Open Metering System
Conformance Test

Volume 4
Application layer

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Release

Document History

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1.9.0	2013-08-09	Adaptions to OMS-S V3 To be released as OMS-CT V2.0	J. Feuchtmeier
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2.0.1	2014-08-14	Correction of meaning for reference VW05 and VM06 in Table 9. For correct [T42-GB3] the manufacturer needs to state the base pressure in [OMSCT-ManDec] For correct [T42-GT3] the manufacturer needs to state the base temperature in [OMSCT-ManDec]	J. Feuchtmeier
2.0.2	2014-09-04	Concretisation of resolution of data object for gas meters ([T42-GT1], [T42-GM1], [T42-GB1]) Add Storage number definition in DIV table and for relevant data objects	J. Feuchtmeier
3.0.0	2014-10-06	Adopting version number of the OMS-CT to be in line with the corresponding OMS-S version Table 17 adopted symbol for power	J. Feuchtmeier
3.0.0	2015-03-04	[T41-AD1]: Editorial, table notes as food notes, remark that order is different to [T31-ADR1] added Adoptions for data objects describtion	J. Feuchtmeier
3.0.0	2015-09-30	Release Version	J. Feuchtmeier

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1 Scope

This document describes the OMS conformance tests for basic meters with focus on the application layer.

This issue is applicable only together with [OMSCT-GEN].

It is split into 2 parts, one covering CI fields and headers usage; the other concentrates on the MBus application layer. The other possible application layers (refer to Table 3) will result in additional parts.

Tests for physical and link layer are covered in the other volumes of the test specification.

2 References

The used references are defined in [OMSCT-GEN] (OMS Open Metering System – Conformance Test Volume 1 – General Part).

3 Definitions, symbols and abbreviations

15 The used term definitions, symbols and abbreviations are defined in [OMSCT-GEN].

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Part 1:

Generic Application Header

4 Check of the fixed part of the application frame

The following fields shall be checked out of the application frame's fixed part.

4.1 [T41-CI1] CI-Field

The Application frame starts always with a CI-Field. The CI-Fields applied for OMS-communication are listed in [OMSS-Vol2] Table 7.

Test condition to be defined!

4.2 [T41-AD1] Address (8 Byte)

If the CI-Field has the type "long header" (APL header length of 12 or 14 byte) then the Address field is present and has to fulfil the limits of Table 1.

Byte number	Content	remark
Byte 1..4	Ident number	BCD only (from 00000001 to 99999999)
Byte 5..6	Manufacturer	Binary (binary coded 3-Letter Manufacture ID as listed by Flag association)[1]
Byte 7	Version	Binary (from 00h to FEh)
Byte 8	Device type	Binary (all values from [EN13757-3] Table 3 and [OMSS-Vol2] Table 10)

Table 1: Valid range for parts of meter address[2]

4.3 [T41-AN1] Access Number (1 Byte)

If the CI-Field of telegram has the type "long header" (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte) the field Access number is present and has to be tested.

[OMSS-Vol2] Clause 4.2.2 distinguishes between meter access number and MUC access number and defines which message type has to apply which type of Access number.

The meter access number may consist of every value between 0d and 255d. It is increased by 1 on each synchronous transmission. In case of telegram repetition, the access number remains constant.

The MUC access number is generated by the MUC. It may consist of every value between 0d and 255d. It is incremented on each transmission to a single meter/actuator containing new data. Additional restriction applies as the MUC shall not reuse an access number for the same meter/ actuator within a period of 300 seconds.

[1] Manufacturer must be listed in [FLAG]. The three letters of Manufacturer ID can be derived by calculation given in [EN13757-3] clause 5.5.

[2] The content is in different sequence as in [T31-ADR1] of [OMS-CT DLL].

4.4 [T41-ST1] Status (1 Byte)

If the CI-field of telegram has the type “long header” (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte) the field Status is present and has to be tested.

[OMSS-Vol2] Clause 4.2.3 distinguishes between meter Status and MUC Status by CI-Field.

The meter Status byte shall be conform to [EN13757-3]. The bit “temporary error” is set only if the meter signals a minor error condition (does not requires a service action immediately).

The bit “permanent error” is set only if the meter signals a fatal device error (requires a service action).

The bit “Power low” is set only to signal interruption of power supply or end of battery life (requires a service action).

The bit combination “any application error” shall be set if an application error happens after the reception of command (refer to [OMSS-Vol2] clause 4.2.3.2. The bit may also be set in meter initiated transmissions.

The manufacture specific bits may consist of any values.

The MUC-Status shall conform to table in [OMSS-Vol2] clause 4.2.3.1.

4.5 [T41-CW1] Configuration Word

If the CI-Field of telegram has the type “long header” (APL header length of 12 or 14 byte) or short header (APL header length of 4 or 6 byte), the Configuration word is present and has to be tested.

The Configuration Word shall conform to [OMSS-Vol2] Table 10. The range of special bits listed in this table has to be fulfilling these limits:

Bit Name	Accepted range	Remarks
B/A	[OMSS-Vol2] Table 2	
MMMM	Value “0”, “4”[1)] and “5” only	
NNNN	As calculated in [OMSS-Vol2] clause 4.2.5.4	
CC	[OMSS-Vol2] Table 8 and Table 9	
HH	[OMSS-Vol2] Clause 3.2.3.1	
Reserved	Reserved bits has to be “0b”	

Table 2: Valid range of bits in configuration word

[1)] Encryption method 4 describes the encryption according to Dutch Smart Meter Requirements. Conformance test has to be based on [DSMR P2] and is not scope of the OMS-CT.

4.6 Encryption/Decryption Test

4.6.1 [T41-E1] Encryption

Wireless meter/actuator shall support data encryption. Encryption is optional for wired meters only. The applied encryption mode and encryption key has to be listed in [OMSCT-ManDec]. The Encryption/Decryption test shall not be executed for Encryption mode “4”!

The encryption of a received telegram is tested by the OMS Conformance Test tool. The Encryption key has to be provided by the manufacture and applied by the OMS Conformance Test tool.

The meter shall send an encrypted telegram with a valid encryption method. (Encryption methods are listed in Table 2 “MMMM”).

The test passes, if at least two telegrams with Encryption method “5” could be decrypted, verified by AES check sequence “2Fh 2Fh”.

4.6.2 [T41-E2] Decryption

The decryption of a received telegram is tested by OMS Conformance Test tool. The Manufacture has to provide an unencrypted Command sequence e.g. “Switch Valve” and valid encryption key of the meter. The Command sequence and Encryption key has to be imported into the OMS-Test tool.

The OMS-Conformance Test tool request Standard data by REQ-UD2 (refer to [OMSS-Vol2] Table 3). When the meter responds the OMS Conformance test tool shall forward a simple Test-Command. An Acknowledge (ACK) has to be responded from meter.

The test has to be executed twice. The first time OMS Test tool send with unencrypted telegram to verify test procedure. (This test is not mandatory!) The second test will be applied with the encrypted command. (This test is mandatory!)

The test passes when meter executes the encrypted command (e.g. state of valve is changed).

5 Check of the variable part of the application frame

The CI field determines the used application protocol of the message. The available application protocols are shown in Table 3. The CI-Field shall be one out of the CI-Fields listed in [OMSS-Vol2] Table 5. If an application frame exists the type of Application protocol is declared in column “Application protocol” of this table. The test specification of the Application protocols are listed in Table 3.

Application protocol	Tested by
M-Bus	OMS-Conformance Test Volume 4 - Part 2 (this document)
DLMS	DLMS/COSEM - To be defined!
SML	To be defined!

Table 3: Table of possible application protocols

Part 2:

M-Bus Protocol

6 Check an M-Bus-Application frame

The M-Bus Application frame consists of one or several data records as chained M-Bus string. To verify every standardised data records the M-Bus String has to be separated into data records. The test tool for Conformance test shall parse the M-Bus-string as defined in next chapter.

6.1 [T42-P1] Parsing an M-Bus-String

The M-Bus string should always start with a valid DIF. The DIF describes the format and length of the contained data. Each data record needs to be evaluated to determine the length and thus the beginning of the next record. The length can be calculated as follows:

```
Length = Sum of all DIF/DIFE + Sum of all VIF/VIFE + Length of Data
```

The Number of DIF/DIFE-fields shall be calculated by summing up all octets until the Extension Bit is cleared.

The Number of VIF/VIFE-fields shall be calculated by summing up all octets until the Extension Bit is cleared.

The Length of data shall be calculated according to the predefined length as given in [EN13757-3] Table 6.

Exceptions have to be applied in case of data field DIF=Dh (LVAR) and data field DIF=Fh (special functions) as well as for VIF=0x7C (user defined VIF).

In case of variable data length, an 8 bit length field can be found at the end of the VIF/VIFE sequence. The field indicated the length of the data following.

Using special functions all special DIF are allowed but the special DIF 2Fh may be supported only. After 2Fh follows no VIF and the Length of data is 0. For all other special functions the parsing should be stopped at this position. Alternatively the special parser may also consider other special functions, if the interpretations rule is known.

Applying these rules the telegram can be separated in different data records before the interpretation of every data record is started.

EXAMPLE 1:

This example shows an M-Bus-string for a volume in gallons represented by a hexadecimal number. As gallons are not part of OBIS-Table, the OMS-Standard interpreter may ignore this data record and continues parsing with the next data record. The length of the ignored data record can be found as following:

```
M-Bus-string [hex]: CC 80 01 FB 23 78 56 34 12 0F 12 34 56 2F 2F
```

DIF, DIFE, VIF, VIFE, example 12345678

Length = 8 Digits BCD for Data (Type 1100b in Table 3) = 4 octets

+ DIF (set extension bit) and DIFE (set ext. bit) and DIFE (cleared ext. bit) = 3 octets

+ VIF (set extension bit) and VIFE (cleared extension bit) = 2 octets

Thus the next DIF (0Fh) follows after 9 octets!

EXAMPLE 2:

The example shows a complete application layer frame (hexadecimal numbers; without CRC). The parsing starts after the configuration word by separating the individual data records.

```
Application layer frame [Hex]:
7A 02 04 00 00 2F 2F 0B 13 56 34 12 8B 82 00 93 3E 67 45 23 0D FD
10 0A 30 31 32 33 34 35 36 37 38 39 0F 88 2F
```

	Data [hex]	Content, Meaning
-	7A 02 04 00 00	CI-Field 7Ah is followed by 4 Byte fix header
1	2F	First DIF Special function (1 DIF, 0 VIF, no data → L=1)
2	2F	Special function (1 DIF, 0 VIF, no data) → L=1
3	0B 13 56 34 12	Data record (1 DIF, 1 VIF, 3 Byte of data) → L=5
4	8B 82 00 93 3E 67 45 23	Data record (3 DIF/DIFE, 2 VIF/VIFE, 3 Byte of data) → L=8
5	0D FD 10 0A 30 31 32 33 34 35 36 37 38 39	LVAR (1 DIF, 2 VIF/VIFE, 1 Length-field (showing 10 (0Ah) remaining bytes) and 10 Byte ASCII) → L=14
?	0F 88 2F	Special function (manufacture specific) unknown Length → stop parsing here

6.2 [T42-P2] Compact Load Profile

6.2.1 Informative

The load-profile defines a list of values that can be defined relative or absolute to each other.

A base-value, a base-time, and a compact-profile define the load-profile. The base-value is a separate m-bus string that defines a start-value. The base-time is the time associated to the base-value.

In the compact-profile-string further values are stored in a compact format, which are referenced to the base-value.

Base-value and base-time are linked to the compact-profile by the same storage-Nr.

Structure of the compact-profile:

DIF/DIFE	VIF/VIFE	LVAR	Spacing ControlByte	Spacing ValueByte	Data

A compact-profile-structure can be identified by a DIF of xDh and a VIFE of 1Eh or 1Fh.

6.2.2 Test

6.2.2.1 Conditions for the fields of a compact-profile:

DIF/DIFE:

DIF_DataField (Bit 0..3):

MUST: xDh

ELSE: → error

DIF_FunctionFiled (Bit 4/5):

value has no restrictions

DIF_StorageNumber :

IF VIFE == 1Fh („compact profile without register“):

MUST: ≥ 8

ELSE: → error

ELSE:

MUST: ≥ 0 AND ≤125 ([OMSS-Vol2] chapter 5.1.1)

According to [OMSS-Vol2] chapter 5.1.2 DIF_StorageNumber must not be zero, since this value is used for the current time.

ELSE: → error

DIF_TariffNumber:

MUST: ≤255 ([OMSS-Vol2] chapter 5.1.1)

ELSE: → error

DIF_SubunitNumber:

MUST: ≤255 ([OMSS-Vol2] chapter 5.1.1)

ELSE: → error

Info:

- Link to base-time is done by DIF_StorageNumber
- Link to base-value is done by DIF_StorageNumber, DIF_TariffNumber, and DIF_SubunitNumber

VIF/VIFE:

Value-information:

has no restrictions (combination of the DataFormat(SpacingControlByte)/VIF- fields for the meter must be valid)

last VIFE:

MUST: 1Eh or 1Fh (identification of the compact profile)

ELSE: → error

LVAR:

MUST: 02h..BFh (02h means that no data is available)

ELSE: → error

SpacingControlByte:

Bit 3..0: DataFormat

MUST: be out of [1..4, 6, 7, 9..Ch, Eh]

ELSE: → error

Bit 5/4: SpacingUnit (time-spacing):

00b=sec,

01b=min,

10b=hours,

11b=days/months

Bit 7/6: IncrementMode:

00b=absolute value (signed)

01b=Increments (positive unsigned)

10b=Decrements (negative unsigned)

11b=Signed difference

SpacingValueByte:

Value 1..250:

time-increment/decrement in the unit that is defined by SpacingControlByte

Value 253:

IF SpacingUnit == 11b:

Number of half months

ELSE:

→ error (reserved)

Value 254:

IF SpacingUnit == 11b:

Number of full months

ELSE:

→ error (reserved)

other values:

→ error (reserved)

Data:

Data in the format defined by SpacingControlByte.

IF IncrementMode is 01b or 10b:

IF DataFormat is in [9..Ch, Eh] (BCD) AND is singed [EN13757-3] Annex B]:

→ error

ELSE:

The data is to be interpreted as unsigned integer
(data typ B ([EN13757-3] Annex A) OR unsigned BCD ([EN13757-3] Annex B))

IF IncrementMode is 00b or 11b:

The data is to be interpreted as signed integer
(data typ B ([EN13757-3] Annex A) OR signed BCD ([EN13757-3] Annex B))

Info:

- If IncrementMode != 00b (absolute) then the Base-Value is to be used as initial value. Every new value is determined by adding or subtracting (depending on IncrementMode) the data-value to the already calculated value. Calculation begins with the first data-value.
- If IncrementMode == 00b (absolute) the data-value is used as it is (without calculation).
- If the base-value is missing then the first value is to be used in absolute-mode. Otherwise an error is to be issued.
- According to [OMSS-Vol2] chapter 5.1.1 BCD is allowed for the meter-data. Float is not allowed.
  According to ([EN13757-3] negative BCD-values are preceded by 0Fh.

6.2.2.2 Conditions for Base-Time:

Time with same storage-number as in CompactProfile available:

YES: use as base-time

NO: → error

Time in the format F to J except H ([EN13757-3], Annex A):

YES: OK

NO: → error

6.2.2.3 Conditions for Base-Value:

Value available with the same Storage-, Tariff-, und Subunit-Number as in the CompactProfile:

YES: use as base-value

NO:

IncrementMode == 00b (absolute):

YES: use first data-value of CompactProfile as base-value

NO: → error

Info:

- The base-value and the values in CompactProfile are connected by the same Storage-, Tariff-, und Subunit-Numbers.
- The first data-value of the CompactProfile is always associated to the base-time plus the time-increment of SpacingValueByte and SpacingControlByte. This is also true if there is no base-balue available.

Info:

- Base-value and base-time may occur in arbitrary order to the CompactProfile.

6.2.3 Test-Cases

The test cases shall be used to check the conformance test and do not reflect a real meter implementation.

Test-case 1

Error condition: no error

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010

DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 2

325 Error condition: DIF_StorageNumber <8 for VIFE==1Fh:

DIF/DIFE	82h, 01h	16 bit integer, storage no. = 2
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 01h	variable length, storage no. = 2
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 3

Error condition: DIF_StorageNumber == 0 for VIFE==1Eh:

DIF/DIFE	02h	16 bit integer, storage no. = 0
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	0Dh	variable length, storage no. = 0
VIF/VIFE	EEh, 1Eh	HCA units (current value), compact profile with registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

330 Test-case 4

Error condition: DIF_StorageNumber >125 for VIFE==1Eh:

DIF/DIFE	82h, 80h, 04h	16 bit integer, storage no. = 128
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 80h, 04h	variable length, storage no. = 128
VIF/VIFE	EEh, 1Eh	HCA units (current value), compact profile with registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 5

Error condition: DIF_TariffNumber >= 256:

DIF/DIFE	82h, 80h, 80h, 80h, 80h, 10h	16 bit integer, storage no. = 0, tariff=256
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 80h, 80h, 80h, 80h, 10h	variable length, storage no. = 0, tariff=256
VIF/VIFE	EEh, 1Eh	HCA units (current value), compact profile with registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

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Test-case 6

Error condition: DIF_UnitNumber >= 256:

DIF/DIFE	82h, 80h, 80h, 80h, 80h, 80h, 80h, 80h, 80h, 40h	16 bit integer, storage no. = 0, tariff=0, unit=256
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 80h, 80h, 80h, 80h, 80h, 80h, 80h, 80h, 40h	variable length, storage no. = 0, tariff=0, unit=256
VIF/VIFE	EEh, 1Eh	HCA units (current value),

		compact profile with registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 7

Error condition: LVAR > BFh

DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	C2h	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value
	03h, 00h, 00h, 00h	value
	04h, 00h, 00h, 00h	value
	05h, 00h, 00h, 00h	value
	06h, 00h, 00h, 00h	value
	07h, 00h, 00h, 00h	value
	08h, 00h, 00h, 00h	value
	09h, 00h, 00h, 00h	value
	0Ah, 00h, 00h, 00h	value
	0Bh, 00h, 00h, 00h	value
	0Ch, 00h, 00h, 00h	value
	0Dh, 00h, 00h, 00h	value
	0Eh, 00h, 00h, 00h	value
	0Fh, 00h, 00h, 00h	value
	10h, 00h, 00h,	value

	00h	
	11h, 00h, 00h, 00h	value
	12h, 00h, 00h, 00h	value
	13h, 00h, 00h, 00h	value
	14h, 00h, 00h, 00h	value
	15h, 00h, 00h, 00h	value
	16h, 00h, 00h, 00h	value
	17h, 00h, 00h, 00h	value
	18h, 00h, 00h, 00h	value
	19h, 00h, 00h, 00h	value
	1Ah, 00h, 00h, 00h	value
	1Bh, 00h, 00h, 00h	value
	1Ch, 00h, 00h, 00h	value
	1Dh, 00h, 00h, 00h	value
	1Eh, 00h, 00h, 00h	value
	1Fh, 00h, 00h, 00h	value
	20h, 00h, 00h, 00h	value
	21h, 00h, 00h, 00h	value
	22h, 00h, 00h, 00h	value
	23h, 00h, 00h, 00h	value
	24h, 00h, 00h, 00h	value
	25h, 00h, 00h, 00h	value
	26h, 00h, 00h, 00h	value
	27h, 00h, 00h, 00h	value
	28h, 00h, 00h, 00h	value
	29h, 00h, 00h, 00h	value
	2Ah, 00h, 00h, 00h	value
	2Bh, 00h, 00h,	value

	00h	
	2Ch, 00h, 00h, 00h	value
	2Dh, 00h, 00h, 00h	value
	2Eh, 00h, 00h, 00h	value
	2Fh, 00h, 00h, 00h	value
	30h, 00h, 00h, 00h	value
	31h, 00h, 00h, 00h	value

Test-case 8

Error condition: Wrong DataFormat in SpacingControlByte

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	35h	spacing: absolute values + days + 32 bit real
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

345 Test-case 9

Error condition: SpacingValueByte == 251

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes

data	34h	spacing: absolute values + days + 32 bit integer
	FBh	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 10

Error condition: SpacingValueByte == 253 but SpacingUnit != 11b

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	FDh	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

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Test-case 11

Error condition: SpacingValueByte == 254 but SpacingUnit != 11b

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	FEh	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units

	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 12

Error condition: missing Base-Time

DIF/DIFE	84h, 04h	32 bit integer, storage no. = 8
VIF	6Eh	HCA units
data	01h, 00h, 00h, 00h	value 1: 1 HCA units
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	34h	spacing: absolute values + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

Test-case 13

Error condition: Base-Value not available for IncrementMode != 00b

DIF/DIFE	82h, 04h	16 bit integer, storage no. = 8
VIF	6Ch	data (format G)
data	5Fh, 1Ch	date 31.12.2010
DIF/DIFE	8Dh, 04h	variable length, storage no. = 8
VIF/VIFE	EEh, 1Fh	HCA units (current value), compact profile without registers
LVAR	0Ah	number of bytes
data	74h	spacing: increments + days + 32 bit integer
	01h	days between values
	02h, 00h, 00h, 00h	value 2: 2 HCA units
	03h, 00h, 00h, 00h	value 3: 3 HCA units

6.3 Coding of data objects

6.3.1 Valid DIF coding (informative)

Valid DIF's[3]	Meaning
nXnn 0010b	2 Byte integer
nXnn 0011b	3 Byte integer
nXnn 0100b	4 Byte integer
nXnn 0110b	6 Byte integer
nXnn 0111b	8 Byte integer
nXnn 1010b	4 digit BCD
nXnn 1011b	6 digit BCD
nXnn 1100b	8 digit BCD
nXnn 1110b	12 digit BCD

365 **Table 4: DIF coding**

For X = 0b: LSB of storage number = 0

For X = 1b: LSB of storage number = 1

6.3.2 Valid VIF coding for Energy (informative)

Ref.	Valid VIFs[4]	Meaning / Scaler/Unit
EW01	0000 0nnnb	Energy Forward kWh 10e-6 … 10e+1
EW02	1111 1011 0000 000nb	Energy Forward kWh 10e+2 … 10e+3
EW03	1111 1011 1000 000n 0111 1101b	Energy Forward kWh 10e+5 … 10e+6
EW04	1000 0nnn 0011 1011b	Energy Forward 2 kWh 10e-6 … 10e+1
EW05	1111 1011 1000 000n 0011 1011b	Energy 10 Forward 2 kWh 10e+2 … 10e+3
EW06	1111 1011 1000 000n 1111 1101 0011 1011b	Energy Forward 2 kWh 10e+5 … 10e+6

[3] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] table 6

[4] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

EW07	**1000 0nnn 0011 1100b**	**Energy Backward kWh 10e-6 … 10e+1**
EW08	**1111 1011 1000 000n 0011 1100b**	**Energy Backward kWh 10e+2 … 10e+3**
EW09	**1111 1011 1000 000n 1111 1101 0011 1100b**	**Energy Backward kWh 10e+5 … 10e+6**
EW10	**1000 0nnn 1111 1100 0001 0000b**	**Energy Abs. kWh 10e-6 … 10e+1**
EW11	**1111 1011 1000 000n 1111 1100 0001 0000b**	**Energy Abs. kWh 10e+2 … 10e+3**
EW12	**1111 1011 1000 000n 1111 1101 1111 1100 0001 0000b**	**Energy Abs. kWh 10e+5 … 10e+6**

370 **Table 5: VIF for Energy data objects [kWh]**

Ref.	Valid VIFs[5]	Meaning / Scaler/Unit
EJ01	**0000 1nnnb**	**Energy forward GJ 10e-9 … 10e-2**
EJ02	**1111 1011 0000 100nb**	**Energy forward GJ 10e-1 … 10e0**
EJ03	**1111 1011 1000 100n 0111 1101b**	**Energy forward GJ 10e+2 … 10e+3**
EJ04	**1000 1nnn 0011 1100b**	**Energy backward GJ 10e-9 … 10e-2**
EJ05	**1111 1011 1000 100n 0011 1100b**	**Energy backward GJ 10e-1 … 10e+0**
EJ06	**1111 1011 1000 100n 1111 1101 0011 1100b**	**Energy backward GJ 10e+2 … 10e+3**

Table 6: VIF for Energy data objects [GJ]

6.3.3 Valid VIF coding for Power (informative)

375

Ref.	Valid VIFs[6]	Meaning / Scaler/Unit
PW01	**0010 1nnnb**	**Active power import W 10e-3 … 10e+4**

[5] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

[6] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

PW02	**1010 1nnn 0011 1011b**	**Active power import W 10e-3 … 10e+4**
PW03	**1010 1nnn 0011 1100b**	**Active power export W 10e-3 … 10e+4**
PW04	**1111 1011 0111 1nnnb**	**Active power import W 10e-3 … 10e+4**
PW05	**1111 1011 0111 1nnnb**	**Active Power import W 10e-3 … 10e+4**
PW06	**1111 1011 1111 1nnn 0011 1100b**	**Active Power export W 10e-3 … 10e+4**
PW07	**1010 1nnn 1111 1100 0001 0000b**	**Active Power absolute kW 10e-6 … 10e+1**
PW08	**1111 1011 1010 100n 1111 1100 0001 0000b**	**Active Power absolute kW 10e+2 … 10e+3**

Table 7: VIF for power data objects [W]

Ref.	Valid VIFs[7]	Meaning / Scaler/Unit
PJ01	**0011 0nnnb**	**Power kJ/h 10e-3 … 10e+4**

Table 8: VIF for power data objects [kJ/h]

380 ### 6.3.4 Valid VIF coding for Volume (informative)

Ref.	Valid VIFs[8]	Meaning / Scaler/Unit
VM01	**0001 0nnnb**	**normal /temp. Converted 100 m³ 10e-6 … 10e+1**
VM02	**1001 0nnn 0111 1101b**	**normal /temp. Converted 100 m³ 10e-3 … 10e+4**
VM03	**1001 0nnn 0011 1010b**	**meas. Condition m³ 10e-6 … 10e+1**
VM04	**1001 0nnn 1111 1101 0011 1010b**	**meas. Condition m³ 10e-3 … 10e+4**
VM05	**1001 0nnn 0011 1110b**	**base Condition m³ 10e-6 … 10e+1**
VM06	**1001 0nnn 1111 1101 0011 1110b**	**base Condition**

[7] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

[8] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

		m³ 10e-3 … 10e+4
VM07	**1001 0nnn 0011 1010b**	**meas. Condition m³ 10e-3 … 10e+4**

Table 9: VIF for Volume data objects [m³]

6.3.5 Valid VIF coding for Volume Flow (informative)

Ref.	Valid VIFs[9]	Meaning / Scaler/Unit
VF01	**0011 1nnnb**	**normal /temp. Converted m³/h 10e-6 … 10e+1**
VF02	**1011 1nnn 0011 1010b**	**meas. Condition m³/h 10e-6 … 10e+1**
VF03	**1011 1nnn 0011 1110b**	**base condition m³/h 10e-6 … 10e+1**

385 **Table 10: VIF for Volume Flow data objects [m3/h]**

6.3.6 Valid VIF coding for Heat Cost Allocator (informative)

Ref.	Valid VIFs[10]	Meaning / Scaler/Unit
HC01	**0110 1110b**	**HCA 10e+0**

Table 11: VIF for Heat Cost Allocator data objects

6.3.7 Valid VIF coding for Temperature (informative)

390

Ref.	Valid VIFs[11]	Meaning / Scaler/Unit
TC01	**0101 10nnb**	**flow °C 10e-3 … 10e+0**
TC02	**0101 11nnb**	**return °C 10e-3 … 10e+0**
TC03	**1101 10nn 0011 1110b**	**Base condition °C 10e-3 … 10e+0**

Table 12: VIF for Temperature data objects [°C]

6.3.8 Valid VIF coding for Pressure (informative)

[9] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

[10] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

[11] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

Ref.	Valid VIFs[12]	Meaning / Scaler/Unit
PR01	1110 10nn 0011 1110b	base condition bar 10e-3 … 10e+0
PR02	1110 10nn 1111 0011 0011 1110b	base condition bar 10e-6 … 10e-3

Table 13: VIF for pressure data objects [bar]

6.3.9 Valid VIF coding for date/time (informative)

Ref.	Valid VIFs[13]	Meaning / Scaler/Unit
DT01	0110 1101b	Date+Time / Time forward (Type F)
DT02	0110 1100b	Date forward (Type G)
DT03	1110 1101 0011 1100b	Date+Time / Time backward
DT04	1110 1100 0011 1100b	Date backward
DT10	0111 01nnb	Actuality duration s, min, h, d
DT11	0111 00nnb	Average duration s, min, h, d
DT12	1111 1101 0010 1000b	Interval monthly values month

Table 14: VIF for date/time

6.4 [T42-GD1] Generic Data points

To be defined!

[12] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

[13] Refer to [OMSS-Vol2] Annex A:
n one or more bits according to [EN13757-3] tables 9,11,12 and 13

6.5 Electricity meters

All following test of this chapter are applicable for device types shown in Table 15:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Electricity	02h

Table 15: Electricity meter – supported Device Types

6.5.1 [T42-EL1] Data point: Current consumption Value (meter count)

6.5.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 5)	DIF Type Ref. (see Table 4)
[T42-EL1] - 1	Active energy import (+A), current value	EW01, EW02, EW03, EW04, EW05, EW06	All (storage number = 0)
[T42-EL1] - 2	Active energy export (-A), current value	EW04, EW08, EW09	All (storage number = 0)
[T42-EL1] - 3	Active energy import (abs.(A)), current value	EW10, EW11, EW12	All (storage number = 0)

Table 16: Electricity meter - Alternative Data objects

6.5.1.2 Tests

6.5.1.2.1 Presence

Check if at least one of the alternative data objects of Table 16: [T42-EL1]-1 or [T42-EL1]-2 or [T42-EL1]-3 shall be present.

6.5.1.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 16 is present.

6.5.1.2.3 Resolution

Check for each found alternative data object of Table 16 a corresponding data object for power shall be present. If the data object for power is mandatory the test [T41-E2] shall be executed. If the data object for power is not mandatory the test [T41-E2] shall be skipped.

Resolution of data object <= 0.1 Wh ➔ data object for power not mandatory

Resolution of data object <= 1 kWh & > 0.1 Wh ➔ data object for power is mandatory

430 Resolution of data object > 1 kWh ➔ test shall be failed

6.5.2 [T42-EL2] Data point: Power

6.5.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 7)	DIF Type Ref. (see Table 4)
[T42-EL2] - 1	Active power import (+P), current value	PW01, PW02, PW04, PW05	All (storage number = 0)
[T42-EL2] - 2	Active power export (-P), current value	PW03, PW06	All (storage number = 0)
[T42-EL2] - 3	Active power import (abs.(P)), current value	PW07, PW08	All (storage number = 0)

Table 17: Electricity meter – power data objects

6.5.2.2 Tests

6.5.2.2.1 Presence

If a power data is mandatory check if a corresponding object of Table 17**Table 7** is present.

6.5.2.2.2 Doublet

Check if only one of the possible combinations of Table 17 is present.

6.5.2.2.3 Resolution

Check if the resolution of the power data object is <= 0,1 W.

6.6 Water meters

All following test of this chapter are applicable for device types shown in Table 18.

Device Type	Code (refer to [OMSS-Vol2] table 10)
Cold Water	07h, 16h
Hot Water	06h, 15h

Table 18: Water meters – supported Device Types

6.6.1 [T42-W1] Data point: Current consumption Value (meter count)

6.6.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see VM07 | 1001 0nnn 0011 1010b | meas. Condition m³ 10e-3 … 10e+4 Table 9)	DIF Type Ref. (see Table 4)
[T42-W1] - 1	Volume (V), accumulated, total, current value	VM01, VM02	All (storage number = 0)

Table 19: Water meter – meter count data objects

6.6.1.2 Tests

6.6.1.2.1 Presence

Check if at least one of the alternative data objects of Table 19 is present.

6.6.1.2.2 Doublet

Check if only one of the possible combinations of Table 19 is present.

6.6.1.2.3 Resolution

Check if the resolution of the meter count is <= 1 m³.

Check for each found alternative data object of Table 19 a corresponding data object for flow shall be present.

If the data object for flow is mandatory the test [T42-W2] shall be executed.

If the data object for power is not mandatory the test [T42-W2] shall be skipped.

Resolution of data object <= 1 m³ ➔ data object for flow not mandatory

Resolution of data object >= 1 m³ ➔ data object for flow is mandatory

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6.6.2 [T42-W2] Data point: Flow

6.6.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 10)	DIF Type Ref. (see Table 4)
[T42-W2] - 1	Flow rate, average (Va/t), current value	VF01	All (storage number = 0)

Table 20: Water meter –flow data objects

475

6.6.2.2 Tests

6.6.2.2.1 Presence

If a flow data is mandatory check if a corresponding object of Table 20 is present

6.6.2.2.2 Doublet

480 Check if only one of the possible combinations of Table 20 is present.

6.6.2.2.3 Resolution

There is no special resolution required.

6.7 Heat/Cold meters

485 All following test of this chapter are applicable for device types shown in Table 21:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Cooling only	0Ah, 0Bh
Combined Heat/cooling	0Dh
Heat only	04h, 0Ch

Table 21: Heat/Cold meters - supported Device Types

6.7.1 [T42-HC1] Data point: Current consumption Value (meter count)

490 ### 6.7.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 5 and Table 6)	DIF Type Ref. (see Table 4)
[T42-HC1] - 1	Energy (A), total, current value (cooling only)	EW01, EW02, EW03, EJ01, EJ02, EJ03	All (storage number = 0)
[T42-HC1] - 2	Energy (A), total, current value (combined heating/cooling)	EW01, EW02, EW03, EW07, EW08, EW09, EJ01, EJ02, EJ03, EJ04, EJ05, EJ06	All (storage number = 0)
[T42-HC1] - 3	Energy (A), total, current value (heating only and combined heating/cooling)	EW01, EW02, EW03, EJ01, EJ02, EJ03	All (storage number = 0)

Table 22: Heat/Cold meter –meter count data objects[14]

6.7.1.2 Tests

495 #### 6.7.1.2.1 Presence

Check if at least one of the data objects of Table 22 is present.

[14] If fields of the the gray marked lines are used it may be in contradiction with the required minimum resolution. Refer to [OMSS-Vol2] Tab15 and [OMSS-Vol2] Tab16!

6.7.1.2.2 Doublet

500 Check if only one of the data objects of Table 22 is present.

6.7.1.2.3 Resolution

Check for each present data object of Table 22 a corresponding data object for power shall be present. If the data object for power is mandatory the test [T42-HC2] shall be executed. If the data object for power is not mandatory the test [T42-HC2] shall be skipped.

505 Resolution of data object

<= 1 kWh ((Qp < 10 m³/h) ➔ data object for power not mandatory

<= 10kWh (Qp < 100 m³/h) ➔ data object for power not mandatory

<= 100 kWh (Qp >= 100 m³/h) ➔ data object for power not mandatory

Resolution of data object

510 > 1 kWh ((Qp < 10 m³/h) ➔ data object for power mandatory

> 10kWh (Qp < 100 m³/h) ➔ data object for power mandatory

> 100 kWh (Qp >= 100 m³/h) ➔ data object for power mandatory

6.7.2 [T42-HC2] Data point: Power

6.7.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 7 and Table 23)	DIF Type Ref. (see Table 4)
[T42-HC2] - 1	Power (energy flow) (P), average, current value	PJ01, PW01	All (storage number = 0)

Table 23: Heat/Cold meter –power data objects

6.7.2.2 Tests

6.7.2.2.1 Presence

Check if at least one of the alternative data objects of Table 23 is present.

6.7.2.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 23 is present.

6.7.2.2.3 Resolution

There is no special resolution required.

6.8 Heat cost allocator

All following test of this chapter are applicable for device types shown in Table 24:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Heat Cost Allocator	08h

Table 24: Heat cost allocator - supported Device Types

6.8.1 [T42-H1] Data point: Current heat cost allocation value (meter count)

6.8.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 11)	DIF Type Ref. (see Table 4)
[T42-H1] - 1	Unrated integral, current value	HC01	All (storage number = 0)

Table 25: Heat Cost Allocator - meter count data objects

6.8.1.2 Tests

6.8.1.2.1 Presence

Check if at least one of the alternative data objects of Table 25 is present.

6.8.1.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 25 is present.

6.8.1.2.3 Resolution

There is no special resolution required.

6.8.2 [T42-H2] Data point: Due date heat cost allocation value (meter count)

6.8.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 11)	DIF Type Ref. (see Table 4)
[T42-H2] - 1	Unrated integral, due date value	HC01	All (storage number = 1)

Table 26: Heat Cost Allocator – due date meter count data objects

6.8.2.1.1 Presence

Check if at least one of the alternative data objects of Table 26 is present.

6.8.2.1.2 Doublet

Check if for each found alternative data object only one possible coding of Table 26 is present.

6.8.2.1.3 Resolution

There is no special resolution required.

6.8.3 [T42-H3] Data point: Due date heat cost allocation (target date)

6.8.3.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 14)	DIF Type Ref. (see Table 4)
[T42-H3] - 1	Local date at due date (target date)	DT02	All (storage number = 1)

Table 27: Heat Cost Allocator – due date data objects (target date)

6.8.3.1.1 Presence

Check if at least one of the alternative data objects of Table 27 is present.

6.8.3.1.2 Doublet

Check if for each found alternative data object only one possible coding of Table 27 is present.

6.8.3.1.3 Resolution

There is no special resolution required.

6.9 Gas meter (temperature converted volume)

All following test of this chapter are applicable for device types shown in Table 28:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Gas	03h

Table 28: Gas meter (temperature converted volume) - supported Device types

6.9.1 [T42-GT1] Data point: Current consumption Value (meter count)

6.9.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see VM07 | 1001 0nnn 0011 1010b | meas. Condition m³ 10e-3 … 10e+4 Table 9)	DIF Type Ref. (see Table 4)
[T42-GT1] - 1	Volume (meter), temperature converted (Vtc), forward, absolute, current value	VM01, VM02	All (storage number = 0)

Table 29: Gas meter (temp. conv.) – data objects

6.9.1.2 Tests

6.9.1.2.1 Presence

Check if at least one of the alternative data objects of Table 29 is present.

6.9.1.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 29 is present.

6.9.1.2.3 Resolution

Check for each present data object of Table 29 a corresponding data object for flow shall be present. If the data object for flow is mandatory the test [T42-GT2] shall be executed. If the data object for flow is not mandatory the test [T42-GT2] shall be skipped.

Resolution of data object

<= 10 l (Qmax <= 6 m³/h) ➔ data object for flow not mandatory

<= 100 l (Qmax <= 60 m³/h) ➔ data object for flow not mandatory

<= 1000 l (Qmax > 60 m³/h) ➔ data object for flow not mandatory

595 Resolution of data object

> 10 l (Qmax <= 6 m³/h) ➔ data object for flow mandatory

> 100 l (Qmax <= 60 m³/h) ➔ data object for flow mandatory

> 1000 l (Qmax > 60 m³/h) ➔ data object for flow mandatory

600 Check for each present data object of Table 29 where a data object for flow is mandatory if the meter count resolution of the data object is <= 1 m³.

6.9.2 [T42-GT2] Data point: Flow

6.9.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 10)	DIF Type Ref. (see Table 4)
[T42-GT2] - 1	Flow rate, temperature converted, averaging period 1 (default period = 5 min), current interval (Vtc/t1)	VF01	All (storage number = 0)

Table 30: Gas Meter (temp. comp.) - flow data objects

6.9.2.2 Tests

6.9.2.2.1 Presence

If a flow data is mandatory check if a corresponding object of Table 30 is present.

6.9.2.2.2 Doublet

Check if only one of the possible combinations of Table 30 is in the present.

6.9.2.2.3 Resolution

Check if the resolution of the flow data object is

<= 10 l/h (Qmax <= 6 m³/h),

<= 100 l/h (Qmax <= 60 m³/h),

<= 1000 l/h (Qmax > 60 m³/h)

6.9.3 [T42-GT3] Data point: Base temperature

6.9.3.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (Table 12)	DIF Type Ref. (see Table 4)
[T42-GT3] - 1	Base temperature	TC03	All (storage number = 0)

Table 31: Gas Meter (temp. comp.) – base temperature data objects

6.9.3.2 Tests

6.9.3.2.1 Presence

If the base temperature for the compensation is not 15°C, check if one of the possible combinations of Table 31 is present.

The manufacturer shall state in the [OMSCT-ManDec] weather the base temperature is 15°C or not.

6.9.3.2.2 Doublet

Check if only one of the possible combinations of Table 31 is present.

6.9.3.2.3 Resolution

There is no special resolution required.

6.10 Gas meter (volume at measurement conditions)

All following test of this chapter are applicable for device types shown in Table 32:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Gas	03h

Table 32: Gas meter (volume at measurement conditions) - supported Device types

6.10.1 [T42-GM1] Data point: Current consumption Value (meter count)

6.10.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 9)	DIF Type Ref. (see Table 4)
		VM07 | 1001 0nnn 0011 1010b | meas. Condition m³ 10e-3 … 10e+4	
[T42-GM1] - 2	Volume (meter), measuring conditions (Vm), forward, absolute, current value	VM03, VM04	All (storage number = 0)

Table 33: Gas Meter (meas. Cond.) – data objects

6.10.1.2 Tests

6.10.1.2.1 Presence

Check if at least one of the alternative data objects of Table 33 is present.

6.10.1.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 33 is present.

6.10.1.2.3 Resolution

Check for each present data object of Table 33 a corresponding data object for flow shall be present. If the data object for flow is mandatory the test [T42-GM2] shall be executed. If the data object for flow is not mandatory the test [T42-GM2] shall be skipped.

Resolution of data object

<= 10 l (Qmax <= 6 m³/h) ➔ data object for flow not mandatory

<= 100 l (Qmax <= 60 m³/h) ➔ data object for flow not mandatory

<= 1000 l (Qmax > 60 m³/h) ➔ data object for flow not mandatory

Resolution of data object

> 10 l (Qmax <= 6 m³/h) ➔ data object for flow mandatory

660 > 100 l (Qmax <= 60 m³/h) ➔ data object for flow mandatory

> 1000 l (Qmax > 60 m³/h) ➔ data object for flow mandatory

Check for each present data object of Table 33 where a data object for flow is mandatory if the meter count resolution of the data object is <= 1 m³.

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6.10.2 [T42-GM2] Data point: Flow

6.10.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 10)	DIF Type Ref. (see Table 4)
[T42-GM2] - 1	Flow rate at measuring conditions, averaging period 1 (default period = 5 min), current interval (Vm/t1)	VF02	All (storage number = 0)

Table 34: Gas Meter (meas. cond.) - flow data objects

6.10.2.2 Tests

6.10.2.2.1 Presence

If a flow data is mandatory check if a corresponding object of Table 34 is present.

6.10.2.2.2 Doublet

Check if only one of the possible combinations of Table 34 is present.

6.10.2.2.3 Resolution

Check if the resolution of the flow data object is

<= 10 l/h (Qmax <= 6 m³/h),

<= 100 l/h (Qmax <= 60 m³/h),

<= 1000 l/h (Qmax > 60 m³/h)

6.11 Gas meter (volume at base conditions)

All following test of this chapter are applicable for device types shown in Table 35:

Device Type	Code (refer to [OMSS-Vol2] table 10)
Gas	03h

Table 35: Gas meter (volume at base conditions) - supported Device types

6.11.1 [T42-GB1] Data point: Current consumption Value (meter count)

6.11.1.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see VM07 | 1001 0nnn 0011 1010b | meas. Condition m³ 10e-3 … 10e+4 Table 9)	DIF Type Ref. (see Table 4)
[T42-GB1] - 2	Volume (meter), base conditions (Vb), forward, absolute, current value	VM05, VM06	All (storage number = 0)

Table 36: Gas Meter (base cond.) – data objects

6.11.1.2 Tests

6.11.1.2.1 Presence

Check if at least one of the alternative data objects of Table 36 is present.

6.11.1.2.2 Doublet

Check if for each found alternative data object only one possible coding of Table 36 is present.

6.11.1.2.3 Resolution

Check for each present data object of Table 36 a corresponding data object for flow shall be present. If the data object for flow is mandatory the test [T42-GB2] shall be executed. If the data object for flow is not mandatory the test [T42-GB2] shall be skipped.

Resolution of data object

<= 10 l (Qmax <= 6 m³/h) ➔ data object for flow not mandatory

<= 100 l (Qmax <= 60 m³/h) ➔ data object for flow not mandatory

<= 1000 l (Qmax > 60 m³/h) ➔ data object for flow not mandatory

Resolution of data object

> 10 l (Qmax <= 6 m³/h) ➔ data object for flow mandatory

710 > 100 l (Qmax <= 60 m³/h) ➔ data object for flow mandatory

> 1000 l (Qmax > 60 m³/h) ➔ data object for flow mandatory

Check for each present data object of Table 36 where a data object for flow is mandatory if the meter count resolution of the data object is <= 1 m³.

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6.11.2 [T42-GB2] Data point: Flow

6.11.2.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 10)	DIF Type Ref. (see Table 4)
[T42-GB2] - 1	Flow rate at base conditions, averaging period 1 (default period = 5 min), current interval (Vb/t1)	VF03	All (storage number = 0)

Table 37: Gas Meter (base cond.) - flow data objects

720 ### 6.11.2.2 Tests

6.11.2.2.1 Presence

If a flow data is mandatory check if a corresponding object of Table 37 is present.

6.11.2.2.2 Doublet

Check if only one of the possible combinations of Table 37 is present.

725 #### 6.11.2.2.3 Resolution

Check if the resolution of the flow data object is

<= 10 l/h (Qmax <= 6 m³/h),

<= 100 l/h (Qmax <= 60 m³/h),

<= 1000 l/h (Qmax > 60 m³/h)

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6.11.3 [T42-GB3] Data point: Base pressure

6.11.3.1 Informative

Ref.	Physical Meaning	VIF Type Ref. (see Table 13)	DIF Type Ref. (see Table 4)
[T42-GB3] - 1	defined Pressure, absolute, at base conditions (pb)	PR01, PR02	All (storage number = 0)

Table 38: Gas Meter (base cond.) - pressure data objects

6.11.3.2 Tests

6.11.3.2.1 Presence

If the base pressure for the compensation is not 1013.25 mbar, check if at least one of the possible pressure data objects of Table 38 is present.

The manufacturer shall state in the [OMSCT-ManDec] weather the base pressure is 1013.25 mbar or not.

6.11.3.2.2 Doublet

Check if for each fond pressure data object only one of the possible combinations of Table 38 is present.

6.11.3.2.3 Resolution

There is no special resolution required.

6.12 Other devices

6.12.1 [T42-MD1] Mandatory data points

It shall be checked if the device type of the TUD is listed in one of the listed tables (Table 15, Table 18, Table 21, Table 24, Table 28, Table 32 and Table 35) and therefore mandatory data points are transmitted.

If the TUD is not listed there this test shall failed, otherwise it shall be passed.

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Appendix A: Applicable Test cases of OMS-CT (Normative)

1. Test cases of M-Bus and wireless M-Bus devices

Test case	Description	EL[1)]	W[2)]	HC[3)]	H[4)]	G[5)]	UDR[6)]	MUC[7)]
[T41-CI1]	CI-Field	M	M	M	M	M	N	N
[T41-AD1]	Address	M	M	M	M	M	N	N
[T41-AN1]	Access Number	M	M	M	M	M	N	N
[T41-ST1]	Status	M	M	M	M	M	N	N
[T41-CW1]	Configuration Word	M	M	M	M	M	N	N
[T41-E1]	Encryption	M	M	M	M	M	N	N
[T41-E2]	Decryption						N	N
[T42-P1]	Parsing an M-Bus-String						N	N
[T42-P2]	Compact Load Profile	M	M	M	M	M		
[T42-GD1]	Generic Data points	N	N	N	N	N	N	N
[T42-EL1]	Meter count	M					N	N
[T42-EL2]	Power	O					N	N
[T42-W1]	Meter count		M				N	N
[T42-W2]	Flow		O				N	N
[T42-HC1]	Meter count			M			N	N
[T42-HC2]	Power			O			N	N
[T42-H1]	Meter count				M		N	N
[T42-H2]	Due date meter count				M		N	N
[T42-H3]	Due date (target date)				M		N	N
[T42-GT1]	Meter count					A1	N	N
[T42-GT2]	Flow					O	N	N
[T42-GT3]	Base temperature					O	N	N
[T42-GM1]	Meter count					A1	N	N
[T42-GM2]	Flow					O	N	N
[T42-GB1]	Meter count					A1	N	N
[T42-GB2]	Flow					O	N	N
[T42-GB3]	Base pressure					O	N	N
[T42-MD1]	Mandatory Data Points	M	M	M	M	M	N	N

Note:

M	This Test case is mandatory (Data point has to exist!)	
O	This Test case is applied only; if data point exists	
Ax	One alternative Test case with same x is mandatory (Data point has to exist!)	
N	Test case is not defined yet	
1)	EL	= Electricity Meter
2)	W	= Water meter (heat and cold)
3)	HC	= Heat meter (also Cooling meter or combined Heat/Cooling meter)
4)	H	= Heat Coast Allocator
5)	G	= Gas meter
6)	UDR	= Unidirectional Repeater
7)	MUC	= Multi utility communication controller

Table 39: Test Cases related to DUT type

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