User Guide

Elcometer 1001

Leak and Corrosion Under Insulation (CUI) Gauge

CONTENTS

en

CE 0518 Ex II 2G EX II 2 G, EEx ia IIC T4
(Ta = -40°C to 80°C) Sira 05ATEX2277

The Elcometer 1001 is compliant for use in potentially explosive atmospheres Directive 94/9/EC†. The Elcometer 1001 is certified as intrinsically safe and rated: EX II 2 G, EEx ia IIC T4, refer to EC TYPE EXAMINATION CERTIFICATE NO. Sira 05ATEX2277†. A 'Declaration of Conformity' is supplied with every pack of 25 gauges.

Essential Health and Safety Requirement 1.0.06. Instructions specific to hazardous area installations (reference European ATEX Directive 94/9/EC, Annex II, 1.0.6.).
The following instructions apply to this equipment, covered by certificate number Sira 05ATEX2277:

1) The equipment may be located where flammable gases and vapours of groups IIA, IIB and IIC may be present. The equipment is only certified for use in ambient temperatures in the range of -40°C to 80°C (-40°F to 176°F) and should not be used outside this range.
2) The equipment has not be assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, Clause 1.5).
3) Installation of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (EN 60079-14 within Europe).
4) Repair of this equipment is not permitted. If faulty in any way, it must be replaced in its entirety. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances; e.g. acid liquids or gases that may attack metals, or solvents that may affect polymeric materials.
Suitable precautions; e.g. regular checks as part of routine inspections or establishing from the materials' data sheet that it is resistant to specific chemicals.

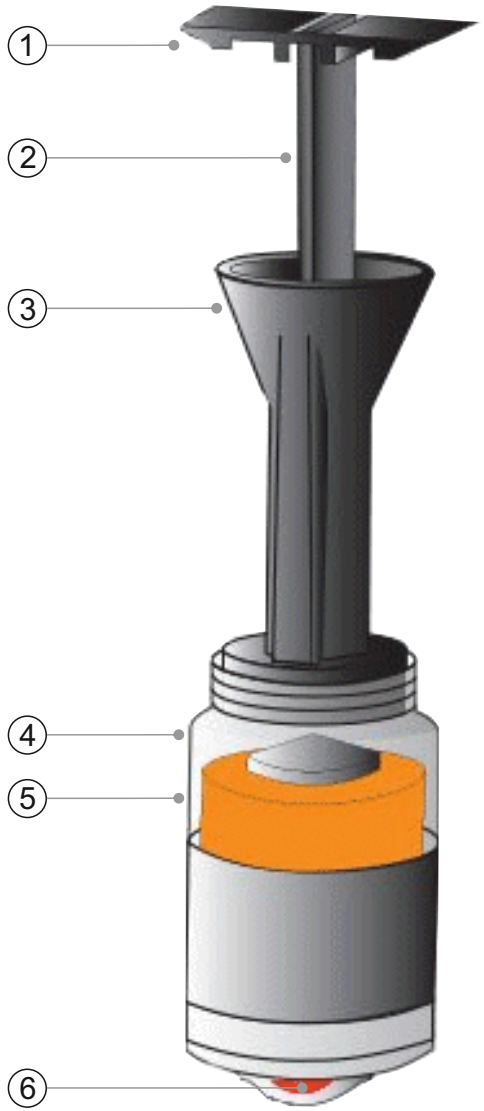
When installed, the gauges are waterproof and rated to IP66, preventing false activation by water entering the encapsulated housing from outside the insulation and the substrate ie., rain water, wash water and sprinkler /deluge systems.

Gauge Diameter: 35.8mm (1.4"). Gauge Weight: 60g (2.1oz)

Applicable Patents: GB2389417. International patents pending under application No. PCT/GB2003/005216.

† Copies available on request. Contact Elcometer or your local Elcometer supplier for details.

1 GAUGE OVERVIEW & BOX CONTENTS



Gauge Overview

1 Flexible Fixing Strap
2 Funnel Support
3 Collection Funnel
4 Collection Housing (screws into the funnel assembly)
5 High Visibility Warning Floatation Device
6 High Intensity LED Visual Alarm

Box Contents

- Elcometer 1001 Funnel Assembly (x25)
- Elcometer 1001 Collection Housing (x25)
- User Guide
- EC Declaration of Conformity

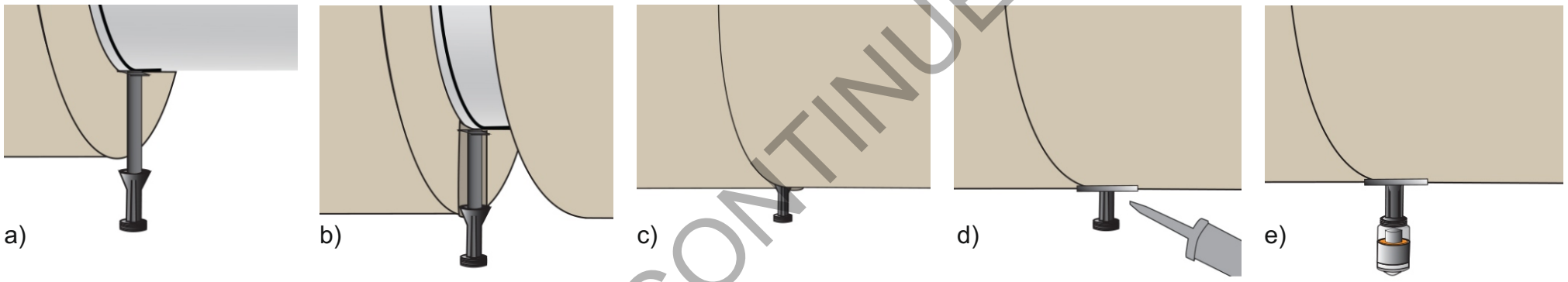
2 INSTALLATION

en

The Elcometer 1001 is designed to function correctly when fitted at the 6 o'clock position at every joint of the thermal insulation on an insulated pipe, on the bottom of bends and on vessels and tanks - only where visible for inspection.

2.1 NEW INSTALLATIONS

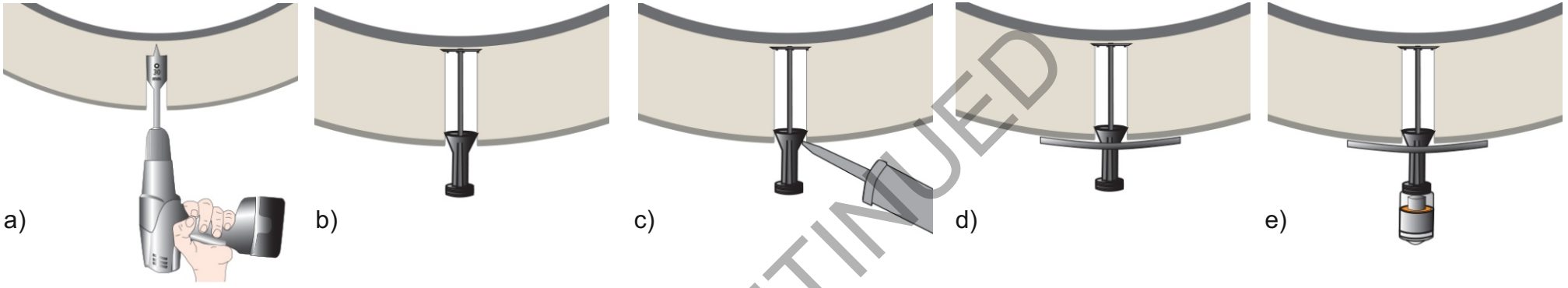
Installing the Elcometer 1001 can be achieved by fitting each unit tight up to the last section of the thermal insulation prior to fitting the next section.



1 Thread a fixing strap through the flexible fixing strap and loosely fix it around the pipe.
2 Slide the funnel assembly up to the edge of the insulation. The funnel must hang vertically with the threaded end facing down.
3 Cut the thermal insulation away around the funnel to ensure a snug fit.
4 Tighten the fixing strap and slide up the next piece of insulation.
5 Adjust the height to ensure the threaded section of the o-ring seal is below and clear of the outer cladding.
6 Make sure that the point at which the funnel exits the outer cladding is fully sealed with silicone adhesive sealant after all protective layers and treatments have been applied to the thermal insulation.

7 Holding the collection funnel in place using a spanner - each funnel has a spanner ‘seating’ to assist the ‘tightening’ process - ensure the o-ring seal is engaged when screwing the housing to the exposed collection funnel screw thread.

2.2 RETROSPECTIVE INSTALLATIONS



1 Using a standard drill with a 30mm diameter drill bit, drill the outer cladding on the underside of the insulation at the 6 o’clock position and core the insulation media to expose the pipe surface, taking care not to damage the pipe surface.
2 Leaving the black protection cap in place, take the black collection funnel with adjustable shaft and extend the shaft to its maximum height.
3 Insert the collection funnel until resistance is felt. The shaft has now touched the pipe surface. Continue to push the collection funnel until the funnel moves no further (this adjusts the funnel to the correct height to the thickness of the insulation).
4 Using standard sealant or mastic, apply to the joint of the funnel and onto the outer cladding, ensuring there are no gaps or holes, smooth over and allow to set (dry).
5 When the sealant/mastic has set, apply a strip of quality metal sealant tape for added waterproofing and additional support.

6 Remove the protective cap. Gently screw on the housing by hand, holding the collection funnel in place using a spanner, ensure the o-ring seal is engaged when screwing the housing to the exposed collection funnel screw thread.

2.3 EX COMPLIANCE

During or after initial inspection it is recommended that an inspection is carried out by a 'competent' person to confirm compliance, to conform to the **IEC standard 60079-14-initial inspection**.

3 ACTIVATION

When fluid is present either on the pipe surface or within the insulation media, it will ingress one way or another, the fluid will find its lowest point of exit and find an installed collector funnel which touches the pipe surface. The fluid exits through the funnel to the outside of the insulation outer cladding and enters the encapsulated housing.

When conductive fluids (water) enter the housing, minimum of 2.5ml, the high intensity LED is activated and flashes. As more fluids enter the housing, the orange float rises giving a double indication that fluid is present under the insulation.

Should the float rise **without** activating the LED, an 'inert' fluid could be present ie. hydrocarbons.

When installed at regular intervals, directional flows can be monitored, identifying where issues may lie.

When activated, the detector housing should be unscrewed from the collector funnel, capped and taken away for further analysis.

From this sample, hydrocarbon and other process product (if any) can be identified and compared with that of the product inside the pipe. Should analysis show same, there is a product release or leak nearby. Should the sample show differences, there is a product release elsewhere moving either along the pipe or within the insulation media. Immediate action and remedial works must be undertaken.

4 WATER INGRESS

When, at the time of initial detector LED flashing and float rising, the water is clear, little or no corrosion/deterioration has taken place and the protective coating on the substrate is sound, with no immediate indication of corrosion under insulation (CUI). However, insulation is wet rendering the thermal properties ineffective.

The incident should be logged and a monitoring regime and / or remedial works instigated, installing a new Elcometer 1001 gauge when complete. In the meantime, a replacement collection housing can be fitted.

Monitor and sample as before, to at least monthly intervals, each analysis to be compared to those of previous samples so a prediction of the deterioration can be produced, giving the most economic timescale for safe repair of the fault. Should a sudden change in the sample be noticed, such as high iron oxide content, the prediction can be revised and the repair date brought forward.

Other monitoring inspection methods (NDT) can be applied just to the section of pipe identified as “at risk”. These identified sections of pipe could be monitored via pulsed eddy current, ultrasonic, thermography, radiography or guided wave based methods which, while normally difficult to apply, may be beneficial in providing a quantitative analysis of pitting or wall thickness when the exact location has been identified.

If, subsequent to the initial detector activation, the next adjacent detector(s) activate(s) there is water ingress to the extent that volume is flowing past the first activated detector.

When water is found, the sample could also be analysed for ph level, electrical resistance and other properties to identify the impurities it contains, including oxides (demonstrating coating / paint breakdown).

In ALL cases of detector activation, water / fluid is present, thus rendering the thermal properties of the insulation ineffective, requiring scheduled maintenance and remedial repairs.

5 MAINTENANCE

To ensure the detectors are maintained in a satisfactory condition for continued use within the hazardous area, regular and periodic inspections should be carried out.

All detectors should be checked to ensure that a) the LED is not flashing and / or b) the orange float is not raised.

It is recommended that inspections are carried out on a 60 day turnround cycle and reported accordingly.

Detectors should be inspected **24 months** from installation date by a ‘competent’ person to confirm compliance and conform to the **IEC 60079-17 (3.1) - close inspection** standard. This inspection must be completed no later than **36 months** from installation date without seeking expert advice.

6 REPLACEMENT

The collection funnel has an indefinite service life and does not require replacement.

The encapsulated fluid collection housing has a service life of five years and requires replacement at the end of this five year service life.

1 Unscrew the housing by hand, holding the collection funnel in place using a spanner to avoid dislodging the installed funnel. Each funnel has a spanner 'seating' to assist this loosening process.
2 Whilst continuing to hold the collection funnel in place with a spanner, screw on a new collection housing by hand, ensuring the o-ring seal is suitably engaged.

7 SERVICE LIFE

The collection funnel has an indefinite service life and does not require replacement. When removed as part of insulation removal, the funnel maybe reused when reapplying insulation or weather barrier. Should the funnel be damaged during this process, or for any other reason, replace with a new collection funnel and adjustable shaft.

The encapsulated fluid collection housing has a service life of five years and requires replacement at the end of this five year service life.

The battery contained in the collection housing is warranted to 'power' the LED for a minimum of seven days at the end of the five year service life. At any time during the service life, when activated, the LED will flash for longer than the stated minimum of seven days. The earlier the activation during the service life, the longer the LED will flash, for example, when activated, a newly installed detector will flash for approximately 60 days.

In the event that the battery is spent (exhausted) rendering the LED ineffective in advance of personnel witnessing the activation, the detectors have a built-in mechanical redundancy in the form of a high visibility orange float. The float will remain raised and visible in the clear upper housing chamber (window) whilst there is fluid present.

8 ACCESSORIES

The collection housing can be unscrewed and the contents taken away for detail analysis if required. A replacement housing can be attached to the funnel assembly whilst the escaped fluid is examined and remedial actions reviewed. Caps for the collection housing are available to purchase as an optional accessory.

Description	Sales Part Number
Collection Housing Screw Cap, Pack of 5	T100125586

9 WARRANTY & GUARANTEE

The Elcometer 1001 device is warrantied to activate via visual float and LED for five consecutive years from date of purchase, where there is presence of sufficient ingress of water or moisture in the device.

The warranty is only valid if the device has been installed and maintained in accordance with these instructions.

10 TECHNICAL SPECIFICATION

Application	Fluid detector for thermally insulated pipes
Power Supply	Lithium Thionyl Chloride Battery
Service Life	5 years
Maximum LED Alarm Operation Time	7 days
Operating Temperature	-40°C to 80°C (-40°F to 176°F)
Maximum Pipe Temperature	180°C (356°F)
IP Rating	IP66
Minimum Pipe Outside Diameter	17mm (0.7") combined with a minimum 15mm (0.6") thickness of insulation
Insulation Thickness Range	10mm to 80mm (0.4" to 3.1")
Protrusion from Pipe Surface	Maximum: 157.0mm (6.2"); Minimum: 125.4mm (4.9")
Gauge Diameter	35.8mm (1.4")
Weight	60g (2.1oz)