE, i.e. each block has the length of a day, a month or a year. For each block, the aggregation value is calculated. If parameter USE_AVERAGE is set to X, it is the average value in the block, else it is the sum of all values in the block.

The difference between check profile value and aggregated reference value is calculated as follows:

- (((check value – reference value) / reference value) * 100)

This calculation requires, that the reference value is not zero.

The magnitude of this difference is compared against the yellow and red Triggers and logged accordingly.

9.5.2.17 Check: PRP_CMP_SU_A2 - Checker of profile values against other prof. val. sum. and time references

Description: Checker of profile values against other prof. val. sum. and time references

Reference Data: Yes

Limits: No

Trigger: Yes

The following parameters are available:

Paramter name	Is Optional	Description
COMPARE_AGAINST_REF_PROF	Yes	"X" for check against reference profile
REF_PERIOD_TYPE	Yes	Reference period (D=Day, m= Month, Y=Year)
REF_PERIOD_LENGTH	Yes	Reference period length
SUM_TYPE	Yes	Sum type (D=Day, M=Month, Y=Year)
CORRECT_REF_DATE	Yes	"X" for check against reference date

Table 58: Parameters of Check PRP_CMP_SUM

Possible values for REF_PERIOD_TYPE and SUM_TYPE parameters:

- D: Interval period type Day
- M: Interval period type Month
- Y: Interval period type Year

This Check can use the reference data found by a Finder directly assigned to this Check. The reference data must be of the same type as the task data (structure /PLGA/SECF_PR_DESCR_POD).

Depending on what was chosen for parameter SUM_TYPE, some restrictions to the check period must be observed:

D: No restrictions

M: The check period must exactly cover one or multiple months. This means: Date-From of the check period must be the first day of a month and the start of the time slice starting directly after the check period must also be the first day of a month.

- Example 1: Check period 01.01.2020 00:00:00 – 31.01.2020 23:59:59 is ok, since the start is on the first day of January and the time slice starting directly after the check period (01.02.2020 00:00:00) starts on the first day of February.
- Example 2: Check period 01.01.2020 06:00:00 – 01.02.2020 05:59:59 is also ok, since start is on 01.01. and the start of the time slice after the end is still 01.02.
- Example 3: Check period 01.01.2020 06:00:00 – 01.02.2020 23:59:59 is not ok, since the start of the time slice after the check period is on the second day of February

Y: The check period must exactly cover one or multiple years. This means: This means: Date-From of the check period must be the first day of a year and the start of the time slice starting directly after the check period must also be the first day of a year.

- Example 1: Check period 01.01.2020 00:00:00 – 31.12.2020 23:59:59 is ok
- Example 2: Check period 01.01.2020 06:00:00 – 01.01.2021 05:59:59 is ok
- Example 3: Check period 01.01.2020 06:00:00 – 01.01.2021 23:59:59 is not ok

If parameter COMPARE_AGAINST is set to X a reference profile must be provided. Otherwise an offset must be provided with parameters REF_PERIOD_TYPE and REF_PERIOD_LENGTH and the profile is checked against itself. The value for REF_PERIOD_LENGTH must be positive. Both options can be combined, i.e. two different profiles can be compared, but an offset it used for the reference profile.

If parameter CORRECT_REF_DATE is set to X, a correction of the reference date is performed. This is only possible if the REF_PERIOD_TYPE is D. Furthermore, a factory calendar must be provided with parameter FACTORY_CALENDAR in order to determine whether a day is a workday.

From here on, the profile from the task data is called check profile, and the profile it is compared against is called reference profile.

The values of the check profile and the reference profile are each subdivided into smaller blocks according to the value of parameter SUM_TYPE. All values in each block are summed. The comparison between check profile and reference profile is essentially comparing the sums of two blocks.

The reference profile blocks corresponding to the check profile are initially for the exact same time period and will subsequently be "moved" towards the past in accordance to REF_PERIOD_TYPE and REF_PERIOD_LENGTH. This is done by modifying the start and end date of each reference block with SAP standard function module ISU_DATE_MODIFICATION.

In case the REF_PERIOD_TYPE is D (i.e. the reference blocks are shifted by one or more days), and parameter CORRECT_REF_DATE is set to X, the date of the block is shifted according to these rules:

- If the check date is a holiday (according to factory calendar provided in parameter FACTORY_CALENDAR) and the reference date is not, shift the reference date to the previous date, which was a holiday
- If the check date is not a holiday, and the reference date is not the same weekday as the check date, shift the reference date to the previous date, which was the same weekday

The difference between the profile value sum in the check block and the profile value sum in its corresponding reference block is calculated as follows:

- (((check sum – reference sum) / reference sum) * 100)

This calculation requires, that the reference sum is not zero.

The magnitude of this difference is compared against the yellow and red Triggers and logged accordingly.

9.5.3 Content for SLP load profiles

For checking load profiles, 5 Finder and three Checks are delivered. They all use the same data structure as format of the task data The data consists of an installation and its associated load profile data, which is a table of combined lines of tables ELPASS and EUFASS. This means, that technically, all load profile data for a single installation is one task data item.

All Checks and Finders work with this task data; thus, any combination is technically possible:

	SLP_CG_AR	SLP_RC	SLP_CG_MS	SLP_CG	SLP_CGG_MS
SLP_UF_ISTPR	X	X	X	X	X
SLP_UF_LIMIT	X	X	X	X	X
SLP_IF_PRV_P	X	X	X	X	X

Figure 199: Combination matrix for load profile components

9.5.3.1 Finder: SLP_CG_AR - Finder of SLP profile based on profrole, contract and customer group

Description: Finder of SLP profile based on profrole, contract and customer group

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
PROFROLE	Yes	Select profrole
CHECK_CONTRACT	Yes	"X" for check active contract
GRID_OPERATOR	Yes	Select network operator
CUSTOMER_GROUP	No	Select customer group

Table 59: Parameters of Finder SLP_CG_AR

Exactly one of parameters PROFROLE and CUSTOMER_GROUP must be provided, not both.

This Finder uses the Customer Group configuration, see section 5.6.

Depending on whether parameter PROFROLE or CUSTOMER_GROUP was provided, the finder does the following:

Finding by PROFROLE:

The profile role provided in parameter PROFROLE is used to find installations and load profile assignments in table ELPASS.

Finding by CUSTOMER_GROUP:

The customer group provided in parameter CUSTOMER_GROUP and the grid operator service provider id provided in parameter GRID_OPERATOR narrow down the possible profile roles and profiles (see table /PLGA/TECF_SLPT), which are considered when checking the load profile assignment of installations in table ELPASS.

The following business logic is common to both variations:

If parameter CHECK_CONTRACT is set to X, only installations are considered, which have an active contract, meaning: there is a contract for the installation for which the move-in date is not later than the beginning of the check period, and for which the move-out date is either not earlier than the start of the check period or empty (= no move-out yet).

The load profile and usage factor selection into the task data table data structure, consider the time slice of table ELPASS and EUFASS as follows:

- Load profile assignments (ELPASS) are selected, if the time slice does not start after the end of the check period and does not end before the start of the check period, i.e. the load profile assignment time slice does not have to cover the complete check period
- Usage factor assignments (EUFASS) are selected if the corresponding load profile assignment was selected (same logical profile allocation for the same installation), and if the EUFASS time slice is at least partly in the ELPASS time slice. The check period time slice is not relevant, i.e. it is possible to select usage factor time slice, which are completely outside of the check period

The include list is not supported for this Finder, as all installations in the system are considered anyways, and all installation must conform to the requirements defined by the parameters.

The Exclude List can be filled with installation numbers. These installations will be excluded from the load profile selection.

9.5.3.2 Finder: SLP_RC - Finder of SLP profile based on profrole, contract and rate category

Description: Finder of SLP profile based on profrole, contract and rate category

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
PROFROLE_IST	No	Select profrole actual
CHECK_CONTRACT	No	"X" for check active contract
PROFROLE_PROG	Yes	Select profrole forecast
RATE_CATEGORY	Yes	Rate category

Table 60: Parameters of Finder SLP_RC

This Finder finds installations and their load profile assignment as follows:

If parameter PROFROLE_IST and parameter PROFROLE_PROG both are provided, load profile assignments with these two roles are selected. If only PROFROLE_IST is provided, for each installation which has an assignment with that role, all other load profile assignments with other roles are selected as well.

If parameter CHECK_CONTRACT is set to X, only installations are considered, which have an active contract, meaning: there is a contract for the installation for which the move-in date is not later than the beginning of the check period, and for which the move-out date is either not earlier than the start of the check period or empty (= no move-out yet).

If parameter RATE_CATEGORY is provided, only installations are considered, which have an installation time slice (table EANLH), with this rate category (field TARIFTYP) and which completely covers the check period, i.e. it must not start after the beginning of the check period, and must not end before the end of the check period.

The load profile and usage factor selection into the task data table data structure, consider the time slice of table ELPASS and EUFASS as follows:

- Load profile assignments (ELPASS) are selected, if the time slice completely covers the check period, i.e. it does not start after the beginning of the check period and does not end before the end of the check period

- Usage factor assignments (EUFASS) are selected if the corresponding load profile assignment was selected (same logical profile allocation for the same installation). The EUFASS time slice is not considered.

The include list is not supported for this Finder, as all installations in the system are considered anyways, and all installation must conform to the requirements defined by the parameters.

The Exclude List can be filled with installation numbers. These installations will be excluded from the load profile selection.

9.5.3.3 Finder: SLP_CG_MS - Finder of SLP profile based on network operator, contract and division

Description: Finder of SLP profile based on network operator, contract and division

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
GRID_OPERATOR	Yes	Network operator
CHECK_CONTRACT	No	"X" for check active contract
DIVISION	No	Division

Table 61: Parameters of Finder SLP_CG_MS

This Finder uses the Customer Group configuration.

Parameters GRID_OPERATOR and DIVISION are used to narrow down the relevant entries of table /PLGA/TECF_SLPT. Furthermore, the Include List and Exclude List can be filled with customer group IDs, which further narrow down the entries.

Whichever entries of that table remains, the combinations of profile role (column PROFROLE) and profile (column PROFILE) determine the load profile selection.

If parameter CHECK_CONTRACT is set to X, only installations are considered, which have an active contract, meaning: there is a contract for the installation for which the move-in date is not later than the beginning of the check period, and for which the move-out date is either not earlier than the start of the check period or empty (= no move-out yet).

The load profile and usage factor selection into the task data table data structure, consider the time slice of table ELPASS and EUFASS as follows:

- Load profile assignments (ELPASS) are selected, if the time slice completely covers the check period, i.e. it does not start after the beginning of the check period and does not end before the end of the check period
- Usage factor assignments (EUFASS) are selected if the corresponding load profile assignment was selected (same logical profile allocation for the same installation). The EUFASS time slice is not considered.

9.5.3.4 Finder: SLP_CG - Finder of SLP profile based on network operator, contract and customer group

Description: Finder of SLP profile based on network operator, contract and customer group

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
GRID_ID	Yes	Grid
CHECK_CONTRACT	Yes	"X" for check active contract
GRID_OPERATOR	Yes	Network Operator
CUSTOMER_GROUP	Yes	Customer group

Table 62: Parameters of Finder SLP_CG

This Finder uses the Customer Group configuration.

Parameters GRID_OPERATOR and CUSTOMER_GROUP are used to narrow down the relevant entries of table /PLGA/TECF_SLPT.

Whichever entries of that table remains, the combinations of profile role (column PROFROLE) and profile (column PROFILE) determine the load profile selection.

In addition to the load profile assignments found via the Customer Group, any load profile assignment to an installation in the Include List is also considered. Load profile assignments to installations, which are in the Exclude List are not considered at all.

All load profile assignments found via either the Customer Group or the Include List, must pass the criteria implied by parameters CHECK_CONTRACT and GRID_ID.

If parameter CHECK_CONTRACT is set to X, only installations are considered, which have an active contract, meaning: there is a contract for the installation for which the move-in date is not later than the beginning of the check period, and for which the move-out date is either not earlier than the start of the check period or empty (= no move-out yet).

If the parameter GRID_ID is provided, only installations, which are associated to a Point of Delivery (via table EUIINSTLN), which is assigned to a grid (table EUIGRID) with that ID, are considered. The time slice of EUIGRID must not end (column DATETO) before the start of the check period. Other time slice information is not considered at this point.

The load profile and usage factor selection into the task data table data structure, consider the time slice of table ELPASS and EUFASS as follows:

- Load profile assignments (ELPASS) are selected, if the time slice completely covers the check period, i.e. it does not start after the beginning of the check period and does not end before the end of the check period
- Usage factor assignments (EUFASS) are selected if the corresponding load profile assignment was selected (same logical profile allocation for the same installation). The EUFASS time slice is not considered.

9.5.3.5 Finder: SLP_CGG_MS - Finder of SLP profile based on network operator, contract, division and grid

Description: Finder of SLP profile based on network operator, contract, division and grid

Advanced selection parameters: No

The following parameters are available:

Paramter name	Is Optional	Description
GRID_OPERATOR	Yes	Select network operator
CHECK_CONTRACT	No	"X" for check active contract
DIVISION	No	Select division
GRID_ID	Yes	Select grid ID

Table 63: Parameters of Finder SLP_CGG_MS

This Finder uses the Customer Group configuration.

Parameters GRID_OPERATOR and DIVISION are used to narrow down the relevant entries of table /PLGA/TECF_SLPT. Furthermore, the Include List and Exclude List can be filled with customer group IDs, which further narrow down the entries.

Whichever entries of that table remains, the combinations of profile role (column PROFROLE) and profile (column PROFILE) determine the load profile selection.

If parameter CHECK_CONTRACT is set to X, only installations are considered, which have an active contract, meaning: there is a contract for the installation for which the move-in date is not later than the beginning of the check period, and for which the move-out date is either not earlier than the start of the check period or empty (= no move-out yet).

If the parameter GRID_ID is provided, only installations, which are associated to a Point of Delivery (via table EUIINSTLN), which is assigned to a grid (table EUIGRID) with that ID, are considered. The time slice of EUIGRID must not end (column DATETO) before the start of the check period. Other time slice information is not considered at this point.

The load profile and usage factor selection into the task data table data structure, consider the time slice of table ELPASS and EUFASS as follows:

- Load profile assignments (ELPASS) are selected, if the time slice completely covers the check period, i.e. it does not start after the beginning of the check period and does not end before the end of the check period
- Usage factor assignments (EUFASS) are selected if the corresponding load profile assignment was selected (same logical profile allocation for the same installation). The EUFASS time slice is not considered.

9.5.3.6 Check: SLP_UF_ISTPR - Checker of customer value form actual and forecast SLP profiles

Description: Checker of customer value form actual and forecast SLP profiles

Reference Data: No

Limits: No

Trigger: Yes (extended)

The following parameters are available:

Paramter name	Is Optional	Description
NUM_DAYS_FOR_REF_TS	No	Number of days
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data
USE_EXTENDED_TRIGGER	Yes	"X" for use advanced trigger

Table 64: Parameters of Check SLP_UF_ISTPR

This Check uses the Customer Group configuration.

At first, the task data is separated into "Actual" and "Forecast" data. The is determined with information from table /PLGA/TECF_SLPT, column SLP_PROFILE_TYPE. The relevant entry in the table is determined by the profile role and the profile number from the task data. This process also considers the EUFASS time slice of the task data: For "Actual", entries for which the usage factor time slice starts after or ends before the check period are not considered. For "Forecast", entries for which the EUFASS time slice is shorter than the number of days specified in parameter NUM_DAYS_FOR_REF_TS are not considered. The length of the EUFASS time slice is calculated with SAP standard function module FIMA_DAYS_BETWEEN_TO_DATES.

Afterwards, the "Actual" data is compared to the "Forecast" data. "Forecast" data is skipped, if its EUFASS time slice does not end before the start of the EUFASS time slice of the "Actual" data and if the "Forecast" usage factor is zero.

The comparison calculates the deviation between "Actual" usage factor and "Forecast" usage factor in percent, with the following formula:

- (((Usage Factor Actual – Usage Factor Forecast) / Usage Factor Forecast) * 100)

This deviation value is compared to Triggers. If parameter USE_EXTENDED_TRIGGER is set to X, this will be the extended triggers defined for the relevant Customer Group (inferred from profile role and profile), otherwise it will the Triggers defined in the Cluster Check configuration.

A deviation, which exceeds the red Trigger values will be logged as an error and a deviation exceeding the Yellow trigger values, but not the red Trigger values, will be logged as a warning.

If parameter REMOVE_FROM_TASKDATA is set to X, the task data item (= installation and all selected load profile assignments) are removed from the task data set under the following circumstances:

- The red trigger was exceeded
- No "Actual" data was found
- No "Forecast" data was found for a "Actual" time slice

9.5.3.7 Check: SLP_UF_LIMIT - Checker of limits of customer value from SLP profile

Description: Checker of limits of customer value from SLP profile

Reference Data: No

Limits: Yes

Trigger: No

The following parameters are available:

Paramter name	Is Optional	Description
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data

CHECK_UPPER_LIMIT	Yes	"X" for check upper limit
CHECK_LOWER_LIMIT	Yes	"X" for check lower limit
PROFROLE	Yes	Select profrole

Table 65: Parameters of Check SLP_UF_LIMIT

This Check compares the Usage Factor values of the task data against the Upper and/or Lower limit. If parameter CHECK_UPPER_LIMIT is set to X, the upper limit is checked. If parameter CHECK_LOWER_LIMIT is set to X, the lower limit is checked.

The checked load profile assignments from the task data can be limited with a profile role specified in parameter PROFROLE. There are two "special" values which can be provided as PROFROLE: "I" and "P". If one of those values is provided, all profile roles specified in entries of table /PLGA/TECF_SLPT which have that "special" value in column SLP_PROFILE_TYPE. Basically, this is a shortcut for selection all "Actual" or all "Forecast" profile roles.

If parameter REMOVE_FROM_TASKDATA is set to X, all load profile assignments which have a usage factor outside of the limit are removed from the task data item. If no load profile assignments remain at the end of the Check, the whole task data item is removed.

9.5.3.8 Check: SLP_UF_PRV_P - Checker of limits of customer value from SLP profile with advanced trigger

Description: Checker of limits of customer value from SLP profile with advanced trigger

Reference Data: No

Limits: No

Trigger: Yes (extended)

The following parameters are available:

Paramter name	Is Optional	Description
NUM_DAYS_FOR_REF_TS	No	Number of reference days
REMOVE_FROM_TASKDATA	Yes	"X" for remove from task data
PROFROLE	Yes	Profrole
USE_EXTENDED_TRIGGER	Yes	"X" for use advanced trigger

Table 66: Parameters of Check SLP_UF_PRV_P

This Check uses the Customer Group configuration.

The Check compares Usage Factors of load profile against previous Usage Factors.

The checked load profile assignments from the task data can be limited with a profile role specified in parameter PROFROLE. There are two "special" values which can be provided as PROFROLE: "I" and "P". If one of those values is provided, all profile roles specified in entries of table /PLGA/TECF_SLPT which have that "special" value in column SLP_PROFILE_TYPE. Basically, this is a shortcut for selection all "Actual" or all "Forecast" profile roles.

The time slices to be checked are those, which use a relevant profile role with respect to the PROFROLE parameter, and for which the EUFASS time slice is within the check period, i.e. the EUFASS time slice must not start after the end of the check period an must not end before the start of the check period.

These time slices are compared with previous time slices of the same load profile assignments, i.e. they must have the same logical profile allocation number (column LOGLPRELNO), the same profile and profile role, and an EUFASS time slice which ends before the start of the EUFASS time of the profile assignment time slices which is to be checked. If the EUFASS time slice is shorter than the number of days specified in parameter NUM_DAYS_FOR_REF_TS, it is not considered. The length of the EUFASS time slice is calculated with SAP standard function module FIMA_DAYS_BETWEEN_TO_DATES.

Additionally, the customer value of the previous time slice may not be zero, as a deviation in percent is calculated, with the previous value as base value.

The comparison calculates the deviation between the usage factor of the checked time slice and the usage factor of a previous time slice, with the following formula:

- (((Usage Factor – Usage Factor previous) / Usage Factor previous) * 100)

This deviation value is compared to Triggers. If parameter USE_EXTENDED_TRIGGER is set to X, this will be the extended triggers defined for the relevant Customer Group (inferred from profile role and profile), otherwise it will the Triggers defined in the Cluster Check configuration.

A deviation, which exceeds the red Trigger values will be logged as an error and a deviation exceeding the Yellow trigger values, but not the red Trigger values, will be logged as a warning.

If parameter REMOVE_FROM_TASKDATA is set to X, the task data item (= installation and all selected load profile assignments) are removed from the task data set under the following circumstances:

- The red trigger was exceeded
- No usage factor to check was found
- No usage factor to compare to was found

10 Fileimport for UTI03

Transaction: */N/PLGA/EU3_FILE*

Within this functionally it is possible to import data with structure of XML or CSV and predefined conditions within SAP standard profile. In dependencies from import option different selection criteria are available.

10.1 Fileimport with "Import file in directory"

Transaction: */N/PLGA/EU3_FILE*

If the option "Import files in directory" is selected the following display is screened.

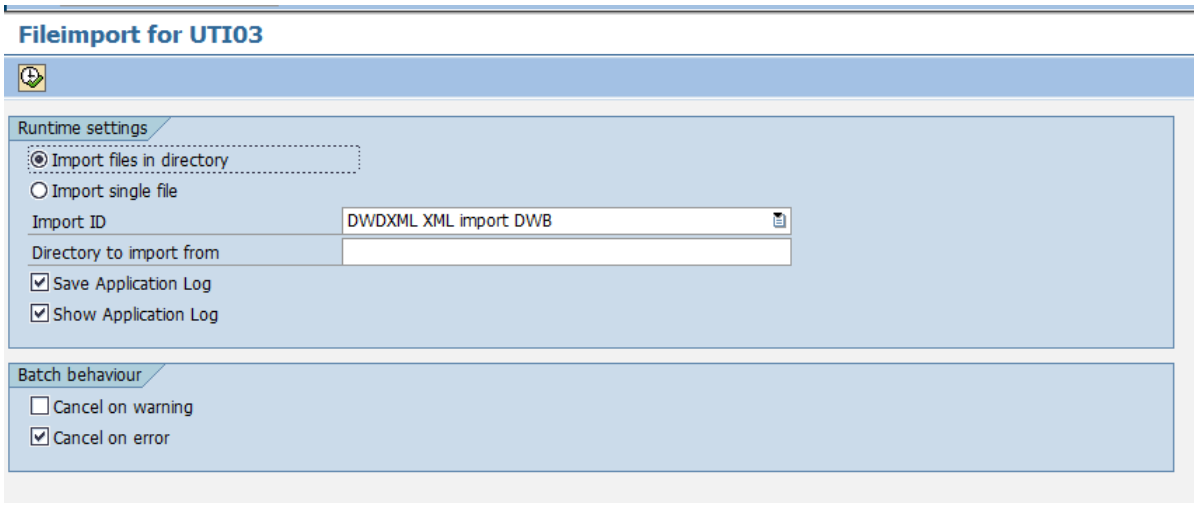


Figure 200: Fileimport – Overview "Import files in dirctory"

The following information are available:

Element	Description
Section "Runtime settings"	
Import files in directory	If this option is active then data from a directory could be chosen
Import single file	If this option is active then data from a single file should be imported
Import ID	Selection of predefined Import ID. The Import ID is a global customizing setting.
Directory to import from	In this field the directory from which the import should take place is defined. Note: it is not possible to select a lokal file e.g. from desktop
Save Application Log	If this option is active then the created protocol log is permanent saved
Show Application Log	If this option is active then the created protocol log is displayed
Section "Batch behaviour"	
Cancel on warning	This option is only relevant for background processing. If this option is active If this option is active then any warning message within the processing put status from background processing in canceled
Cancel on error	This option is only relevant for background processing. If this option is active If this option is active then any error message within the processing put status from background processing in canceled

Table 67: Fileimport – Details "Import file in directory"

10.2 Fileimport with "Import single file"

Transaction: */N/PLGA/EU3_FILE*

If the option "Import files in directory" is selected the following display is screened.

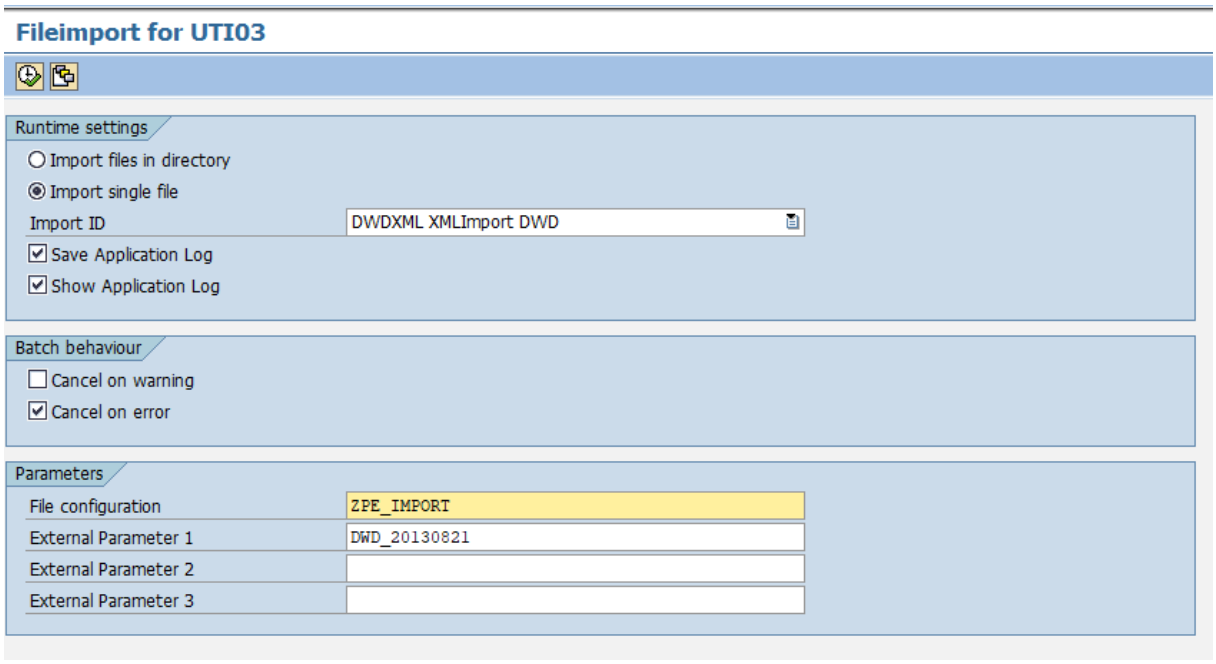


Figure 201: Fileimport – Overview "Import files in directory"

The following information are available:

Element	Description
Section "Runtime settings"	
Import files in directory	If this option is active then data from a directory could be chosen
Import single file	If this option is active then data from a single file should be imported
Import ID	Selection of predefined Import ID. The Import ID is a global customizing setting.
Save Application Log	If this option is active then the created protocol log is permanent saved
Show Application Log	If this option is active then the created protocol log is displayed
Section "Batch behaviour"	
Cancel on warning	This option is only relevant for background processing. If this option is active If this option is active then any warning message within the processing put status from background processing in canceled
Cancel on error	This option is only relevant for background processing. If this option is active If this option is active then any error message within the processing put status from background processing in canceled
Section "Parameters" – only available if option "Import single file" is chosen	
File configuration	This option is only relevant for "Import single file". Here a logical file must be defined, in which the import file is characterized. Basics for this are defined setting within transaction "FILE" an "SPF".
External Parameter 1 - 3	This option is only available with "Import single file". Could be used for definitions like filenames within transaction FILE or SF01.

Table 68: Fileimport – Details "Import single file"

10.3 Log display

After execution the result log is displayed if the option "Show Application Log" is active.

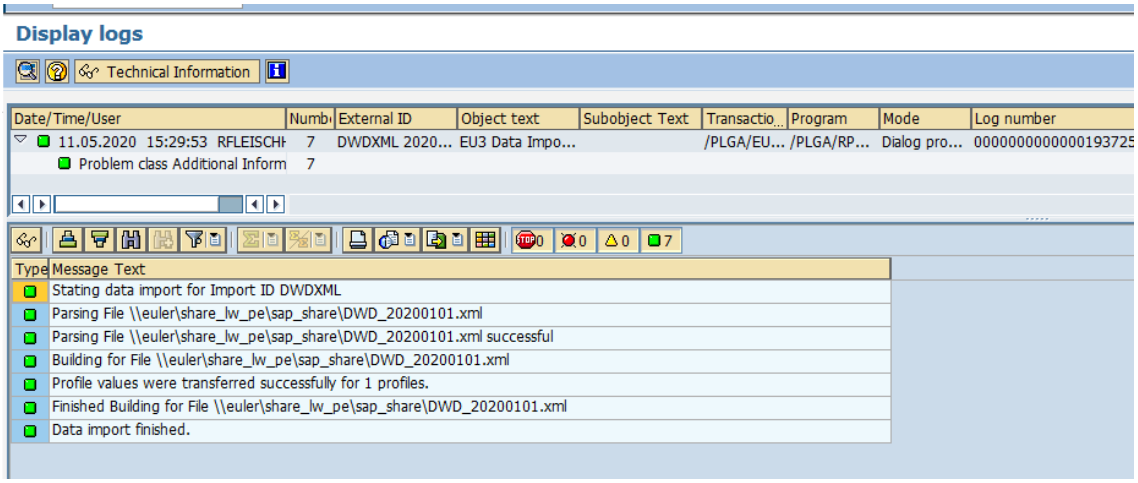


Figure 202: Fileimport – Log display 1

Furthermore if the file is already correct imported and a re-import is tried, the following message is displayed within the log:

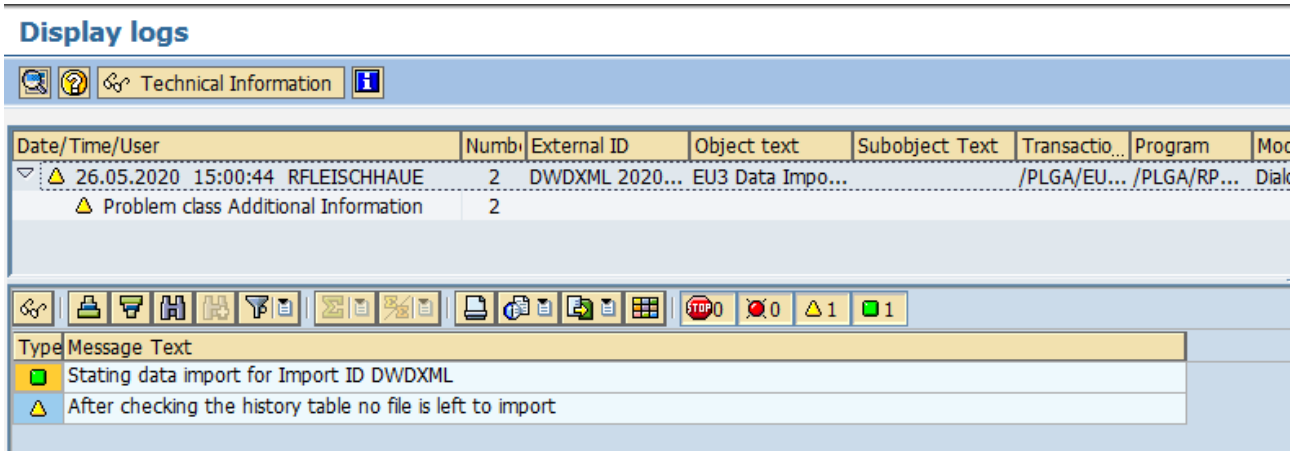


Figure 203: SLG1 – Log display 2 – already imported

Afterwards if the option "Save Application Log" the results can be displayed via transaction SLG1. Here you can select via the object "PLGA/EU3".

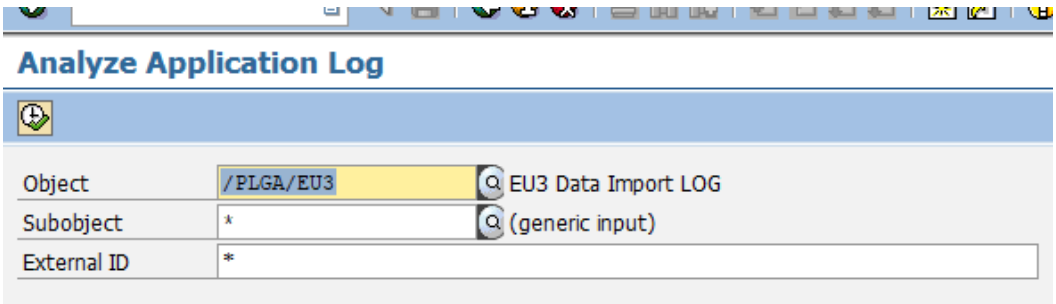


Figure 204: SLG1 – Log display 3

Here you can see all import log.

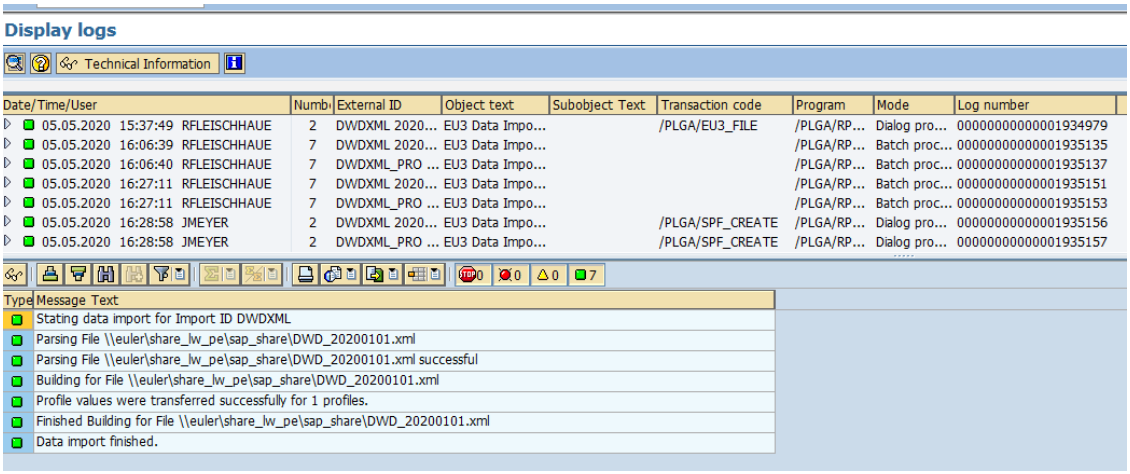


Figure 205: SLG1 – Log display 4

10.4 Master data definition

Transaction: */N/PLGA/EU3_MSD*

Within this transaction necessary master data for import are defined.

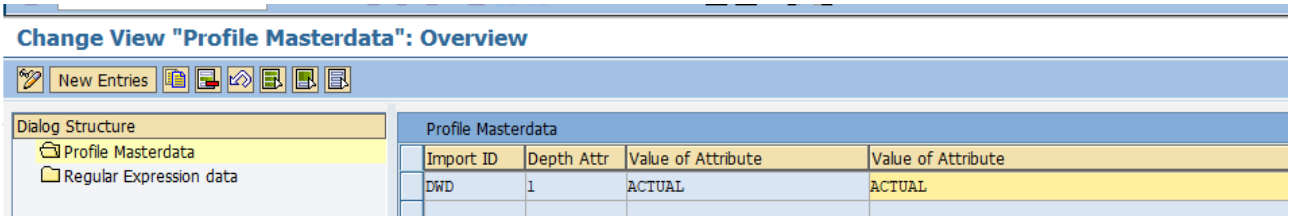


Figure 206: Profile Masterdata - overview

The following information are available:

Element	Description
Section "Profile Masterdata" – definition of master data for import in profile	
Import ID	Definition of predefined Import ID
Depth Attr	Definition of deep from attribute in file
Value of Attribute	Definition of Value of attribute in file
Depth Attr	Definition of deep from second attribute in file
Value of Attribute	Definition of value of second attribute in file
Profile	Enter a profile number
Status	Enter a valid profile value status for import
Depth Date	Definition of deep for date in file
Depth time	Definition of deep for time in file
Depth value	Definition of deep for value in file

Table 69: Profile Masterdata - details

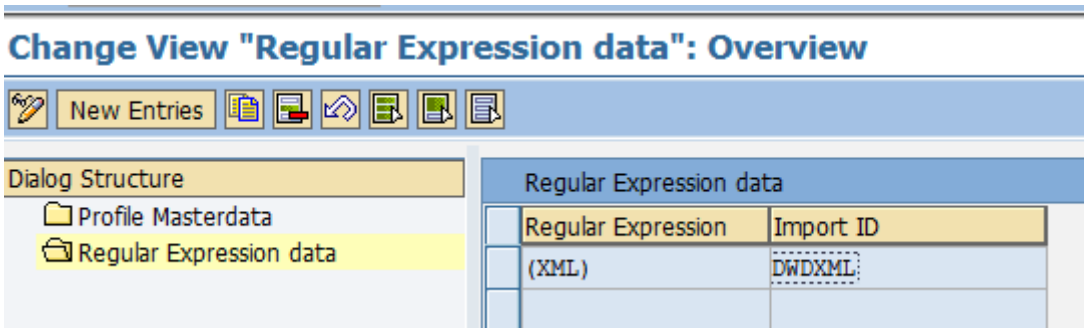


Figure 207: Regular Expression data - overview

Within the section "Regular Expression data" regular expression for data import are defined. The regular expression is used for unique data identification. For detailed use of regular expression please see SAP documentation.

The following information are available:

Element	Description
Section "Regular Expression data" – definition of master date for regular expression	
Regular Expression	Regular expression used to find data within the file which contains "(CSV)" or "(XML)"
Import ID	Definition of Import ID to regular expression

Table 70: Regular Expression data - details

11 Transaction

The following transaction are available within the *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA*.

Transaction code	Description	Associated module
/PLGA/ECA_AUTOCALCWB	EDM automatic calculation workbench	Extension for EDM calculation workbench
/PLGA/ECF_CFG	ECF: Configuration	Cluster Framework
/PLGA/ECF_CHK	ECF: Check settings	Cluster Framework
/PLGA/ECF_LOG	ECF: Diplay logs	Cluster Framework
/PLGA/ECF_RUN	ECF: Run Check Cluster	Cluster Framework
/PLGA/ECV_MAINTBILL	Maintain billing relevant tables	Calorific value extension
/PLGA/ECV_PROF_ST	EDMCV: Maintain profiles to CV area	Calorific value extension
/PLGA/ECV_REF_PV	Calculate reference factor profile	Calorific value extension
/PLGA/EDMSET_CRT_ST	EDM Settlment Ext. maintain control	Dynamic EDM Settlement extension
/PLGA/EDM_CREATE_SLP	Create SLP profiles	Master data extensions
/PLGA/EDM_MD_CHANGE	Change Master Data	Master data extensions
/PLGA/EDM_SLP_TUMX	Configure own TUM SLP types	h-value calculation
/PLGA/EDM_TAPROF	Maintenance Temperature area/profile	Global settings
/PLGA/EU3_FILE	EU3 Fileimport	Generic CSV/XML Importer
/PLGA/EU3_MSD	EU3: Master data	Generic CSV/XML Importer
/PLGA/SPF_CREATE	SPF: Create process instance	Simple Process Flow

Table 71: List of transaction

12 Miscellaneous

Installation Guide, User manuals and other documentation can be found under:

http://service.sap.com/instguides -> *SAP Solution Extensions -> SAP S/4HANA Utilities extensions for meter to cash processes*

13 Comments and Feedback

To send problem messages to SAP®, use the relevant application component in the SAP® application component hierarchy.

For *SAP® S/4HANA Utilities extensions for meter to cash processes by PROLOGA* the application component is XX-PART-PLG-UTL.