

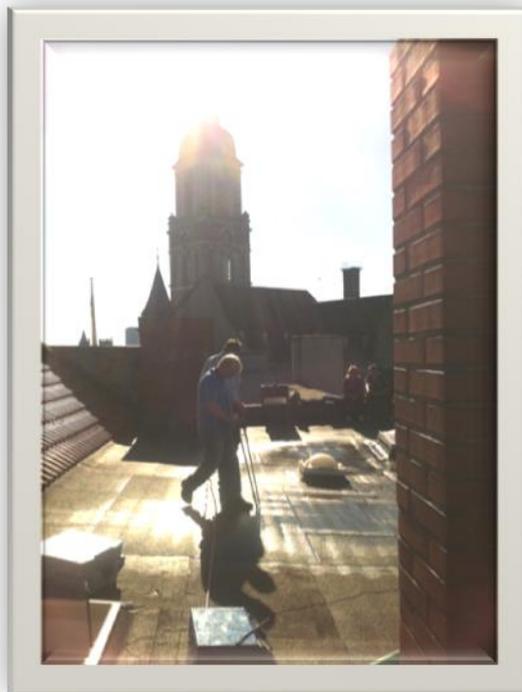


**E.LU-Mess GmbH** - Steinstraße 18 - 33397 Rietberg - Tel. 05244 939330

Manufacturer and Service Provider of Measuring Technology

## Flat Roof Leak Detection

... and your property is dry



### **E.LU-Mess GmbH**

Service providers and manufacturer of monitoring equipment

Steinstraße 18  
33397 Rietberg  
Tel: +49(0)5244 939330  
Mobile: +49 (0) 171 3690582

E-mail: [info@luemmen-messtechnik.de](mailto:info@luemmen-messtechnik.de)  
Homepage: [www.luemmen-messtechnik.de](http://www.luemmen-messtechnik.de)

Court: Gütersloh HRB 8803  
Court of Jurisdiction Gütersloh  
General Manager Ewald Lümmen





Dear customers,

Leak tightness tests on old or new flat roofs are becoming increasingly important

In Germany alone approximately 100 million m<sup>2</sup> of flat roofs are being sealed annually, by far the larger part is attributed to renovation work and only 40% relates to new buildings

In most cases, the damage that flat roofs might have is not detectable with the naked eye. However, damaged areas can be very accurately located without the requirement that the flat roof needs to be cleared.

Ewald Lümmer and his employees are known far beyond the borders of East Westphalia and operate throughout Germany as well as in Austria as experts in flat roof leak detection.

Prevent long-term damage to the building fabric and the associated high renovation costs and have your flat roof inspected regularly by us.

Arrange a no-obligation consultation with me and we will put together a worry-free maintenance package completely tailored to your needs.

Your, Ewald Lümmer

General Manager  
E.LU-Mess GmbH



## Flat roof leak detection

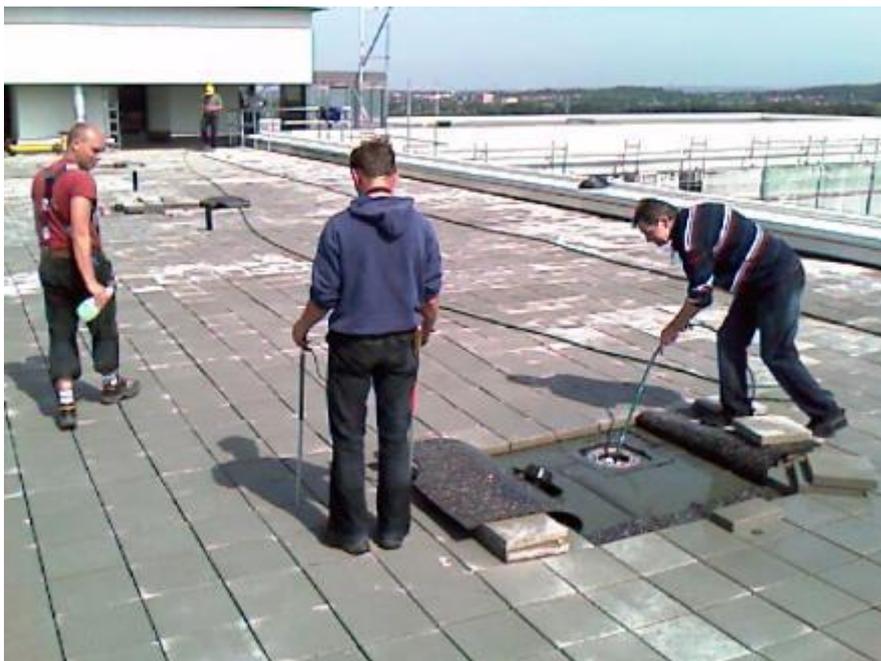
### Our Service

#### Leak tightness tests using the electron flow - measuring technique

An area on the flat roof is marked with a wire loop and subsequently slightly moistened. Our transmitter (the plus pole having previously been connected to the building's earth) supplies pulses of electrons to the roof's upper skin. Due to being earthed, the flow of electrons is drawn from the leak and flows to the building's earth.

Our digital receiver locates the drop in the electron flow and shows the direction to the leak. Even readings taken through a layer of gravel with paving or greened roofs provide reliable results.

We use our specially developed **FDO 4.5 P monitoring system** that has proven itself for years. Our daily use has continuously shown us new opportunities for improvement, and thus we continuously improve our instruments.





**FDO 4.5 P flat roof leak detection system**  
automatic search function with radio connection

Net price € 3495.00

Part number 2010001



**Flat roof leak detection case**

**Area of use**

- Flat roof

**Possible applications/Flat roofs**

- Gravelled
- Greened
- Terrace slabs on gravel
- Roofing felt
- Screw jack pedestal





## Leak tightness test using the flue gas technique

Using a side channel blower, flue gas is introduced into the insulating layer under the sealing with the aid of a filling adaptor. The gas is distributed under the membrane and exits through the leak. The leakages are then marked and can then be repaired by a roofing contractor. They also seal the connection points.

The flue gas that is used is harmless to health. The amount used depends on the structure (material and thickness) of the existing insulation.

In contrast to flat roof leak detection using the electron flow monitoring technique, no wetting of the roof is required using the flue gas technique. Even metallic constructions (such as lightning conductors or vent pipes) do not interfere with the detection technique.

Connection points, perimeter areas and rear vents can be checked very well and quickly. Similarly, this procedure for leak testing and quality assurance has been used very successfully on new buildings.



Flue gas inspection of a chimney



Result of a flue gas sample in the area of the wall connections



**Flue gas analysis system  
to augment the FDO 4.5 P flat roof leak detection system case**

Net price: € 1948.00

Part number 2010002



**Included in delivery:**

**1 flue gas generator  
with 5 ltr tank  
3000 watt heating capacity**

**1 Booster LLV145  
145 m<sup>3</sup> air capacity  
1100 watt motor power**

**1 bitumen inlet adapter  
1 membrane roof inlet adapter  
5m spiral hose DIN 50  
5 hose clips  
1 T-piece to draw in the smoke**

This procedure is suitable for very large roofs without imposing a large ballast weight. The basic principle is, a generated air-smoke mixture pressurized under the sealing layer discharges at the leak as a visible fog. Connection points, perimeter areas and rear vents can be checked very well and quickly. Similarly, the procedure for leak testing and quality assurance has been used successfully in new constructions

**Area of use:**

**Leakage detection on flat roofs  
Leak tightness test on new flat roofs**



## Drain verification set

€ 379.00 net price

Part number 2010003

### Leakage in run-offs and drains?

In many cases place of leaks on flat roofs are the run-offs or drains that are not resistant to a build-up of backwater (Defective - or missing O - Rings).

Using our blocking system we simulate a backwater which would result from heavy rainfall.

Place the sealing cushion into the drain and pump it to 1.5 bar.

This blocks the flow. Now fill up the drain to the brim with water. If the level does not change a leak does not exist.



1 sealing cushion 70 - 100 mm 1.5 bar

1 sealing cushion 100 - 150 mm 1.5 bar

1 air hose with valve and quick release connection

1 air pump with pressure gauge





Run-off with a water column

## Electro-acoustic Pipe Detection

In electro-acoustic detection leakages are located by using contact microphones.

A burst pipe, for example, is located by acoustic signals spreading from connected components (e.g. radiators). An increasing noise intensity indicates that the microphone is approaching the leakage. The exact localization is carried out using a surface microphone. If air has entered the pipes, this method is also very suitable for plastic.

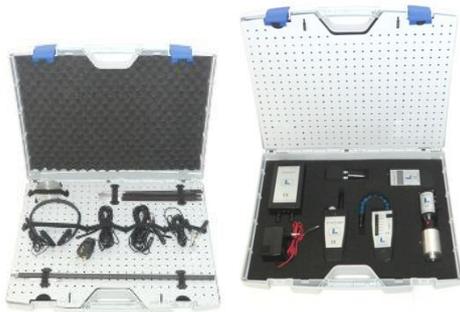
We pinpoint leakages precisely and reliably in water pipes from the building's plumbing. A leak is often hidden behind walls or under floors. With the help of our measuring technique, leakages are usually localized exactly to within a few centimetres. And consequently only there must be opened up. Large-scale chiselling open and costly repairs nowadays belong to the past.





## Leak and pipe location in two chamber "experts' case"

**Net price: € 1859.00**



### The ideal case in the area of "heating / plumbing"

A leak is often hidden behind walls or under floors. Large-scale chiselling open and costly repairs are nowadays usually completely unnecessary. The whole case uses the latest technology that reduces the work to a minimum. With the help of our technology, leakages are usually exactly located to within a few centimetres. And consequently only that area must be opened up.

#### **Pipe location:**

Electrically conductive (metallic) pipes are measured in their routing and laying depth. Locating of all metallic pipes in the building's plumbing.  
Determining the depth and position of the leak, in floors and walls.

#### **Acoustic leak detection:**

Following the previously measured pipe route the pipes are "listened" to. Leakage sounds are amplified, so leaks can be pinpointed accurately. With our ground microphone typical sound waves are detected that occur in a leak in water or heating pipes:

#### **Contents:**

- Lu-22 modulator and charger
- Lu-32 receiver and battery
- Connection cables and adapter plugs
- Lu-14 acoustic leak detection probe and resonance disc
- remote control
- headphones, battery
- 1 moisture meter with accessories**
- 1 gas detector**



**New ! EvaLuate 5.3 acoustic leak detector**



EvaLuate assesses the leak noise at the contact point to the water pipe and tells you where the best grade of the noise is. The closer the distance to the leak, the better the sound (grade) of the leak.

- > an exact pinpointing is possible!

**Contents:**

Analyser, piezo microphone, monitoring probe and disc, headphones, sturdy plastic case

**Net price € 1199.00**



## Prices / services from 1.1.2018

### Flat Roof Leak Detection

Electron flow monitoring, if required flow gas measurement.  
Monitoring of drainage/run-offs for backflow,  
including locating devices, the use of equipment and consumables,  
as well as labour up to 4 hours.

€ 895.00 net

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### Flat roof maintenance contract

Please speak to us for an individual offer!

.....

### Dewatering:

Roof insulation dewatering

Price on request

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### Leak tightness verification

Leak tightness verification of sealed-flat roof areas  
by means of electron-flow technique, including damage report.

Price on request

.....

### Leak detection in buildings

Electro-acoustic leak detection, including electromagnetic pipe location,  
humidity measurements, infrared measurement of the pipeline route and Lu gas technique,  
including location equipment, use of machinery, test gas up to 0.2 m<sup>3</sup>,  
as well as labour up to 3 hours.

€ 295.00 net

.....

Travel expenses

Return journey including vehicle costs and travel time  
0.87 €/km



## **General Terms and Conditions (GTC)**

### **§ 1 General - Scope of application**

- (1) Only our sales conditions are applicable; any contrary conditions of the purchaser or conditions differing from our sales conditions are not accepted by us, unless, we have expressly agreed to them in writing. Our terms and conditions of sale shall apply even if we make the delivery to the buyer without reservation, in full awareness of conflicting or deviating terms and conditions of the buyer.
- (2) All agreements that are concluded between us and the customer for the purposes of executing this contract are contained in writing in this contract.
- (3) Our terms of sale shall only apply towards entrepreneurs within the meaning of § 310 Par. 1 BGB [German Civil Code].

### **§ 2 Offer - Offer documents**

- (1) If the order is to qualify as an offer in terms of § 145 BGB, we shall have 2 weeks in which to accept it.
- (2) We reserve the proprietary rights and copyrights to all illustrations, drawings, calculations and other documents. This shall also apply to such written documents which are labelled "confidential". The customer requires our express prior consent before these may be forwarded to third parties.

### **§ 3 Prices-Terms of Payment**

- (1) Provided that nothing else is stated in the order confirmation, our prices are "ex works", exclusive of packaging; which shall be charged separately.
- (2) Our prices do not include the statutory VAT; the VAT is stated on the invoice separately at the applicable rate on the date of the invoice.
- (3) Deduction of discount requires a special written agreement.
- (4) Unless not otherwise specified in the confirmation of order, the net sales price (without deduction) will be due for payment within 30 days after date of invoice. The statutory rules regarding the consequences of default of payment apply.
- (5) The customer will be only entitled to rights set-off, if his counter claims are found to be legally valid, are undisputed or recognized by us. In addition, the customer is authorized to practice the right of retention in so far as his counter claim is based on the same contractual relationship.

### **§ 4 Delivery time**

- (1) The beginning of the delivery time specified by us implies that all technical questions have been clarified.
- (2) The compliance with our delivery conditions is subject to the prompt and orderly fulfilment of the obligations of the customer. The objection to a non-fulfilled contract remains reserved
- (3) If the customer fails to accept the goods or if he culpably infringes any other duty to collaborate, we shall be entitled to demand compensation for any resulting damage including any possible extra expenses. All further claims or rights are reserved.
- (4) Insofar as the preconditions of paragraph (3) exist, the risk of an accidental loss or the accidental deterioration of the object of the purchase shall pass to the customer at the moment that he is in default of acceptance or payment.
- (5) We are liable under the statutory provisions, to the extent that the base contract is a firm deal in terms of § 286 para. 2 No. 4 BGB or § 376 HGB [German Commercial Code]. We are also liable in accordance with the statutory provisions to the extent that, in consequence of a delay in delivery caused by us, the customer is entitled to enforce the assertion that his interest in the further fulfilment of the agreement no longer exists.
- (6) Furthermore, we shall be liable in accordance with legal provisions should the failure to deliver be founded on a wilful or grossly negligent breach of contract for which we are responsible; negligence on the part of our representatives or vicarious agents is to be attributed to us. Provided that the delay in delivery is due to a grossly negligent violation of the agreement attributable to us, our liability for losses or damage shall be limited to the foreseeable, typically incurred damage.
- (7) We shall also bear legal liability under statutory regulations if the delay in delivery for which we are responsible has been caused by the culpable violation of a major contractual obligation, but in any such case our liability for damages shall be limited to such losses, which are foreseeable and typical of such circumstances.
- (8) This shall not affect the customer's other legal claims and rights.

### **§ 5 Transfer of risk - Cost of packaging**

- (1) To the extent that nothing to the contrary can be understood from the order confirmation, delivery "ex works" has been agreed.
- (2) Special agreements shall apply for the return of packaging.
- (3) Insofar as the customer desires, we shall take out transport insurance for the shipment; the customer shall pay the resulting costs.

### **§ 6 Liability for faults**

- (1) Claims for faults by the customer provide that the customer met his obligation of inspection and reporting of defects according to § 377 HGB [Commercial Code] correctly.
- (2) Insofar as the purchase item has a fault, the purchaser shall be entitled to supplementary performance in the form of rectification of the fault or to delivery of a new item free of faults. If removal of faults or replacement delivery takes place, we are obligated to assume all necessary expenses for the purpose of supplementary performance, especially



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transportation, shipping, labour, and material costs, insofar as these are not increased by the fact that the purchase item has been brought to a location other than the place of performance.

- (3) If the supplementary performance is not successful, the customer has the option of withdrawal or demanding a reduction.
- (4) We will be liable in accordance with statutory provisions insofar as the customer makes claims for damages that are based on intent or gross negligence, including intent or gross negligence by our representatives or vicarious agents. As far as we are not accused of wilful breach of contract, our liability for claims for damages is limited to the foreseeable, typically occurring damage.
- (5) We shall be liable in accordance with the statutory provisions insofar as we culpably breach an essential contractual obligation; also in this case, liability for damages shall be limited to the foreseeable typically occurring damage. An essential contractual obligation exists where the breach of duty refers to a duty the performance of which the customer relied on and could rely on.
- (6) Insofar as the purchaser additionally, due to a negligent breach of duty, has a claim for compensation in lieu of performance, our liability shall also be limited to compensation for the foreseeable loss or damage that might typically incur.
- (7) Liability for culpable injury to life, limb or health remains unaffected; this also applies to mandatory liability in accordance with the product liability law.
- (8) Unless otherwise specified, liability shall be excluded.
- (9) The limitation period for any claims arising from faults is 12 months, beginning with the transfer of risk. This shall not apply if the item purchase item is usually used for a building and caused the defect.
- (10) The limitation period in the case of a delivery regress under §§ 478 and 479 BGB [German Civil Code] remains unaffected; it amounts to 5 years reckoned from delivery of the defective item.

#### § 7 Total liability

- (1) Further liability for losses or damage other than that provided for under § 6 is excluded, irrespective of the legal nature of the asserted claim. This applies particularly to damage claims for liabilities resulting from contract closure, due to other non-fulfilment of commitments or legal claims for replacement due to damage according to § 823 BGB [German Civil Code].
- (2) Limitation according to paragraph (1) also applies as far as the customer, instead of a claim for replacement due to damages, demands reimbursement of useless expenditure instead of performance.
- (3) As far as the liability for compensation against us is excluded or restricted, this shall be valid as well with respect to the personal liability for compensations of our employees, staff members, representatives and vicarious agents.

#### § 8 Security of the Reservation of Title

- (1) We reserve title to the purchase item until receipt of all payments from the delivery contract. If the customer acts contrary to contract, in particular if he is in default of payment, we are authorised to take back the purchase item. By taking back the purchase item we withdraw from the contract. After taking back the purchase item we are authorized to exploit it, the proceeds are to be imputed to the account of the customer - minus reasonable usage costs.
- (2) The customer is obliged to handle the object of the contract carefully, particularly he is obliged to effect a new for old insurance at his expense against the risk of fire, water damage and theft. Should maintenance and inspection work be required, the customer must perform such work in good time and at his own expense.
- (3) In case of distrains or other interventions of third parties, the customer has to inform us immediately in writing, that we can take legal actions in accordance with § 771 ZPO [German Civil Practice Act]. As far as such third party is unable to reimburse us the court and out-of-court costs of a lawsuit according to § 771 ZPO, the customer is liable for the loss occurred to us.
- (4) The customer shall be entitled to resell the purchase goods in the proper course of business; however, the customer already now assigns to the supplier all and any claims in the amount of the final invoice amount, including value added tax, which arise to it from the resale, against its customers or against third parties, irrespective of whether the purchase item has been resold after resale. The customer shall still be authorised to collect the amount due after the assignment. Our right to collect the payment ourselves remains unaffected hereof. However, we undertake not to collect these accounts receivable as long as the customer meets his payment obligations from earnings received from the sale, does not get into arrears with payment and in particular does not make application to start insolvency proceedings or ceases to make payments. Should this be the case, however, we may demand that the customer discloses to us the assigned claims and their debtors, that he furnishes all necessary information and surrenders all appropriate documents and that he notifies the debtors (third parties) of the assignment.
- (5) The processing or modification of the purchased item by the customer will always be carried out on our behalf. If the purchase item is processed with other objects not belonging to us, we acquire the joint ownership of the new resulting item in proportion to the value of the new resulting item (invoice sum total, including value added tax) and the other processed goods at the time of processing. For the item produced through processing, the same applies in other respects as for the purchase item under retention of title.
- (6) If the purchase item is inseparably mixed with other goods not belonging to us, then we shall acquire co-ownership of the new item created in the ratio of the value of the purchase item (final invoice value including value-added tax) to the value of the other mixed goods at the time of processing. If the mixing takes place in such a manner that the item of the Supplier is to be regarded as the main item, then it is deemed to be agreed that the Supplier transfers co-ownership on a pro rate basis. The customer shall then hold the resultant sole or partial ownership for us.
- (7) To secure our claims against him the customer shall also assign all claims against a third party that accrue to him through the connection of the purchase item to property.
- (8) We undertake to release the securities due to us at the request of the customer insofar as the value of the securities exceeds the secured accounts receivable by more than 10 %; the securities released shall be at our discretion.

#### § 9 Court of Jurisdiction - area of performance

- (1) If the customer is a merchant, the place of jurisdiction shall be our registered office; we are also authorised, to sue the buyer in the court of his residence.



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- (2) The laws of the Federal Republic of Germany shall apply; the terms of the UN Sales Convention shall not apply.
- (3) As far as not otherwise stated in the confirmation of order, our registered offices shall be the place of fulfilment.

## **General Conditions of Services**

### **§ 1 General - Scope of application**

- (1) For agreed services in the areas of building drying, location technology and assessments as well as consultations there are no building work services. For these and for all other services, including consultations, the following general terms of service apply.
- (2) Only our conditions of services are applicable; any contrary conditions of the customer or conditions differing from our sales conditions are not accepted by us, unless, we have expressly agreed to them in writing. Our conditions of services shall apply even if we make the service to the customer without reservation, in full awareness of conflicting or deviating conditions of services of the customer.
- (3) All agreements that are concluded between us and the customer for the purposes of executing this contract are contained in writing in this contract.
- (4) Our conditions of services shall only apply towards entrepreneurs within the meaning of § 310 Par. 1 BGB [German Civil Code].

### **§ 2 Offer - Offer documents**

- (1) If the order placement is to qualify as an offer in terms of § 145 BGB, we shall have 2 weeks in which to accept it.
- (2) We reserve the proprietary rights and copyrights to all illustrations, drawings, calculations and other documents. This shall also apply to such written documents which are labelled "confidential". The customer requires our express prior consent before these may be forwarded to third parties.

### **§ 3 Prices - Terms of payment**

- (1) As far as not otherwise stated in the confirmation of order, our prices at the time of order placement shall be applicable.
- (2) Our services are based on the current price list, according to our set rate and hourly rate. The related journeys to and fro are charged per kilometre. Services provided on Saturdays, Sundays and bank holidays are charged separately.
- (3) Weather and temperature-related delays, repetitions, waiting times, etc., including the ancillary costs and renewed journeys to and fro are calculated using our current price list.
- (4) Costs of heating up and heating facilities and buildings to be examined shall be borne by the client.
- (5) We are entitled to deviate from the conditions of § 632a BGB [German Civil Code] and send invoices for partial amounts. Services, which are billed according to performance and with hourly rates may be charged weekly.
- (6) Our prices do not include the statutory sales tax/VAT; they are stated on the invoice separately at the applicable rate on the date of the invoice.
- (7) Deduction of discount requires a special written agreement.
- (8) Unless not otherwise specified in the confirmation of order, the invoice amount (without deduction) will be due for payment within 7 days after date of invoice. The statutory rules regarding the consequences of default of payment apply.
- (9) The customer will be only entitled to rights set-off, if his counter claims are found to be legally valid, are undisputed or recognized by us. In addition, the customer is authorized to practice the right of retention in so far as his counter claim is based on the same contractual relationship.

### **§ 4 Productivity time**

- (1) The beginning of the stated time of productivity of our service implies that all technical questions have been clarified.
- (2) The compliance with our performance obligation is subject to the prompt and orderly fulfilment of the obligations and cooperation of the customer. The obligations of the customer to cooperate arise from the respective order. In each case, the customer has to ensure that all necessary documents and permits are provided, we have unrestricted access and an electricity and water supply and sewage drain is provided at the place of work. The objection to a non-fulfilled contract remains reserved.
- (3) If the customer fails to accept the goods or if he culpably infringes any other duty to collaborate, we shall be entitled to demand compensation for any resulting damage including any possible extra expenses. All further claims or rights are reserved.
- (5) We are liable under the statutory provisions, to the extent that the basic service contract is a firm deal in terms of § 286 para. 2 No. 4 BGB or § 376 HGB [German Commercial Code]. We are also liable in accordance with the statutory provisions to the extent that, in consequence of a delay in performance caused by us, the customer is entitled to enforce the assertion that his interest in the further fulfilment of the agreement no longer exists.
- (6) Furthermore, we shall be liable in accordance with legal provisions should the delay in performance be founded on a wilful or grossly negligent breach of contract for which we are responsible; negligence on the part of our representatives or vicarious agents is to be attributed to us. Provided that the delay in performance is due to a grossly negligent violation of the agreement attributable to us, our liability for losses or damage shall be limited to the foreseeable, typically incurred damage.



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- (7) We shall also bear legal liability under statutory regulations if the acceptable delay in performance for which we are responsible has been caused by the culpable violation of a major contractual obligation, but in any such case our liability for damages shall be limited to such losses as are foreseeable and typical of such circumstances.
- (8) This shall not affect the customer's other legal claims and rights.

#### **§ 5 Liability for faults**

- (1) Claims for faults by the customer provide that the customer met his obligation of inspection and reporting of defects according to § 377 HGB [Commercial Code] correctly.
- (2) In case of inadequate service, the customer has a claim for improvement. In case of repair or rectification work, we are obliged to bear all necessary costs for the purpose of supplementary performance, in particular transport, travel, labour and material costs.
- (3) If the supplementary performance is not successful, the customer has the option of withdrawal or demanding a reduction.
- (4) We will be liable in accordance with statutory provisions insofar as the customer makes claims for damages that are based on intent or gross negligence, including intent or gross negligence by our representatives or vicarious agents. As far as we are not accused of wilful breach of contract, our liability for claims for damages is limited to the foreseeable, typically occurring damage.
- (5) We shall be liable in accordance with the statutory provisions insofar as we culpably breach an essential contractual obligation; also in this case, liability for damages shall be limited to the foreseeable typically occurring damage. An essential contractual obligation exists where the breach of duty refers to a duty the performance of which the customer relied on and could rely on.
- (6) Insofar as the purchaser additionally, due to a negligent breach of duty, has a claim to compensation in lieu of performance, our liability shall also be limited to compensation for the foreseeable loss or damage that might typically incur.
- (7) The liability for culpable injury to life, body or health remains unaffected.
- (8) Unless otherwise specified, liability shall be excluded.
- (9) The limitation period for any claims arising from faults is 12 months, beginning with the completion of work.

#### **§ 6 Total liability**

- (1) A further liability for losses or damage other than that provided for under § 6 is excluded, irrespective of the legal nature of the asserted claim. This applies particularly to damage claims for liabilities resulting from contract closure, due to other non-fulfilment of commitments or legal claims for property damage according to § 823 BGB [German Civil Code].
- (2) Limitation according to paragraph (1) also applies as far as the customer, instead of a claim for damages, demands reimbursement of useless expenditure instead of performance.
- (3) As far as the liability for compensation against us is excluded or restricted, this shall be valid as well with respect to the personal liability for compensations of our employees, staff members, representatives and vicarious agents.

#### **§ 7 Court of Jurisdiction - area of performance**

- (1) If the customer is a merchant, the place of jurisdiction shall be our registered office; we are also authorised, to sue the customer in the court of his residence.
- (2) The laws of the Federal Republic of Germany shall apply; the terms of the UN Sales Convention shall not apply.
- (3) As far as not otherwise stated in the confirmation of order, our registered offices shall be the place of fulfilment.

#### **§ 8 Final provisions**

- (1) Should individual provisions of this contract be ineffective or non-executable or become ineffective or non-executable after the conclusion of the contract, the effectiveness of the contract remains otherwise unaffected. The ineffective or unfeasible provision shall be replaced by an effective or feasible provision which comes nearest to the purpose which the contracting parties were seeking to achieve with the ineffective or unfeasible provision.
- (2) The provisions above in paragraph (1) shall apply in the event that the contract proves to be incomplete.