

# **Overpressure leak detector**



Z - 65.23 - 218

**Documentation ELC** 

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## 1. Object

Leak detector for double-skin tanks.

## 2. Type

ELC/500 for tanks with a test pressure of 500 mbar in the interstitial space ELC/600 for tanks with a test pressure of 600 mbar in the interstitial space with indicator unit ELC

- ELC-R/500 for tanks with a test pressure of 500 mbar in the interstitial space and the possibility of installing a pipe leak detector
- ELC-R/600 for tanks with a test pressure of 600 mbar in the interstitial space and the possibility of installing a pipe leak detector

with indicator unit ELC-R

## 3. Field of application

## 3.1. Tanks

- Underground tanks made from double-skin steel or plastic, without leak detection liquid in the interstitial space, assembled in the factory or on site, with an interstitial space which is suitable for the connection of an ELC as per paragraph 4.1.
- Underground tanks made from single-skin steel or plastic, with pressure-proof leakage protection lining or leakage protection shell, with an interstitial space which is suitable for the connection of an ELC as per paragraph 4.1.

## 3.2. Integrated pipe leak detector (as an option)

ELC-R offers the possibility of integrating (installing) a pipe leak detector. The alarm given by such leak detector is indicatored on the ELC-R unit. The field of application (monitored pipes) depends on the selected pipe leak detector.

## 3.3. Liquids to be stored

Liquids incompatible with water.

## 3.4. Exclusions

The leak detector must not be used if the nature of the liquid to be stored and the material of the inner skin are likely to cause permeation which may lead to an explosive atmosphere in the interstitial space during normal operation.

## 4. Description of the function

The overpressure leak detector ELC monitors both skins of a tank for leakage. The test pressure in the interstitial space is such that any leakage below or above the level of the liquid (stored liquid and groundwater) will be signalled as a result of the pressure drop.

In order to build up the required pressure, air is sucked from outside by the integrated pump, led through a dry-type filter and transmitted to the interstitial space.

The dry-type filter reduces the relative humidity of the outside air to approx. 10%. Drying is required in order to prevent accumulation of humidity or condensate in the interstitial space. **Used filter media of dry-type filters must be either regenerated or replaced.** 

#### 4.1. Minimum and maximum pressure values inside the tank

Тур	Pressure of the stored liquid on the tank bottom, including any existing superimposed pressure	Pressure of the groundwater on the tank bottom	Test pressure in the interstitial space
ELC/500 bzw. ELC-R/500	max. 300 mbar	max. 300 mbar	mind. 500 mbar
ELC/600 bzw. ELC-R/600	max. 400 mbar	max. 400 mbar	mind. 600 mbar

The following pressures must be kept at all times

## 4.2. Trip pressure of the leak detector

The following pressure values are factory-set:

Туре	Alarm		Pump		Overpressure valve	
	ON	OFF	ON	OFF	ON	OFF
ELC/500 bzw. ELC-R/500	335 <sup>+10</sup> / <sub>-5</sub>	365 <sup>+25</sup> / <sub>-25</sub>	370 <sup>+25</sup> / <sub>-25</sub>	400 <sup>+10</sup> / <sub>-10</sub>	440 <sup>+10</sup> / <sub>-25</sub>	395
ELC/600 bzw. ELC-R/600	435 <sup>+10</sup> / <sub>-5</sub>	465 <sup>+25</sup> / <sub>-25</sub>	470 <sup>+25</sup> / <sub>-25</sub>	500 <sup>+10</sup> / <sub>-10</sub>	540 <sup>+10</sup> / <sub>-25</sub>	495

#### 4.3. Normal operation

The overpressure leak detector is connected to the interstitial spaces through pressure lines and instrument leads. The overpressure generated by the pump is measured and controlled using a manometric switch.

When the service pressure (Pump OFF) is reached, the pump is switched off. Then, the pressure slowly drops as a result of unavoidable leakage in the leak detection system. When the pressure drops to the trip value "pump ON", the pump is switched on, and the service pressure is generated again.

In normal operation, the leak detector oscillates between these two pressure values, with short running cycles and longer standstills, depending on the degree of tightness of the complete system.

## 4.4. Air or liquid leakage

If leakage occurs below or above the liquid level, the overpressure pump is switched on to reestablish the service pressure. If the delivery of the pump is insufficient to compensate for the volume lost through leakage, the system pressure drops, and the pump runs continuously.

An increase in leakage will result in a further loss of pressure until the alarm pressure is reached. The visual signal and the audible alarm are then activated.

The pump delivery, which is measured by the leak detector, is limited to 70 - 100 litres of air per hour, related to the alarm pressure.

#### 4.5. Overpressure valve

Overpressure protection installed in the pressure lines protects the interstitial space between the skins against any excessively high pressure (in excess of the test pressure).

Unacceptable high pressure may arise from e.g.

- high temperature caused by environmental factors
- temperature rise resulting from filling at too high a temperature (contact the manufacturer, if necessary).

#### 4.6. Number of tanks to be connected

The number of stop valves installed determines the number of tanks which can be connected. The leak detector can be designed for 3, 4, 5 or 6 tanks.

## 5. Installation instructions

#### 5.1. General instructions

- (1) The leak detection system must be installed by experts<sup>1</sup>.
- (2) The applicable rules for the prevention of accidents must be observed.

#### 5.2. Installation of the leak detector

- (1) The leak detector consists of a leak detection unit and an indicator unit.
- (2) The leak detector is suitable for outdoor installation. The indicator unit, however, must be installed in a dry room. If this is not possible, a suitable protective box including an additional outdoor signal or potential free contacts must be provided.
- (3) The leak detector and the leak indicator unit must **NOT be installed in potentially explo**sive areas.
- (4) The leak detector and the leak indicator unit are intended for wall mounting. Usually, they are fastened using dowels and bolts.
- (5) The distance between the leak detector and the interstitial space should be kept as short as possible.

#### 5.3. Installation of the connection lines

- (1) Connecting pipework between leak detector and tank may be either of metal (usually Cu) or of plastic.
- (2) The pipes must have an inside diameter of 6 mm and an outside diameter of 8 mm (pipe: 8 x 1 mm).
- (3) The connecting pipes (between leak detector and tank) should not be much longer than 50 m. Otherwise, a pipe with a larger inside diameter must be used with appropriate reducers.
- (4) Colour code: Instrument leads: red Pressure lines: white (or transparent)
- (5) The connecting pipes must have the same cross section over their entire length. Indentations and kinking<sup>2</sup> are not permitted.

<sup>&</sup>lt;sup>1</sup> In Germany: experts specialised as per § 19I WHGB (Water Resources Law), incl. TRbF 180 / 280 no. 1.7.

<sup>&</sup>lt;sup>2</sup> If necessary, commercial-type fittings (defined bending radius) must be used with plastic pipes.

- (6) When plastic pipes are buried in the ground or laid outdoors, above the ground, protective sheathing tubes must be used.
- (7) In order to cover and to protect plastic tubes between the housing of the leak detector and the point of entry into a protective sheathing tube, we recommend the use of a special sheathing tube from the SGB range of accessories.

## 5.4. Electrical connections

- (1) 230 V 50 Hz
- (2) continuously run, i.e. no (plug) connection.
- (3) Connecting pipework between leak detector and leak indicator unit ELC: LiYY-JZ 4x1.0 or equivalent
- (4) Connecting pipework between leak detector and leak indicator unit ELC-R: LiYY-JZ 5x1.0 or equivalent.
- (5) All regulations of the electric supply companies must be observed <sup>3</sup>.
- (6) Terminal identification:
  - 0 3 connections for wiring between leak detector and leak indicator unit ELC.
  - 0 4 connections for wiring between leak detector and leak indicator unit ELC-R
  - 5 live conductor (phase)
  - 6 neutral conductor
  - 7 earth
  - 8,9 outside signal
  - 10,11 potential free contacts, contact opens in case of an alarm (and in the event of a power failure)
  - 12 earthing for pipe leak detector (if applicable)
  - 13 live conductor (phase) for pipe leak detector (if applicable)
  - 14 neutral conductor for pipe leak detector (if applicable)
  - 15 switched alarm contact for the pipe leak detector (if applicable)

#### 5.5. Examples for installation

An example for the installation can be found in the appendix.

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<sup>&</sup>lt;sup>3</sup> In Germany also VDE regulations

## 6. Commissioning

- (1) Only once the pneumatic system has been connected can the electrical connections be carried out.
- (2) The service and alarm lamps must light up, and the audible signal must sound. Then, place the "signal off" switch to the Off position.
- (3) Place the three-way valve 21 in position "B" and connect the measuring instrument to three-way valve 21.
- (4) The leak detection system must be pressurised at the service pressure (use the installation pump with an appropriate dry-type filter or nitrogen accumulator).

For this purpose, connect the installation pump to socket 82 of the leak detector and place test valve 20 in position  $C^4$ . Open the cock at muff 82, the compressed air (or the nitrogen) flows into the interstital space.

<u>Please note</u>: If pressure fails to build up despite the installation pump being connected, identify and eliminate the source of leakage (if necessary, check the performance of the installation pump and the setting of the pressure reducing valve).

(5) When the service pressure of the leak detector has been reached (the pump in the leak detector switches off), place the two three-way valves in the service position and remove the installation pump and the measuring instrument. Then carry out an operational check as per paragraph 7.3.

## 7. Operating instructions

#### 7.1. Generell instructions

- (1) When the leak detection system is properly installed (density), it may be assumed that the leak detector operates in the normal range.
- (2) Frequent or continuous operation of the pump indicates small leaks. Such leaks should be rectified within a reasonable period.
- (3) An alarm indicates a significant leak or defect. The cause must be found and eliminated within a short time.
- (4) The operator must check the service lamp at regular intervals.
- (5) The operator must check the dry-type filter at regular intervals<sup>5</sup>. If the colour of the filter medium has changed from orange to transparent, it must be either replaced or reactivated.
- (6) The leak detector must be switched off to carry out maintenance work.

<sup>&</sup>lt;sup>4</sup> If the three-way valve is not placed in position C, the overpressure protection may open if the pump delivery exceeds the volume flow towards the tanks. The overpressure protection must not be manually closed.

<sup>&</sup>lt;sup>5</sup> Recommended interval: 2 months.

#### 7.2. Maintenance

- (1) Maintenance work and operational checks shall only be carried out by experts<sup>6</sup>.
- (2) The leak detector must be checked for functional and operational safety once a year.
- (3) The extent of the annual check is described in paragraph 7.3.
- (4) Furthermore, observation of the conditions described in sections 5 to 7.2 must be checked.
- (5) The maintenance prescriptions for the pipe leak detector are also applicable to an integrated pipe leak detector.

#### 7.3. Fuctional testing

Checks of the functional and operational safety must be carried out

- after commissioning or recommissioning
- at intervals quoted in paragraph 7.2<sup>7</sup>
- after each trouble shooting.

#### 7.3.1 Scope of the checks

- (1) If necessary, work to be carried out must be agreed with the responsible person on site.
- (2) Observe safety instructions concerning the handling of any liquids being stored.
- (3) Reactivate or replace the filter medium.
- (4) Check the interstitial space for continuity (paragraph 7.3.2).
- (5) Check the trip pressures using a testing instrument (paragraph 7.3.3). Alternatively, follow instruction no. (6).
- (6) Check the trip pressures without testing instrument (paragraph 7.3.4). Alternatively, follow instruction no. (5).
- (7) Check the overpressure protection using a testing instrument (paragraph 7.3.5). Alternatively, follow instruction no. (8).
- (8) Check the overpressure protection without testing instrument (paragraph 7.3.6). Alternatively, follow instruction no. (7).
- (9) Check the system for tightness (paragraph 7.3.7).
- (10) Make the system ready for operation (paragraph 7.3.8).
- (11) Complete the test report, to confirm the functional and operational safety (to be carried out by the expert).

<sup>&</sup>lt;sup>6</sup> In Germany: experts for installation and service of leak detectors or under the supervision of an expert, in conformity with applicable regulations

<sup>&</sup>lt;sup>7</sup> In Germany, federal rules must also be observed (e.g. VAwS).

## 7.3.2 Continuity check of the interstitial space

If several interstitial spaces are connected, each space must be checked individually for continuity:

- (1) Close all stop valves.
- (2) Connect the measuring instrument to three-way valve 21 and place valve 21 in test position "B".
- (3) Place the three-way valve 20 in test position "B".
- (4) Open the stop valves of the first (following) tank (arranged in pairs one above the other).
- (5) Read the pressure drop indicated on the measuring instrument. If there is no fall in pressure, find and eliminate the cause.
- (6) Close the stop valves.
- (7) Carry out steps (5) to (7) for each tank.
- (8) Place three-way valve 20 in the operating position.

#### 7.3.3 Checking the trip pressures using a testing instrument

- (1) Close all stop valves.
- (2) Remove the measuring instrument from three-way valve 21.
- (3) Connect the testing instrument to three-way valves 20 and 21. Place both valves in position "B".
- (4) Connect the measuring instrument to the testing instrument.
- (5) Close the needle valve (testing instrument). Pressure is generated until the service pressure is reached.
- (6) Bleed the system through the needle valve. Note the trip pressures "pump ON" and "alarm ON" (visual signal and audible alarm).
- (7) Close the needle valve and note the trip pressures "alarm OFF" and "pump OFF". (If necessary, slightly open the needle valve so that the pressure builds up slowly).
- (8) Place the two three-way valves in the operating position and remove the testing instrument.

## 7.3.4 Checking the trip pressures without testing instrument

- (1) Close all stop valves except those of the interstitial space<sup>8</sup> to be checked.
- (2) Connect the measuring instrument to three-way valve 21 and place it in position "B".
- (3) Bleed the system through three-way valve 20 (position "B"), note the trip pressures "pump ON" and "alarm ON" (visual signal and audible alarm).
- (4) Place three-way valve 20 in the operating position and note the trip pressures "alarm OFF" and "pump OFF".
- (5) Place three-way valve 21 in the operating position and remove the testing instrument.

#### 7.3.5 Checking the overpressure protection using a testing instrument

- (1) Connect the testing instrument with attached measuring instrument to three-way valves 20 and 21. Place the two valves in position B.
- (2) Open the needle valve until the pump is switched on.
- (3) Place three-way valve 21 in position A.
- (4) Close the needle valve and note the opening pressure of the overpressure protection.
- (5) Place three-way valve 21 in position B. The pump is switched off.
- (6) Note the closing pressure of the overpressure protection.
- (7) Remove the connected testing instrument, place three-way valves 20 and 21 in the operating position and open all stop valves (with connected tank).

#### 7.3.6 Checking the overpressure protection without testing instrument

- (1) Close all stop valves except those of the interstitial space<sup>8</sup>, to be checked.
- (2) Place three-way valve 21 in the operating position and remove the measuring instrument (if this is still connected).
- (3) Place three-way valve 21 in position C. The manometric switch is bled. As a result, the pump is switched on and the alarm is tripped.
- (4) Connect the measuring instrument to three-way valve 21. Then turn valve 21 by 90° in clockwise direction until reaching of test position "A" (manometric switch is "blind", i.e. the pump is not switched off).
- (5) Wait until the opening pressure of the overpressure protection is reached. If the test pressure in the interstitial space rises to 500 mbar or 600 mbar and higher while you wait for the opening pressure, the test must be stopped immediately, the pressure must be let off, and the overpressure protection must be replaced.

<sup>&</sup>lt;sup>8</sup> The interstitial space with the least volume should be selected.

- (6) When the opening pressure has been reached (no further rise of pressure), place threeway valve 21 in test position B.
- (7) The pump is switched off. Note the closing pressure of the overpressure protection <sup>9</sup>.
- (8) Place three-way valves 20 and 21 in the operating position and remove the measuring instrument.
- (9) Open all stop valves (with connected tanks).

#### 7.3.7 Checking the system for tightness

- (1) Make sure that all stop valves which are connected to a tank are open.
- (2) Connect the testing instrument to three-way valve 21 and place the three-way valve in position B.
- (3) After pressure compensation, check the system for tightness. The system is tight if the values quoted in the following table are kept:

Volume of the interstitial space in litres	Pressure drop of 1 mbar in
250	15 min
500	30 min
1000	1,0 h
1500	1,5 h
2000	2,0 h
2500	2,5 h
3000	3,0 h
3500	3,5 h
4000	4,0 h

Volume of the interstitial space in litres Pressure drop of 1 mbar in

(4) To detect possible leaks either in the tank or in the connecting pipework, we recommend to check each interstitial space individually. For this purpose, the stop valves of the tank concerned must be opened while all remaining stop valves remain closed.

(5) Place three-way valve 21 in the operating position and remove the testing instrument.

<sup>&</sup>lt;sup>9</sup> Should the pump switch on before reaching the closing pressure, the cause must be found out and eliminated.

## 7.3.8 Making the system ready for operation

- (1) Plumb the housing of the leak detector and the signal stop switch on the indicator unit.
- (2) The stop valves of each connected tank must be in the "open" position.

## 7.4. Occurrence of alarm signal

- (1) In the case of an alarm, the red indicator light 1 lights up, and the audible signal 69 is given.
- (2) Remove the lead seal from alarm switch 71, switch off the audible signal and call immediately an expert.
- (3) The expert (either from an external company or an in-house expert) must find out and remove the cause for the alarm. Then, he has to submit the leak detector to a operational check in accordance with paragraph 7.3 or with the instructions applicable to pipe leak detectors.

## 8. Identification

- Electric data
- Serial number
- Type designation
- Date of construction (month / year)
- Logo of the manufacturer
- Signs according to legal provisions

## 9. Abbreviations

- 1 Indicator light "alarm", red
- 2a Stop valve, pressure line
- 2b Stop valve, instrument lead
- 9 Indicator light "operation", green
- 17 Overpressure pump
- 20 Three-way valve in the pressure line
- 21 Three-way valve in the instrument lead
- 22 Bleeding device
- 30 Housing
- 31 Terminal strip (mains)
- 41 Alarm switch in 54
- 42 Pump switch in 54

- 49 Screw connection pump housing
- 54 Max. pressure governor
- 59 Relay
- 69 Buzzer
- 70 Overpressure protection
- 71 Signal stop switch
- 72 Dry-type filter
- 78 Terminal, special function
- 82 Connection installation pump
- 83 Pipe leak detector
- 84 Test tank 1 litre
- 85 Test socket for pressure gauge
- 90 Thermostat
- 91 Heating

## 10. Technical data

#### 10.1. Electrical data

Connected wattage (without external signal)		230 V – 50 Hz – 60 W
Switching contact rating, AS terminals		230 V – 50 Hz – max. 50 VA
Switching contact rating, potential free contacts	max.:	230 V – 50 Hz – 8 A
	min.:	5 V – 5 mA
External fusing of the leak detector		max. 10 A
Overvoltage category		2

## 10.2. Pneumatic data (requirements on the testing instrument)

Nominal size	mind.	100
Accuracy, depending on class	mind.	1,6
End scale value	600 m	ıbar

## 11. Application of a pipe leak detector in the ELC-R

The leak detector of the ELC may also be accommodated in a larger housing (ELC-R) which offers enough space to integrate a pipe leak detector.

If necessary, the housing for the pipe leak detector can be dispensed with. Furthermore, this leak detector must have potential free contacts (for the alarm).

Voltage supply and alarm output of the pipe leak detector are ensured through the leak detector ELC-R.

#### 11.1. Installation of a pipe leak detector in the ELC-R housing

- (1) The pipe leak detector can be installed in the ELC-R housing either in the factory or on site.
- (2) If the installation is made on site, the instructions in the documents attached to the supply must be observed.
- (3) Furthermore, the installation instructions given in paragraph 5 and in the documentation of the pipe leak detector must be observed.

#### 11.2. Connection, commissioning and operational check of a pipe leak detector integrated in the ELC-R

(1) The conditions for connection, commissioning and operational check of the pipe leak detector are applicable. In addition, the alarm trigger signal of the leak indicator unit (ELC-R) must be checked.

















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## 1. Field of application / Purpose

In this appendix further statements are made, which are to be observed when monitoring tanks for the storage of inflammable liquids (flash point  $< 55^{\circ}$ C).

This appendix has become necessary because of appendix II to directive 94/9/EWG.

## 2. Intended use

Summary of the intended use is described as follows:

- underground double-walled tank, stored product side wall made of steel •
- pressure less tank resp. liquid-and excess pressure may not exceed max. pressure on tank . bottom.
- tank grounding according EN 1127
- leak detection system is tight according to the documentation
- leak detector is installed outside Ex-area
- Protecting tube for the pneumatic hose has to be closed gas-tight •
- leak detector (electrical) connected disconnectible •

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## 3. Extension to field of application

The field of application stated in the documentation remains, however in addition applies:

steam-air mixtures, which can develop by

- stored liquids
- stored liquids in connection with air / air moisture or condensate
- stored liquids in connection with parts (materials), which are in contact with the liquids

have to be able to be classified in explosion group II B and the temperature class T3.

## 4. Installation instructions

Supplementary to the installation instruction are the points, listed in this chapter to be observed.

- (1) The valid Ex-regulations are to be observed.
- (2) The protecting tube for the pressure- and measuring line has to be closed at least gas tight at the entrance of the manhole chamber. Electrostatic chargings (e.g. when entering resp. leading through of lines) has to be avoided.
- (3) For establishment of a power failure (on leak detector resp. of its power supply), we recommend the assignment of the potential free contacts for transmitting the alarm or another securing, that the operation lamp (leak detection unit) extinguishes.

## 4.1. Personal equipment

The mentioned parts refer only to the safety when working on units, where Ex-dangers can be assumed.

When working in potentially explosive areas, use the following equipment:

- suitable cloth (danger from electrostatic charging)
- suitable tools (according EN 1127)
- suitable, calibrated gas-warning device for the existing steam-air mixtures (works should only be carried out with a concentration of 50% below the explosion limit)

## 5. Commissioning and repair

- (1) The statements made in the previous chapter are to be observed here as well.
- (2) In case a leak detector is started on an already filled tanks, special protection provisions are to be observed (e.g. testing of the gas freedom in the leak detector). Further provisions can depend on and are therefore estimated by the personnel.
- (3) Repairing the leak detector, especially the exchange of parts should only be carried out by adequate educated personnel or in co-ordination with SGB.

## 6. Disassembly

When disassembling, the following points are to be observed:

- Before and during working, testing of gas freedom (see chapter 4 above).
- Openings, through which a procrastination of Ex-atmosphere can occur, have to be closed gas tight.
- If possible not to carry out the disassembly with non sparking tools ( saw, grinder...). If this should be unavoidable, EN 1127 has to be observed.
- Avoidance of electrostatic charging (e.g. by rubbing)
- Suitable disposal of contaminating parts.

## 7. Designation

The chapter "designation" of the documentation is extended by the following point:

 pressure- and measuring line can also be connected to areas, for which units of group II (G), category 3 are required.

# Overpressure leak detector

# Overpressure valve



## Statement about overpressure valves

The pressure values given in the documentation for "overpressure valve ON" are the values for the triggering pressure (=initial opening) of the overpressure valve.

If a functional test is carried out according to the chapter "Functional test", the opening pressure (blowing-off pressure) of the overpressure valve is measured using the test described. The opening pressure is up to 30 mbar higher than the triggering pressure. The volume flow blown off at opening pressure corresponds to the maximum volume flow feed from the pump or from the pressure tank.

When a functional test is carried out it is also considered to have been passed if the measured value for overpressure valve ON is approx. 30 mbar higher than is given in the table. The opening pressure guarantees the prevention of pressure exceeding that of the testing pressure of the monitoring space caused perhaps by the pressure switch failing to control the pump or by changes in temperature.

The above statements are valid for the following leak detectors:

- ELC
- DL-4000
- DL-5
- DL-6
- DL-8

Siegen, 06.12.00

J. Berg -Managing director-

# Work Sheet: AB-820 500

## **Pneumatic connections**

## **1** Flare type fitting for flare type pipes

- 1. Lubricate the O-rings
- 2. Place the intermediate ring loosely in the threaded connection piece
- 3. Push the union nut and the thrust collar over the pipe
- 4. Tighten the union nut manually
- 5. Tighten the union nut until clearly increased force is needed
- 6. Finished assembly: turn by a further  $\frac{1}{4}$  of a revolution



## 2 Clamping ring threaded fitting for plastic and metal pipes



 Insert the support sleeve into the end of the pipe
 Insert the pipe with support sleeve as far as it will go

3. Tighten the thread until strong resistance can be clearly felt

4. Lightly loosen the nut

5. Tighten the nut until resistance can be felt (nut must exactly match the thread of the basic body)



## 3 Olive threaded fitting for plastic and metal pipes



1. Insert the reinforcing sleeve into the end of the pipe

2. Knock in the reinforcing sleeve

3. Push the union nut and the olive over the end of the pipe

4. Screw the union nut by hand until you feel a stop

5. Press the pipe against the stop in the inner cone

6. Tighten the union nut by approx. 1.5 revolutions (pipe must not turn)

7. Loosen the union nut: check whether the pipe visibly projects from under the cutting ring (it doesn't matter if the clamping ring can be turned)

8. Retighten the union nut using normal force

## 4 Quick-action fitting for PA- and PUR-tubes



- 1. Make a right-angled cut in the PA pipe
- 2. Loosen the union nut and push it over the end of the pipe
- 3. Push the pipe onto the nipple up to where the thread begins
- 4. Tighten the union nut by hand
- 5. Further tighten the union nut using a wrench until clearly increased force is needed (approx. 1 to 2 revolutions)

NOT suitable for PE-pipes



## Pneumatic connections



## 5 Tube connections (socket 4 and 6 mm for EXCESS PRESSURE)







- 1. Push wire or screw clip over the tube
- 2. Push the tube onto the Cu pipe or the tube socket (if necessary heat or dampen PVC tube), tube must fit tightly all the way round
- 3. Wire clip: clamp tightly using pliers and push onto the joint Screw clip: push the clip over the joint and tighten it using a screwdriver, care must be taken that the clip is a smooth tight fit.

## 6 Tube connections (socket 4 and 6 mm for VACUUM)

For vacuum applications where there is no excess pressure on the connection lines even in the case of a leakage proceed as in item 5, but without clips.

For vacuum applications where excess pressure could arise in the case of a leakage, proceed as in Item 5.

# DEUTSCHES INSTITUT FÜR BAUTECHNIK

Anstalt des öffentlichen Rechts

(German Institute for Constructional Engineering)

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 V 16-1.65.23-32/99

## NOTICE

# About the extension of the period of validity of the General Approval of the Building Inspection Authorities dated June 2, 1999

Approval no.:	Z-65.23-218
Applicant:	Sicherungsgerätebau GmbH Hofstr. 10 57076 Siegen
Subject of approval:	Leak detectors type "ELC" and "ELC-R" forming part of a leak detector device for double-skin tanks made from steel or plastic used for the storage of liquids incompatible with water, functioning according to the overpressure system
Validity:	June 30, 2009

This notice extends the period of validity of the General Approval of the Building Inspection Authorities No. Z-65.23-218 dated June 2, 1999. This notice comprises one page. It is only valid in connection with the above-mentioned general approval of the building inspection authorities and may only be used together with this.

## II. SPECIAL PROVISIONS

#### 1 Subject of approval and field of application

- 1.1 The present general approval applies to overpressure leak detectors type "ELC/..." and a variant with the designation "ELC-R/...", composed of a pressure absorber, a pressure-controlled pump and an overpressure protection as well as a leak indicator unit for visual and audible alarms. In the case of the leak detector type "ELC-R/...", an additional leak indicator unit is installed which is suited to monitor a double-skin pipe. The alarm of this unit is given through the leak indicator unit. Any leaks in the skins enclosing the interstitial space are indicated by pressure loss and visually and audibly signalled (for design of the leak detector devices, see appendix 1).
- 1.2 The leak detector may be connected to interstitial spaces of up to six double-skin tanks made from steel or plastic or tanks with pressure-proof leakage protection lining / leakage protection shell suitable for underground storage of liquids incompatible with water. These are interstitial spaces of tanks to DIN 6608-2 and DIN 6619-2, provided that their suitability has been confirmed by the building authorities according to nos. 15.2 and 15.8 of the Bauregelliste (*building provisions*) A, part 1 without leak detection liquid or tanks with general approval of the building authorities. The interstitial space must be suited for the connection of this type of leak detector, taking account of the permissible density of the liquid and the max. permissible pressure in the interstitial space of the tank. In the case of a pressure drop up to at least 330 mbar (types ELC/500 and ELC-R/500) or 430 mbar (types ELC/600 and ELC-R/600), the leak detector must give an alarm.
- 1.3 This general approval confirms the functional safety of the subject of approval in the sense of paragraph 1.1.
- 1.4 This general approval is issued without prejudice to any reservations made with respect to testing and approval under other regulations (e.g. 1<sup>st</sup> code on the safety of devices -low-voltage directive-, code on electromagnetic compatibility -EMVG directive- 11<sup>th</sup> code on the suitability of devices and protective systems for potentially explosive locations).

#### 2 Regulations applicable to the subject of approval

#### 2.1 Composition

2.1.1 The subject of approval (overpressure leak detector) consists of the basic components of a leak detector with leak indicator unit ELC:

Type ELC/500	tanks with a test pressure of 500 mbar in the interstitial space
Type ELC/600	tanks with a test pressure of 600 mbar in the interstitial space
Type ELCR/500	tanks with a test pressure of 500 mbar in the interstitial space and with the possibility of installing a pipe leak detector; with indicator unit ELC-R $$
Type ELC-R/600	tanks with a test pressure of 600 mbar in the interstitial space and with the possibility of installing a pipe leak detector; with indicator unit ELC-R

2.1.2 The functional safety of the subject of approval in the sense of paragraph 1.1 has proved to be in accordance with the 'principles of approval for leak detector devices for tanks' (ZG-LAGB) of August 1994, issued by the German Institute for Constructional Engineering.

#### 2.2 Manufacture and marking

2.2.1 Manufacture

The leak detector shall be manufactured only in the applicant's manufacturing shops. Its design, dimensions and materials shall be in accordance with the specifications described in appendix 2 of the present general approval.

#### 2.2.2 Marking

The manufacturer shall place the conformity mark on the leak detector, on the packing of the leak detector or on the delivery note. The conformity mark shall be in accordance with the relevant codes of the different states. Such marking is only valid if the conditions as per paragraph 2.3 have been complied with. In addition, the leak detector shall be marked with the following data:

Type designation Approval number.

#### 2.3 Certificate of conformity

2.3.1 General

Conformity of the leak detector with the provisions of the present general approval must be confirmed by the manufacturer's certificate of conformity, issued on the basis of in-house inspection and testing and an initial testing of the leak detector by an authorised technical control board.

2.3.2 In-house inspection and testing

The manufacturer shall implement and carry out in-house inspection and testing.

In the course of such in-house inspection and testing, every leak detector or its components shall be checked. Such individual checks shall ensure that materials, dimensions, tolerances and design correspond to the approved sample, and that the leak detector is reliable.

The results of in-house inspection and testing shall be recorded and evaluated. The records should contain the following details as a minimum:

- designation of the leak detector
- type of in-house inspection and testing
- date of manufacture, inspection and testing of the leak detector
- results of inspection and testing
- signature of the person responsible for in-house inspection and testing.

The records shall be kept on file for at least 5 years. Upon request, they shall be presented to the German Institute for Constructional Engineering and the Building Inspection Authorities.

In the event of inadequate test results, the manufacturer shall immediately take appropriate remedial action. Leak detectors that do not meet the requirements shall be separated so as to avoid confusion with satisfactory units. After repair (if possible and necessary from a technical point of view), the leak detector shall be re-tested.

2.3.3 Initial testing of the leak detector by an authorised technical control board.

Initial testing shall comprise the functional checks as defined in the approval principles for leak detectors on tanks. If the general approval of the Building Inspection Authorities includes checking of samples from current production, initial testing as described herein is not necessary.

#### 3 Conditions relating to the design

A leak detector with the type designation "ELC/..." or "ELC-R/..." may be used for tanks according to paragraph 3.1 of the technical description<sup>1</sup> for which a general approval has been issued by the building authorities.

#### 4. Conditions relating to the construction of leak detectors

4.1 (1) Leak detectors should be installed in accordance with paragraph 6 of the technical specification<sup>1</sup> and commissioned in accordance with paragraph 6 of this technical specification. Installation, maintenance, repair and cleaning of the leak detectors shall only be carried out by specialist companies as per § 19 I of the Water Resources Law.

(2) Carrying out of installation, maintenance, repair and cleaning work by specialist companies is not required if such work is exempted from these rules, or if such work is carried out by inhouse experts.

- 4.2 The alarm trip pressure of the leak detector must be at least 30 mbar above the static pressure of the liquid at the tank bottom.
- 4.3 The leak detector must not be installed in potentially explosive locations.

#### 5. Provisions concerning use, maintenance and regular checks

The leak detector must be operated and maintained according to paragraph 7 of the technical specification<sup>1</sup>. The technical specification<sup>1</sup> should be part of the manufacturer's supply.

By order

Dr. Ing. Kanning

Official seal

Deutsches Institut für Bautechnik

*German Institute for Constructional Engineering* 

<sup>&</sup>lt;sup>1</sup>Technical specification "European Leak Control ELC" of the applicant issued on March 23, 1999, tested by the TÜV Nord e.V.

SGB

ECKANZEIGETECHNI

This declaration applies for

## PRESSURE LEAK DETECTORS DL-4000, DL-5, ELC

from the Company

Sicherungsgerätebau GmbH Hofstraße 10 D- 57076 Siegen

With this declaration, SGB confirms that the leak detector specified above fulfills the protection requirements established in EC Guideline 89/336/EEC for alignment of the legal regulations of the member states regarding electromagnetic compatibility and in the German law on electromagnetic compatibility (EMC) dated 9 November 1992 (§ 4 Para. 1).

This declaration applies for appliances produced according to the documentation (technical description, drawing(s) – which are constituents of this declaration.

The following declarations were used for evaluation of the products in terms of its electromagnetic compatibility:

- EN 55 014-1:1998+A1:1999
- EN 55 014-2: 1998, Cat. I
- EN 61 000-3-3: 1995
- EN 61 000-3-2: 1997 + A1:1998 + A2:1998

With this declaration, SGB confirms that the leak detector specified above fulfills the protection requirements established in EC Guideline 73/23/EEC for alignment of the legal regulations of the member states regarding electrical operating equipment for use within certain voltage limits and defined in the 1<sup>st</sup> Code on the Equipment Protection Law dated 11 June 1979.

The following declarations were used for evaluation of the products in terms of use within certain voltage limits:

- EN 60 335-1:1988
- EN 61 010-1:1993 (IEC 1010-1:1990 + A1:1992, modified)

With this declaration, SGB confirms that the leak detector specified above fulfills the protection requirements established in EC Guideline 94/9 EEC for alignment of the legal regulations of the member states for equipment and protective systems for intended use in explosion hazard areas or in the 2<sup>nd</sup> Code on the Equipment Protection Law dated 12 December 1996.

The leak detector may be connected with its pneumatic components to monitoring chambers of tanks requiring equipment regarding category 3.

This declaration applies for appliances produced according to the documentation in accordance with internal QM documentation (technical description with drawings) – which are constituents of this declaration.

Evaluation of the product was accomplished. The following documents were used for this purpose:

- EN 1127-1:1997
- EN 13463-1:2001
- EN 13160-1:2003

The ignition hazard analysis / risk evaluation indicated no further hazards.

Siegen, 4 July 2003

Martin Hücking, Development, Explosion-protection representative

# Warranty



Dear customer,

You have purchased a high-quality leak detector from our company.

All of our leak detectors undergo a 100% quality control examination.

The type plate with the serial number is only affixed after all test criteria have been complied with.

The **warranty period** for our leak detectors is **24 months**, beginning on the date of installation on site.

The maximum warranty period is 27 months from our date of sale.

Our warranty will be effective only if the customer submits to us the functional report or test report on initial putting into service, prepared by a recognised company specialised in water and water protection systems, including the serial number of the leak detector.

Our warranty shall not apply in the event of faulty or improper installation or improper operation, or if modifications or repairs are carried out without the manufacturer's consent.

In case of malfunction, please contact your local specialist company:



Stamp of the specialist company

Yours sincerely

