Evaluation Certificate

SC0324-18 Certificate for a part of a measuring system for LOTW

DACC - Terminal Automation System for liquid bulk products

Issued to

Extended Control in Sweden AB
Stortorget 8, SE-21134 Malmö, Sweden

In respect of (part of instrument)

A Terminal Automation System, partly a purely digital self-service device (SSD) intended for use with volume and/or mass flow meters, in a depot for loading trucks, trains or boats with bulk products.

Characteristics/rated operating conditions

The evaluated part of a measuring system for liquids other than water (LOTW) is a Terminal Automation System, a self service device for interruptible unattended delayed payment. It includes an electronic calculator with conversion function, pre-set, indication for the driver (not under legal control), a printer (optional, not under legal control) and a memory device for unattended delayed payment. Measurement/transaction information is accessed via DACC Client.

Accuracy class	0,5
Mechanic class:	class M1
Electromagnetic class:	class E2
Ambient temperature limits:	+5 °C to +30/40 °C
Humidity:	H1/H2
Location:	closed

In accordance with

- WELMEC Guide 8.8, Issue 2 “General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID”,
- WELMEC Guide 10.4, Issue 1 “Guide for Testing of Electronic Calculators with Conversion Function” and
- WELMEC Guide 10.9, Issue 1 “Guide on evaluating purely digital ancillary devices (PDDAD)” and
- WELMEC Guide 7.2, Issue 2015 “Software Guide”.

This Evaluation Certificate is the positive result of the applied modular approach under these WELMEC Guides, for a part of a measuring system for the continuous and dynamic measurement of quantities of liquids other than water.

This is not a MID Certificate (EU-type examination certificate according to 2014/32/EU), but the MID requirements have been applied. The complete measuring system shall be subject to a conformity assessment procedure as described in MID.

This Evaluation Certificate may only be used after permission by Extended Control in Sweden AB.

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Internal No.: 7P05536

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Applicable essential requirements MID 2014/32/EU

- MID, Annex I, Essential requirements
- MID, Annex MI-005, Measuring systems for the continuous and dynamic measurement of quantities of liquids other than water (LOTW)

Harmonised standards and normative documents used

Applicable parts of the following normative documents referred to in the Official Journal of the European Union 2011/C33/01:

- OIML R 117-1 Edition 2007 (E), Dynamic measuring systems for liquids other than water Part 1: Metrological and technical requirements

Further applied documents:

- The Measuring Instruments Regulation, STAFS 2016:1
- Regulations and Guidelines concerning Measuring Systems for the Continuous and Dynamic Measurement of Quantities other than Water, STAFS 2016:6
- OIML R 117-2 Edition 2014 (E), Dynamic measuring systems for liquids other than water, Part 2: Metrological controls and performance tests
- WELMEC Guide 10.5, Issue 1 “Guide for Common Application of Marking of Fuel Dispensers”
- SP´s Certification Rules SPCR 181

Validity

Valid until April 12, 2028.

Miscellaneous

This issue of the certificate is the first edition.

The principal characteristics, approval conditions are set out in the appendix hereto, which forms part of the approval documents. All the plans, schematic diagrams and documentations are recorded under reference file 7P05536. The evaluation report 7P05536-1 has been issued in accordance with WELMEC Guide 8.8, Voluntary system of Modular Evaluation.

Lennart Aronsson Kerstin Mattiasson

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0 Conditions

The use of this Evaluation Certificate is limited to:
Combination with volume and/or mass flow meter, with double pulse output according to level B of ISO6551.

Other parties may use this EC only with written permission by Extended Control in Sweden AB, Stortorget 8, SE-21134 Malmö, Sweden

The device must correspond with the following specifications:

1 Design of the device

1.1 Construction

DACC is a part of a self service arrangement.

Terminal Automation System description
A Terminal Automation System, for use with volume and/or mass flow meters, in a depot for loading trucks, trains or boats with bulk products. Up to three products can by mixed in the same delivery.
It includes an electronic calculator with conversion function, pre-set, indication for the driver (not under legal control), a printer (optional, not under legal control) and a memory device for unattended delayed payment. Measurement/transaction information is accessed via DACC Client.

Primary/decisive “indications” are:
Memory device (SQL data bas)
DACC Client, in module [Deliveries]-[page: Pumpings]-[button: Show legal relevant data]

DACC is is a system based on a SQL server, used for depot administration including loading system. DACC communicates with business system, laboratory system, CRM etc and uses OPC (open platform communication) to communicate with Scada/automation equipment.

DAAC Client is used to set up the depot, storage tanks, products, loading points including flow meter and temperature sensor, final reception points, transport companies, drivers/depot staff, vehicles etc.
DACC Server is used to integrate with auxiliary systems, like ERP, OPC, and handling internal, background processes.
DACC Ordering terminal for access and handling of the loading (not under legal control).

Two pulse outputs (volume or mass) from each flow meter (not included in this certificate) are counted and compared in the PLC (according to level B in ISO 6551), the 3-wire Pt100 temperature sensor, mounted in a temperature pocket, is connected to the PLC. The measured amount for each product may be converted to volume at +15 °C or +20 °C, or mass, depending on product. Different conversion equations are used depending on product. Up to three products mixed in one delivery.

Low level detection in storage tanks can be handled by DACC.

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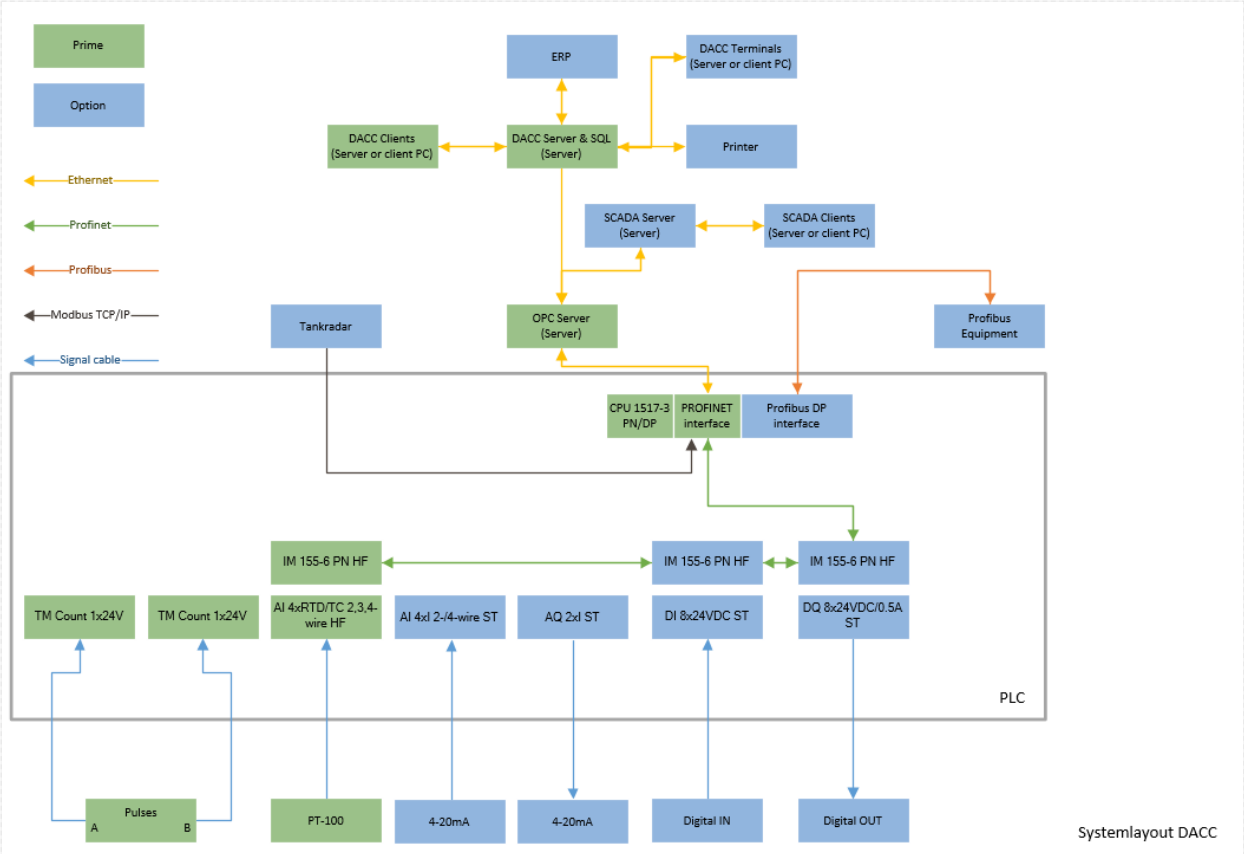
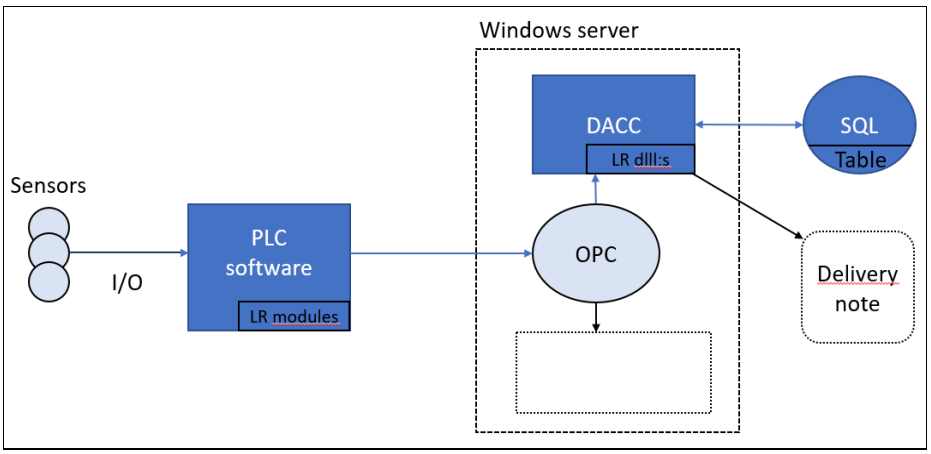


Picture 1: System layout



Picture 2: DACC measuring system. Legally relevant SW parts in blue.

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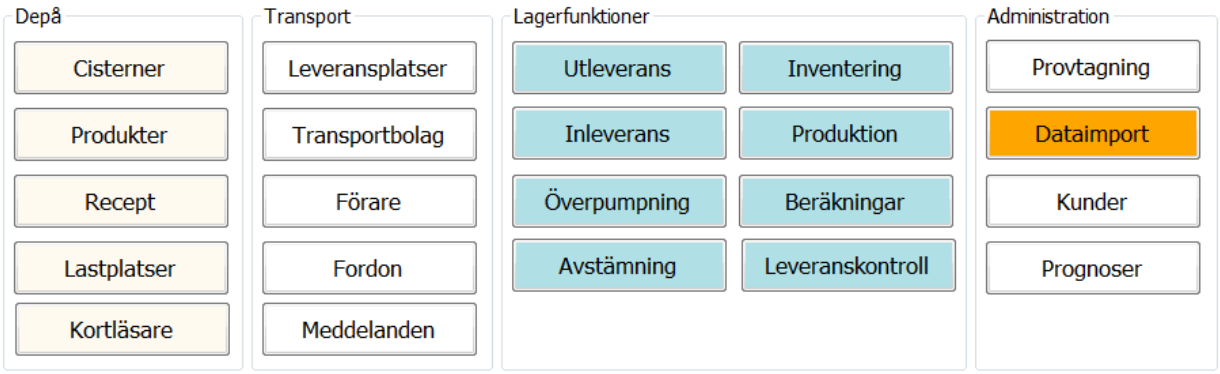
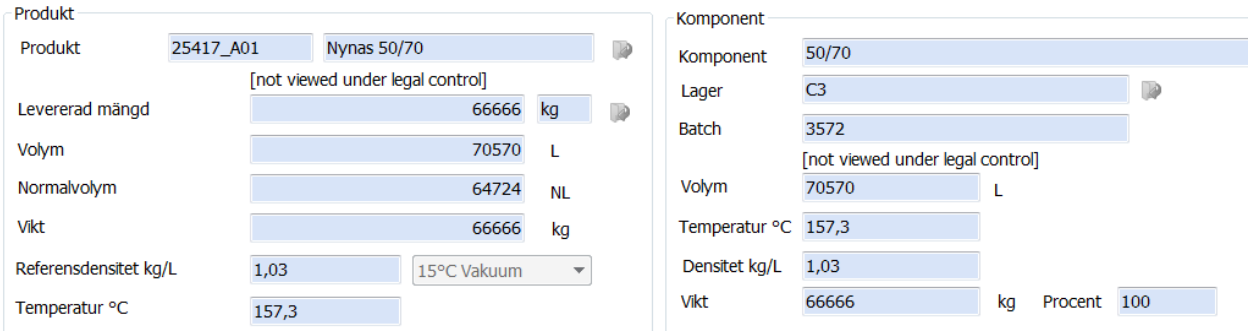
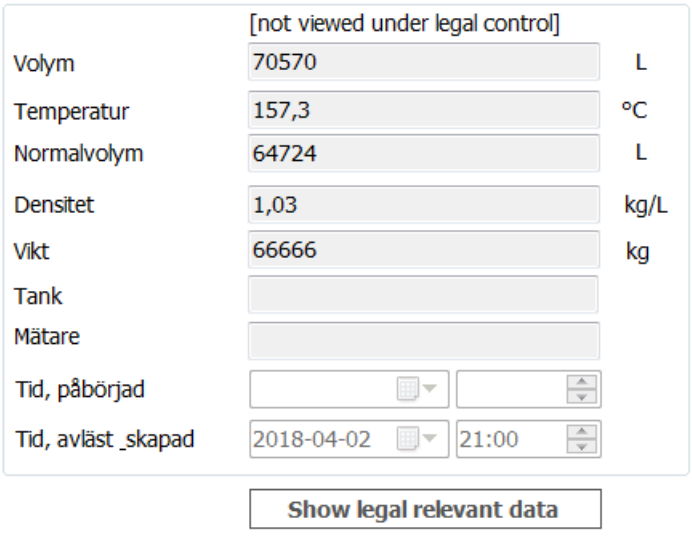


Picture 3: Functions in DACC Client

Sales product and components:



Pumping:



Picture 4: Example of bulk delivery information in DACC Client (“Utleverans”), and in case of mix, information concerning one of the components (Open in Client-[Utleverans])

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1.2 Components included

The hardware of the self-service device should comply with the EMC-directive and other applicable directives as specified in the Declaration of Conformity of the self-service device.

Server computer*

Manufacturer:	FUJITSU
Pattern designation:	PRIMERGY TX1330 M3
Signal line, PLC Ethernet:	Unshielded

Server DACC application software

Manufacturer:	Extended Control
Version:	2.0

PLC (1 pc or more)*

Manufacturer:	Siemens
Pattern designation:	SIMATIC S7-1500 CPU 1517-3 PN/DP
Signal line:	Profinet shielded, Profibus shielded

Power supply (for PLC) (1 pc per PLC)

Manufacturer:	Siemens
Pattern designation:	SIPLUS S7-1500 PM 1507 24V/3A

Interface module (1 pc or more)

Manufacturer:	Siemens
Pattern designation:	ET 200SP IM 155-6 PN HF
Signal line:	Profinet shielded

Technology Module (pulse counter) (2 pcs per flow sensor)

Manufacturer:	Siemens
Pattern designation:	ET 200SP TM Count 1x24V
Signal line:	Shielded and unshielded

Analog input module (Pt100 temperature) (1 pc per 4 temperature sensors)

Manufacturer:	Siemens
Pattern designation:	ET 200SP AI 4xRTD/TC 2-,3-,4-wire HF
Signal line:	Shielded
Ferrite:	WÜRT 742 772 55, one extra turn

Analog input module (mA) (0 or more pcs)*

Manufacturer:	Siemens
Pattern designation:	ET 200SP AI 4xI 2-,4-wire ST
Signal line:	Shielded and unshielded
Ferrite:	WÜRT 742 772 55, three extra turns

Analog output module (mA) (0 or more pcs)*

Manufacturer:	Siemens
Pattern designation:	ET 200SP AQ 2xI ST
Signal line:	Shielded and unshielded

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Digital input module (0 or more pcs) *
- Manufacturer: Siemens
- Pattern designation: ET 200SP DI 8x24VDC ST
- Signal line: Shielded and unshielded

Digital output module (0 or more pcs) *
- Manufacturer: Siemens
- Pattern designation: ET 200SP DQ 8x24VDC/0.5A ST
- Signal line: Shielded and unshielded

DP/DP coupler (Profibus) (0 or more pcs) *
- Manufacturer: Siemens
- Pattern designation: SIMATIC DP/DP coupler
- Signal line: Profibus shielded

RS 485 repeater (Profibus DP) (0 or more pcs) *
- Manufacturer: Siemens
- Pattern designation: SIMATIC RS 485 repeater
- Signal line: Profibus shielded

Industrial Ethernet Switch (0 or more pcs) *
- Manufacturer: Siemens
- Pattern designation: SCALANCE X005
- Signal line: Profinet shielded

RFID (0 or more pcs) *
- Manufacturer: Pepperl+Fuchs
- Pattern designation: U-P6-B6, IP§T1-FP
- Signal line: Profibus shielded

Pt100 temperature sensor (0 or more pcs)
- Manufacturer: Ing. Ivar Pettersen
- Pattern designation: MF3C0-K-030006B-1AAB
- Signal line: 3-wire shielded (shield not connected at temperature sensor)

Temperature sensor well (1 pc per temperature sensor) *
- Manufacturer: PyroControl AS
- Pattern designation: AISI 316 ø8x300 (outer diam. 10 mm, inner diam. 7 mm)

Power Supply (24 V 10 A) (1 pc or more)
- Manufacturer: Siemens
- Pattern designation: SITOP Lite PSU100L 24V / 10A

Power Supply (24 V 20 A) (1 pc or more)
- Manufacturer: Siemens
- Pattern designation: SITOP Lite PSU100L 24V / 20A

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AC mains circuit breaker (230 V 1-phase 10 A) (1 pc or more) *

Manufacturer:	Schneider Electric
Pattern designation:	iC60N
Ferrite (L and N):	WÜRT 742 772 90, two extra turns

**or equivalent with CE-marking and suitable climate specification*

Software specification according to WG 7.2:

Software type	U
Risk class	C
Extension	L, T, S, D

Software on server computer

Server DACC legally relevant software

Pattern designation:	Calc.dll
Manufacturer:	Extended Control
Version:	2.0.1
Checksum:	**bf25e7d941389a989b7546abc0abcd57**
Pattern designation:	DispatchProcess.dll
Manufacturer:	Extended Control
Version:	2.0.0
Checksum:	**58f6979a5bb540a33f50d2780c90f9cd**
Pattern designation:	DACC_MID_UI.dll
Manufacturer:	Extended Control
Version:	2.0.0
Checksum:	**C5da9ad66dd4a2cadef43a78a6a082fd**

Software on PLC

PLC legally relevant software

Pattern designation:	FB_Counter_std_v3.0
Manufacturer:	Extended Control
Version:	3.0
Code/Data Modified on:	**12/10/2017 - 6:08:18 PM**
Pattern designation:	FB_TempSamp_8C_std_v3.0
Manufacturer:	Extended Control
Version:	3.0
Code/Data Modified on:	**12/10/2017 - 6:17:36 PM**

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1.3 Optional equipment and functions subject to MID requirements

In case a printer (not under legal control) prints a delivery note, the information concerning the measured volume/mass must be marked “not under legal control”.

Low level detection in storage tanks can be handled by DACC.

If the sampling facility in DACC is used and the sample is taken from the measured quantity, the amount sampled must not exceed 0,1 x MPE (maximum permissible error of the measuring system), see OIML R117-1:2007, chapter 5.7.4.

1.4 Technical documentation

For market surveillance the construction and included components are described in 1.1 and 1.2. The metrological software is identified by the checksums, which can be accessed according to 5.3.

1.5 Integrated equipment and functions not subject to MID

The following equipment may be connected to the DACC (without change of this certificate):

- Sampling devices (see 1.3)
- Printers
- Screens

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2 Technical data

2.1 Rated operating conditions

Terminal Automation System, intended for use with volume and/or mass flow meters, a self service device in an interruptible measuring system.

Device for unattended delayed payment. It includes an electronic calculator with conversion function, pre-set, indication for the driver (not under legal control), a printer (optional, not under legal control) and a memory device for unattended delayed payment.

Measurement range

Scale interval, indicated/memorized volume	same as volume flow meter but not larger than 1 l
Scale interval, indicated/memorized mass	same as mass flow meter but not larger than 1 kg
Scale interval, temperature	0,1 °C or 0,01 °C
Temperature sensor	-20 °C to +200 °C

Conversion to volume at base condition and to mass (not Ind. Chemicals)

Minimum "Sample frequency" for conversion is 100 l.

Base temperature, not for Ind. chemicals	+15 °C
Base temperature, Ind. chemicals	+20 °C

Product	Measuring range	Standard/method
Bitumen	ρ_{15}: 850 - 1200 kg/m3, -20°C to 200°C	ASTM D4311/D4311M-15*
GasOil	ρ_{15}: 600 - 1076 kg/m3, -20°C to 70°C	ASTM 54B**
FuelOil	ρ_{15}: 600 - 1076 kg/m3, -20°C to 70°C	ASTM 54B**
CrudeOil	ρ_{15}: 610 - 1075 kg/m3, -18°C to 150°C	ASTM 54A**
Ind.Chemicals	ρ_{20}: 800 - 1200 kg/m3, -20°C to 200°C	$\rho_t = \rho_{20} - \alpha * (T - 20)$, VCF = ρ_t / ρ_{20}, α = 0,0006 /°C

* Standard Practice for Determining Asphalt Volume Correction to a Base Temperature
** Standard Guide for Use of the Petroleum Measurement Tables (ASTM D1250 - 08(2013)e1)

Minimum measured quantity, MMQ

(Restrictions based on time constant for temperature sensor including pocket and volume based integration):
Minimum MMQ 1000 l for maximum flow rate ≤2000 l/min
Minimum MMQ 2000 l for maximum flow rate ≤4000 l/min
Minimum MMQ 5000 l for maximum flow rate ≤5000 l/min

In-line blending, up to three products in one delivery, minimum ratio 25%.

Accuracy class of measuring system

0,5 or higher

Environments classes / influence quantities

Mechanic:	class M1
Electromagnetic:	class E2
Ambient temperature limits, server:	+5 °C to +30 °C
Ambient temperature limits, PLC:	+5 °C to +40 °C
Humidity, server:	non-condensing (H1)
Humidity, PLC:	condensing (H2)
Location:	closed

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2.2 Other operating conditions

Not applicable

3 Interfaces and compatibility conditions

Connection to volume/mass flow meter with double pulse output according to level B of ISO6551.
Requirements on pulse output from flow meter:
Active or passive, resolution at least 1 pulse per liter or kg.

3-wire shielded signal line from Pt100 temperature sensor. Shield is not connected at temperature sensor.

Low level detection in storage tanks can be handled by DACC, with “positive security”, if level information is available.

4 Requirements on production, putting into use and utilisation

4.1 Requirements on production

No special requirements identified.

4.2 Requirements on putting into use

Nominal pulse value including unit from flow meter is stored under legally relevant parameters, accessible only to Extended Control.
Correction factor for temperature sensor is stored in PLC, protected by password, accessible only to Extended Control.
Provisions shall be made for installing reference temperature instrument in the measuring system, to verify the temperature sensor and transmitter (for second stage of initial verification and subsequent verification).
See WELMEC 10.4 “Guide for Testing of Electronic Calculators with Conversion Function..”, chapter 8 for advice.

4.3 Requirements for consistent utilisations

No special requirements identified.

5 Control of the measuring tasks of the device in use

5.1 Documentation of the procedure

During testing of the flow sensor and temperature sensor, volume, volume at base condition, mass and temperature is presented by DACC Client under “Utleverans” (Delivery):
[page: “Pumpings”]-[Button:” Show legal relevant data”]

5.2 Special equipment or software, if applicable

No special requirements identified.

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5.3 Identification of

- Hardware

The construction and included components are described in 1.1 and 1.2.

- Legal Relevant Software in DACC

The legally relevant software modules are identified by “Checksum” for software on Server Computer and “Code/Data Modified on” for software on PLC (see bottom part of 1.2 **in bold**)
The list is available through [“About”]-[“Version”].

5.4 Calibration-/adjustment procedure

Only nominal pulse value from flow meter is used, any correction/adjustments is handled within the flow sensor (not included in this certificate).
Correction factor for temperature sensor is stored in PLC, protected by password, accessible only to Extended Control.

6 Security measures

6.1 Sealing

The temperature sensor is sealed.

6.2 Data logger

The SQL data base in the server acts as memory device for unattended delayed payment.

7 Labelling and inscriptions

7.1 Information to be borne by and to accompany the device

The marking plate/label mounted on the PLC shall contain the following information (according to WG 10.5, chapter 8):

- the name or trademark of the manufacturer
- the serial number of the DACC 2.0 and year of manufacture
- the designation or type name
- the Evaluation Certificate number, **SC0324-18**
- place for the verification sticker

7.2 Conformity marking in accordance to MID article 17

This Evaluation Certificate is not an EU-type examination Certificate. Therefore the Terminal Automation System DACC must **not** be marked with the supplementary metrology marking “M xx”, following the CE marking.

7.3 Further inscriptions, if necessary

No special requirements identified.

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7.4 Evaluations carried out for this Evaluation Certificate

The evaluation under this certificate is recorded in Evaluation Report 7P05536-1 (referring to test and examinations in test report 7P05535-1, 7P005535-2, 7P0035-02-1 Rev1, 7P05535-02-2 Rev1, MTc7P005535-K01.

A summary of the evaluation under this certificate is given below.

Description	+	-	Remarks
Relevant parts of the checklist OIML R117-1	*		7P05535-1

Extension	Description	+	-	Remarks
Type P	Requirements on basic configuration	/	/	
Type U	Requirements on basic configuration	*		7P05535-02-1 Rev1
Extension L	Requirements on data storage	*		7P05535-02-1 Rev1
Extension T	Requirements on interfaces	*		7P05535-02-1 Rev1
Extension S	Requirements on software separation	*		7P05535-02-1 Rev1
Extension D	Requirements on software download	*		7P05535-02-1 Rev1
Extension I	Specific software requirements	/	/	

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