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TYPE APPROVAL CERTIFICATE	No.: 08-3394 *
	Edition: 2 Replaces edition 1
	Date: 2005-07-25
Valid until: 2007-02-24	W & M Approval No.: IV - 362 S

MEASURING SYSTEM
Individual approval

Manufactor	Toptech Systems, Inc – Longwood FL USA and Brooks USA
Applicant	Toptech Europe NV, Zwijndrecht (Antwerp), Belgium
Art	Measuring system for loading road tankers
Location	Shell A/S, Egeskovvej 265, Fredericia, Denmark
Type	Meter sensor: Brooks type B-82DB1 Transducer: Spectra Dual Pulls Transmitter type VS300 Flowcomputer/Indication device: TLC Multiload
Apply to	Measuring gasoline, petroleum or gasoil
Measuringsystems identification	See componentlist (Enclosure No. 2)
Approval foundation	Approved according to MDIR. 22.46.01

NOTE ! Measuring instruments, which are not completely identical as defined in this approval, can only be verified on condition that separate approval is given in connection to this approval.

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1. LEGAL MEASURING DATA

Capacity

Qmax: 2500 litres pr. min.

Qmin: 500 litres pr. min.

Minimum Measured Quantity

500 litres

Display

litre	capacity	999999	litres
	scale interval	1	litre

Nature of Liquid

Gasoline, Petroleum and Gasoil

Verification tolerance

± 5 ^{o}/oo

2. VERIFICATION REGULATIONS

Verification

According to existing regulations, and also provided legal sealing are broken or defect, with the following exeption.
After legal sealing are broken in one meter sensor or to this a connected transducer, pulsjunctionbox or pulstransmissionbox (FlowControlModul-box), only the corresponding meter sensor are verified (partial verification).
After broken sealing on a pulstransmissionplinth, all meter sensors involved are verified.
After broken sealing in the internal (comon) RemotControl-Unit/ flowcomputer (RCU-enclosure), all meter sensors are verified.

Verification is carried out according to existing verification regulations.
Following is carried out in addition, If meter factors are determined at a flow rate which is different than Qmin and Qmax:
At initial verification, one measuring per flowpoint is carried out, with at least one minutes duration. When a sealing is broken on EPROM, memory storage PROM U7 or bridge-piececonnection for W&M changes, meter Factor is compared with last verification. If disagreement, verification are carried out as initial verification.
Moreover verification is carried out after other intervention, which have influence on measuring accuracy.

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Inscription

Possible **secundary display´s** are marked »**Ikke verificeret«** (not verified).

Displaydial: **L** (Litre)

Verification plate: For each meter:
meter-placement/meterdescription and meter product specification**: »Kun til Benzin«** (only for gasoline) or »**Kun til Gasolie«** (only for gasoil) or »**Kun til Petroleum«** (only for petroleum).

»Systembetegnelse« (W & M approval no.),
»TS-nr.« (TS no.), »Fabr. nr.« (Serial no.)
» Max. .....liter pr. min.«,
(Maximum….litres pr. min.)
» Min. .....liter pr. min.«
(Minimum….litres pr. min.)

»Verifikationen gælder kun udmåling over……..liter«
(Verification is only valid for measuring out over ..... litres)
»Verifikationen gælder kun litertælleren«
(Verification is only valid for litre-indication (primary display)).
»Verifikationen gælder kun ikke kompenseret volumen«
(Verification is not valid for converted indication).

NOTE:The measuring system is only valid with one verification plate.

Partial verification

Plate: Plate for verification-info-sticker is placed on verificationplate or separate plate. It is worked out such as, each metersensors placement/script-designation clearly emerges, and with place to mount verification-info-sticker for each meter sensor.

Sealing

Verification plate (foil):
Verification plate (foil) is sealed to flow computer RCU cover with 18 mm verificationyearsealing-sticker.
With sealing wire and loose lead seal with verification markings (notified body number), are following secured:

Meter sensor (Brooks type B-82DB1):
Meter sensors end cover, with one wire and in at least two points (screws), are secured. Meter sensors axil/shaft to transducers adaptor connection, are sealed against separation, with one wire, through holes in adaptor connections two fasten screws to meter sensor.
Note: Meters draining valve are not sealed. The draining valves outlet shall be visible under normal use of the measuring system, and the outlet must not be blocked.

Sealing, *continued*

Transducer (Spectra Dual Puls Transmitter type VS300):
Transducers endcover is sealed against opening, with one wire trough one of endcovers fixed holes to fixed hole on transducers housing. Hereby, also transducer from adaptorconnection and pulstransmissionwire from transducer to pulsjunctionbox are secured against removal.

Pulsjunctionbox:
Pulsjunctionbox is sealed against opening, with fixed seals in two screwholes. Above secures pulstransmissionwire from transducer to pulsjunctionbox against removal, and pulstransmissionwire from pulsjunctionbox to pulstransmisionbox (FlowControlModul-box) against removal. (See technical Annex 1).

Pulsconnectionplinth:
Pulstransmisionwire from pulsjunction-box to pulsconnectionplinth, and pulstransmissionwire from pulsconnectionplinth to FCM-module-box are sealed against removal, with one wire trough holes in two (of four) diagonal placed screws, which fix a Plexiglas plate over pulsconnectionplinth. (See technical Annex 1).
Note: Sealing of one Plexiglas plate can cover sealing of several pulsconnectionplinths (See Enclosure 2, component list for detailed combination)

Electronic control:

FCM module (FlowControlModule-Boxes):
Pulstransmissionwire from pulsjunction-box to FCM-module-box are on pulsterminalconnection in the FCM-module-box, sealed with seal sticker against removal. Pulsterminalconnection is sealed with seal sticker to FCM-board, against removal. (See technical Annex 1).

Pulstransmision:
In general pulstransmission is lead trough a uninterrupted wire from transducer to the electronic regulation and control. Pulstrans-missionwire from FCM to RCU is not sealed, as it is transmitted as a encrypted signal.

Flow computer RCU (RemotControlUnit-enclosure):
With seal sticker, EPROM with legal metrological influence (W&M parameters) and PROM U7 with memory storage is sealed to motherboard, against removal. Bridge piece connection for chang-ing Weight & Measure parameters (flow rate, meter factors) are with seal sticker sealed on RCU motherboard, against use. RCU motherboard is sealed with seal sticker to the inside of RCU encover.
(See technical Annex 1)

The Danish Accreditation and Metrology Fund reserves the rights to require modification in sealing plan.

3. CONSTRUCTION

The measuring system is a module-build-up system, with one flow computer/calculator-unit, up to 5 pumps and gasseperators each connected with up to 5 active meter sensors.

The measuring system is constructed with up to five meter sensors (Brooks, type B-82DB1) each in connection with a transducer (Spectra Dual Puls Transmitter, type VS300) with an adaptor connection, a pulsjunctionbox, a pulsconnectionplinth and a pulstransmisionbox (Toptech, FCM).
Each meter sensor supplies only one load arm (outlet).
Meter sensors are without mechanical calibration, as the measuring system has electronic pulscalibration (pulsfactorregulation/ meterfactor).

Meter sensor is a rotor system which at liquid flow is rotating. Rotors movement affect transmissionshafts connected to a crankshaft. Hereby, are produced a rotating movement which is transferred to the transducer. In bottom of meter censor a draining valve with visible outlet, is mounted. (The draining valves outlet shall be visible under normal use of the measuring system, and the outlet must not be blocked).

The electronic control (flow computer) consists of to parts: An input/output section (I/O), consisting out of one to five Flow Control Modules (FCM-boxes), and a Remote Control Unite (RCU-encover) Pulssignal is transmitted unaltered from transducer to pulsjunctionbox and pulsconnectionplinth, through Flow Control Module (FCM) to Remote Control Unite (RCU-encover), where the processing of pulssignal takes place. Flow Control Modules also handles other inputs from associated measuring instruments to the Remote Control Unit, e.g. temperature sensors. (These associated measuring instruments are not part of this approval).

In the calculation/indication device (Remote Control Unite) the legal metrological program is situated in an EPROM on the main board, and the U7 PROM is memory storage of legal metrological parameters. The Remote Control Unite is mounted with one LCD display-card with 6 digits retaillitredisplay, covering measurements from all meter sensors in the measuring system.

Several meter sensors can be used at the same time. Only the indication on displays main menu, is verified. Displays main menu, will indicate all meters in use and pressed volume as well. After a few seconds the display will go back to main menu, when selecting another display mode, e.g. pressed volume, indication of one meter at the time, flow, converted volume.

To main board (Remote Control Unite) is connected a terminal connection for electronic adjustment/calibration of meter sensors pulsconstant (meter factor). For each meter, meter factor is defined for a minimum flow, medium flow and maximum flow.
(See technical annex 1 for electronic meter sensor adjustment (K-factor)).

Program with Legal metrological influence (W & M) is only changeable when removing the existing EPROM and replacing with another EPROM.

Construction, *continued*

Componentlist

Componentlist General	**Product**	**Type**	**Notes**
Meter Sensor	Brooks	B-82DB1	Qmax = 2500 l/m Qmin = 500 l/m MMQ = 500 litres
Transducer	Spectra Dual Puls Transmitter	VS300	In connection with a pulstransduceradaptor
Pulsjunctionbox	-	-	Pulstransmission from transducer to pulsconnectionplinth
Pulsconnectionplinth	-	-	Pulstransmission from pulsconnectionplinth to Flow Control Module
Electronic calculation/indication TLC Multiload			
Flow Control Module	Toptech	FCM	In/out-put: Pulstransmission and associated measuring instruments
Remote Control Unit	Toptech	RCU	Electronic calculation/indication, including electronic calibration of meter sensor pulsfactor
Program on mainboard with Legal Metrological influence (Control/Calculation)	Toptech	Program-version 2.23 and 2.24	Programversion recognizable on EPROM
Displaycard (volume)	Toptech	LCD	

4. DOCUMENTATION

- Test report No. CVN-205658/01
- Danish approval No. IV-298 incl.:
  Application No.:
  - 1992-4163-0282
  - 1995-4163-732
  - 1996-4163-0932

Application No.: 08-3394

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