Level gauge

Mano-Clock ADR

Part no. 588 20 60

Special float gauge with guided floater designed for ADR tanks (IBC containers for the transportation of dangerous goods). Tested by SP (the Swedish National Testing and Research Institute). Intended for use with tanks containing Fuel oil/ diesel fuel (EN 590), Biofuel FAME (EN 14213), Biodiesel FAME (EN 14214) and motor oil.

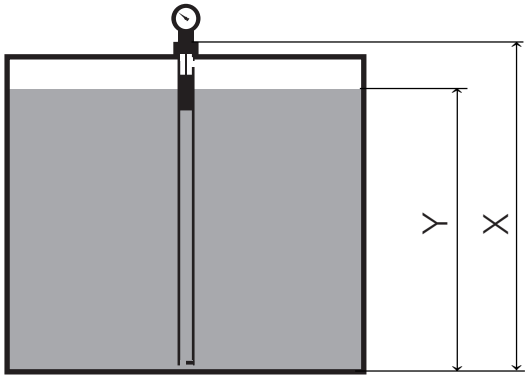
Function

The indicator floater moves in a guiding pipe.
The movements of the floater are transmitted by a line to the measuring mechanism inside the meter house. The measuring mechanism consists of a spring-loaded winding drum actuating the pointer needle by means of a gear drive.

Description

Meter house ø 90 mm in cast anodized aluminium.
UV-tested according to EN ISO 4892-1.
Tempered 8 mm front glass.
Connection thread in steel.
Guiding pipe in a plastic material that eliminates the risk of static electricity.
Corrosion-resistant measuring mechanism in acetal plastic (POM) and spring motor made of stainless steel.
Durable float made of acetal plastic (POM).
Resistant against Fuel oil/diesel fuel (EN 590), Biofuel FAME (EN 14213), Biodiesel FAME (EN 14214) and motor oil.
Connection 1 1/2” BSP.
Standard gauges graduated in cm.
Special gauges (graduated in litres, with customer logotype etc.) are available on request.
Maximum working pressure: 1 bar. (The indicator is not intended for use with pressure vessels but only for IBC containers).
Operating temperature range: -30/+50°C
Measuring accuracy: ±3% FS (of full scale value).

Please state X and Y values when ordering.



Y= Max. liquid level in cm.
X= Tank bottom to sockettop edge in cm.

Precision mechanism

NOTE: Not for use with tanks containing gasoline, ethanol, etc. Not intended for use as an overfill prevention device.
All specifications are subject to change without prior notice. Directives and Regulations may vary from country to country.

P1484

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REPORT

issued by an Accredited Laboratory

SWEDAC ACCREDITERING 1002

Ingenjörsfirma Mano-Term AB
Landskronavägen 30
252 32 HELSINGBORG
SWEDEN

Handled by, department	Date	Reference	Page
Göran Eliasson, Mechanics +46 33 16 52 34	2 Oct. 2002	P204200	1 (4)

This is a translation from the Swedish original document. In the event of any dispute as to the content of the document, the Swedish text shall take precedence.

Assignment

Testing of level gauge destined for intermediate bulk containers (IBC) for the transport of dangerous goods. Client: Ingenjörsfirma Mano-Term AB, Helsingborg, Sweden.

Product

Level gauge for IBC. Manufacturer: Ingenjörsfirma Mano-Term AB, Helsingborg, Sweden.

Basis

Testing was carried out by mounting the level gauge to a metal IBC for liquids, 31A, packing group II, a maximum density of 1.0 kg/dm^3 and a maximum gross weight of 1530 kg, according to the present edition of the following regulations:

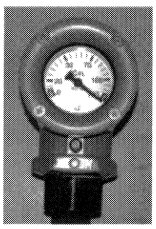
RID and RID-S for rail transport, 2001:2,
ADR and ADR-S for road transport, 2001:1,
IMDG Code for transport by sea, incl. 30th amendment,
UN Recommendations on the Transport of Dangerous Goods, 12th edition.

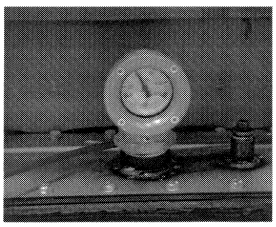
Result of tests

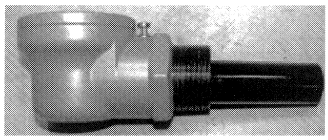
See note "Result" at each applicable test moment below.

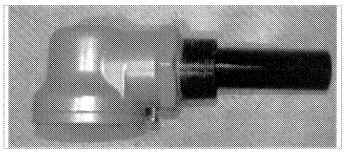
Description of test object

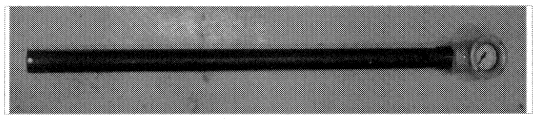
Manufacturer:	Ingenjörsfirma Mano-Term AB, Helsingborg, Sweden.
Type:	Level gauge. Manufacturer's designation: Mano-clock ADR.
Design:	Gauge, moulded of aluminium with tempered glass. See drawing MC-0230-1 from 27 September 2002. See also photo below.
Material in gauge housing:	Al 4261











Testing

Tests were performed 4 September 2002 at SP Swedish National Testing and Research Institute, Borås, Sweden. The test results apply only to the submitted specimen. The test objects had been selected by the client without SP's assistance.

The following tests were performed:

Receiving inspection

The test specimen (4 test objects) arrived at SP, Borås, 4 September 2002. A receiving inspection was made and the specimen was marked with assignment number. The results of the inspection are reported above under the heading Description of test object.

Leakproofness test

The test was performed according to the UN Recommendations for the Transport of Dangerous Goods, subparagraph 6.5.4.7.

Number of test objects:	1
Temperature:	Room temperature
Pressure:	20 kPa
Test duration:	10 min
Method for leakage detection:	Pressure differential measuring
Result:	Passed

Hydraulic pressure test

The test was performed according to the UN Recommendations for the Transport of Dangerous Goods, subparagraph 6.5.4.8.

Number of test objects:	1
Contents:	Water
Temperature:	Room temperature
Pressure:	65 + 200 kPa
Method for leakage detection:	Visual detection
Test duration:	10 + 10 min
Result:	Passed

Drop test

The test was performed according to the UN Recommendations for the Transport of Dangerous Goods, subparagraph 6.5.4.9.

Number of test objects:	1
Number of drops:	1
Drop height:	1.2 m

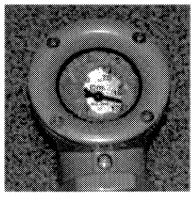
Drop height:	1.2 m
Drop weight:	1530 kg
Contents:	Water
Degree of filling:	98 %
Temperature:	Room temperature
Drop orientation:	Diagonally on the bottom edge
Result:	Passed
Note:	After approved drop test another leakproofness test was performed according to description above.

Bursting test

The test object was filled with water and connected to the pressure test equipment. The pressure was raised to levels according to table 1 until breakage. After each pressure level step the test object was unpressurised and a visual inspection for leakage was made.

Pressure (bar)	Time under pressure (s)	Visual check
10	90	No deformations or leakage.
20	30	No deformations or leakage.
30	30	No deformations or leakage.
50	30	No deformations or leakage.
75	Instantaneously	Fracture of the glass of the test object. See photo below.

Table 1



SP Swedish National Testing and Research Institute
Mechanics - Transport Safety

Lars-Göran Nilsson
Technical Manager

Göran Eliasson
Technical Officer

Appendix: Drawing MC-0230-1 from 27 September 2002