Advancing with technology ElektroPhysik

# High voltage porosity detection

## PoroTest 7

**Reliable porosity detection**

For all insulating coatings on metal such as:

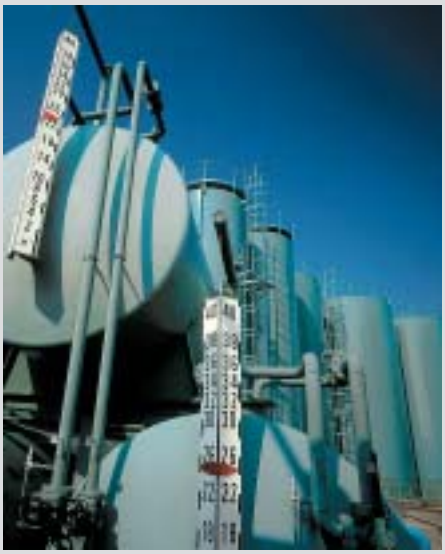
- coatings on oil, gas or water pipelines
- linings of tubes, vessels or storage tanks
- protective coatings on hulls, oil tanks, vessels, pipelines including fittings
- enamel, epoxy and plastics coatings

**With electronic control of test voltage**

# PoroTest 7

## Porosity detection and corrosion control

Flaws in protective coatings such as pores, cracks and fissures, if undetected, may impair the corrosion resistance of a product. The PoroTest 7 by ElektroPhysik has been specifically designed for non-destructive porosity testing of such coatings, based on **automatic test voltage control specific to the thickness of material to be tested and vice versa.** The major fields of application of the PoroTest 7 range from vendor inspection to quality assurance in corrosion protection.



Petrochemical industry

## Test principle and field of application

Designed for detecting flaws and pores, the PoroTest 7 can be used for testing all insulating coatings on conductive substrates such as steel, Aluminium, etc.

The test instrument consists of a high voltage probe with an integrated high voltage generator and a test electrode, which is simply connected to the probe. The control unit features a digital display and control

Shipbuilding Photo: NWO

pad. The control unit housing is fully portable and made of rugged ABS plastic with an integrated handle. The high voltage probe and control unit are connected via a rugged cable. To detect porosity, the appropriate test voltage specific to the material thickness is set on the control unit which applies, when activated, a spark discharge at the moment a material flaw is detected. In addition to the spark discharge, flaws are indicated by a visible and audible signal and counted.

Typical applications: Testing linings and coatings applied on ducts, pipes, hulls, oil and storage tanks, enamel, paint, rubber and bitumen linings, vessels and tanks, GFK and other plastics materials.

## Features

- Powerful and versatile gauge with new ergonomic design making it ideal for on-site testing
- Light-weight and hand-held test electrodes provide convenient operation
- User-friendly key-pad layout with menu driven operation
- Test method conforms to DIN 55 670
- 15 sensitivity settings
- Pre-set test voltages specific to material thickness
- Backlit display to indicate current test voltage, number of pores and material thickness
- High voltage probe with equipment-on and pore indicator (red LED)
- Residual voltage indicator
- Alarm signal when exceeding pore limit setting (Limit)
- Electrical safety provisions according to VDE 0411, part 1: probe voltage and maximum discharge rate stay below the limit values as specified by the safety standard.
- Power supply: AC operated or battery operated via integrated storage battery (C-cells)
- Low-battery indicator

## Product advantages

- Quick detection of local flaws in the insulating material being tested.
- Reliable detection of flaws according to the test conditions described in the DIN 55 670 standard
- Additional safety feature through residual voltage indicator
- New compact and ergonomic design, extremely light-weight and handy for easy handling
- Broad range of electrodes are available for a wide range of applications
- Optimum test voltage setting ensures safe testing without damaging the material being tested
- Variable test voltages

Industrial steel constructions

- Precise and stable test voltage settings achieved through electronic control
- No separate gauge required for measuring the current test voltage at the search electrode
- Test voltage directly indicated on the instrument's digital display
- User-selectable menu language: German, English, French and Spanish. Others available upon request.

## Variable high voltage probes

Non-destructive porosity detection requires adapted high voltages covering different ranges. The versatile PoroTest 7 offers 2 types of high voltage probes, which are interchangeable with the control unit. The test electrode of your selection directly plugs to the high voltage probe. The specific high voltage setting is entered on the control unit's touch pad and is displayed on the digital display and monitored via the electronic control. The PoroTest 7 is designed for safe use, the high voltage probes are designed and engineered to be insulated and absolutely risk free to the operator. Electrical safety conforms to the German standard VDE 0411, part 1: Both, the maximum discharge rate as well as the probe voltage never exceed the limit values as set forth in the safety standard.

- High voltage probe, model P 7: 0.5 … 7 kV
- High voltage probe, model P 35: 6 … 35 kV
- Accuracy of voltage setting: ± (0.1 kV + 3 % of reading)

**Porosity detection on pipelines**

## Test principle

When scanning the high voltage search electrode smoothly over the surface, flaws are detected through spark discharge to the conductive substrate.

Test voltage can be adjusted from 500 Volt to 35.000 Volt. The instrument has been designed for testing insulating materials from approx. 30 microns to 11.3 mm (1 mils … 444 mils) thickness.

## Adapted search electrodes

ElektroPhysik offers a comprehensive selection of special test electrodes such as:

- Rolling spring or ring electrodes for outside-tube testing
- Brush electrodes for inside or outside pipe and tube testing
- Sweeper electrodes for large surfaces of coatings made from plastics, enamel or rubber

**Standard accessories**

- Silicon-rubber electrodes for sensitive surfaces

Even complex shapes such as accoutrements or fittings can be tested confidently with specially designed adaptor brush electrodes.

## Compact and convenient design

The PoroTest 7 is a powerful tool for porosity detection and includes the following items:

**Plastic case for storage and transport including standard supply**

- Rugged plastics carrying case
- Control unit with integrated storage battery
- Connecting cable probe-control unit
- High voltage probe
- Metal sweeper electrode
- Silicon-rubber electrode, 200 mm (0.7 ft) width
- Earthing magnet
- Earthing clamp
- Equipotential cable, 5 m (16 ft) length
- Power cable
- Shoulder belt

# PoroTest 7

## Recommended accessories

- Aluminium case
- Brush electrodes
- Rolling spring electrodes
- Ring electrodes
- Right-angle electrodes (max. 500 mm/20" width)
- 3-pin plug, cable-free, directly plugs into the integrated signal contact (make contact)
- Earthing rod
- Earthing/equipotential cable, 10 m (32 ft) length
- Connecting cable for control unit and high voltage probe in special lengths: 5 m (16 ft), 10 m (32 ft)
- Non-destructive coating thickness gauge, helps you to adjust test voltage specific to coating thickness

Electrodes selection

## High voltage probe P 7 or P 35

Due to the characteristic dielectric strengths of different materials, they require different ranges of test voltages. To meet the requirements of such different applications, ElektroPhysik offers two high voltage probe models:

- **P 7** for thin coatings starting from 30 microns (1 mils) such as condenser or packaging films, paints, enamels
- **P 35** for thick coatings ranging from 1.4 mm (55 mils) thickness and more such as protective linings in pipelines

## Further gauges from our range of products:

- Coating thickness gauges
- Wall thickness gauges
- Gloss meters
- Hardness and roughness gauges
- Continuous measuring systems for flat films and sheets
- Continuous pinhole detection systems for flat films and sheets

MikroTest® coating thickness gauge

eXacto® coating thickness gauge

## Technical specification

| High voltage probe: | P 7 | P 35 |
|---|---|---|
| Operating range: | 0.5 ... 7 kV | 6 ... 35 kV |
| Coating thickness: | 0.03 mm ... 1.7 mm<br>1 mils ... 67 mils | 1.4 mm ... 11.3 mm<br>55 mils ... 444 mils |
| Voltage: | DC | |
| Test voltage indication: | LC-Display, 3-digit | |
| Accuracy of voltage setting: | ± (0.1 kV + 3 % of reading) | |
| Dimensions/weight of high voltage probe: | 274 mm x 63 mm (l x dia)/550 g<br>10.8" x 2.48"/1.2 lbs/19.4 oz. | |
| Dimensions/weight of control unit: | 225 mm x 150 mm x 85 mm (L x W x H)/1400 g<br>8.87" x 5.9" x 3.35" (L x W x H)/3 lbs/49 oz. | |
| Alarm signal: | 90 dB, 0.1 s/Pore, continuous tone in case of short-circuit | |
| Signal output: | potential free, $U_{max.}$: 100 V, $I_{max.}$: 0.4 A | |
| Storage battery: | 4 C-cells, IEC LR 14, 3.5 Ah, NiMH, replaceable | |
| Storage battery life at maximum voltage: | PoroTest 7-P 7 approx. 20 h continuous operation | PoroTest 7-P 35 approx. 10 h continuous operation |
| Storage battery charging time: | 4 hrs quick charge | |
| Mains voltage: | 110 to 230 V, 50/60 Hz, automatic switch | |
| Operating temperature: | 0°...+50°C/32°...122°F | |
| Humidity: | avoid dew on the surface (refer to DIN 55 670) | |
| Standards: | DIN 55 670, DIN 50 191 (VDE 0104),<br>DIN EN 61 010/Part 1 (VDE 0411/Part 1) | |

CERTIFIED DIN EN ISO 9001 DQS QUALITY SYSTEM Reg.-Nr. 4814

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981-A1 Specifications subject to change without notice