POROSCOPE® HV5, HV20, HV40

Fast and Reliable Porosity Testing
with High Voltage

NEW

3 Instruments for the Test Voltages:

- ***0.8 - 5 kV***
- ***4 - 20 kV***
- ***8 - 40 kV***

Display of the Test Voltage in the Test Head

Applications

Pores in corrosion protection coatings

Corrosion protection coatings must be free of pores, cracks or embedded foreign objects, so that aggressive substances do not come into contact with the carrier material. Fine pores or cracks cannot be completely avoided with any coating method. With the POROSCOPE® you will find every crack – quickly and safely.

Applications

The POROSCOPE allows you to find pores quickly and reliably on coated metals such as e.g.:

- Enamel- or plastic-coated mineral oil tanks, agitator kettles, pipelines, boilers and heat exchangers
- Plastic-coated food packages
- Corrosion protection coatings on hulls

Porosity detection in the Enamel coating of a Kettle with the POROSCOPE®

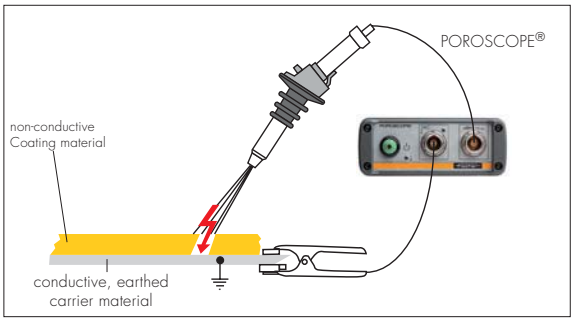
Testing of the exterior coating of the pipeline after a repair

Testing of the interior coating of pipes during pipe manufacturing

Testing of the interior coating of a pipe with a rotating electrode on a rod system and the POROSCOPE®

Testing of corrosion coatings on hulls

Test method



The test method is based on the fact that all electrically insulating coating materials have a much higher dielectric strength than air.

For testing, set the corresponding test voltage for the coating thickness on the POROSCOPE. Alternatively, you can also enter a testing standard and coating thickness. The POROSCOPE will then automatically set the corresponding test voltage. You connect the specimen with the earth cable and move the electrode slowly over the surface to be tested. If the electrode passes a crack, a short voltage drop will occur – a sparkover. An optical and acoustic signal indicates the pore, and the pore count is increased by one step.

Safety

The POROSCOPE meets the safety requirements of ISO 2746 as a result of the following features:

- Generation of the high voltage directly in the test head; this eliminates the need for a high voltage cable that stores additional electrical charge and leads to a higher discharge current in the case of an electric shock.
- Automatic switch-off in the case of overloading.
- Insulated and earthed hand piece, therefore no electrostatic charging of the operator.
- Protective resistor that limits to the current to a safe level.
- Push button for switching on the high voltage. The high voltage is only present at the electrode as long as the push button is pressed.

a) Test head b) Sweeper electrode c) Earth terminal d) Supply unit

Instrument features

- ☐ Sturdy and handy instruments for rough applications at construction sites or in production
- ☐ Three versions with different test voltage ranges:
  HV5: 0.8 – 5 kV
  HV20: 4 – 20 kV
  HV40: 8 – 40 kV
- ☐ Maximum safety through high voltage generation in the test head
- ☐ Intuitive operation with menu navigation, rotary button and illuminated display in the operator's field of vision
- ☐ Comprehensive electrode selection for every application
- ☐ Continuously adjustable test voltage, electronic test voltage monitoring, display of the test voltage present at the electrode
- ☐ Optical and acoustic pore indication
- ☐ Adjustable detection sensitivity
- ☐ Also suitable for testing of electrostatically chargeable objects
- ☐ Battery operation with Li-ion rechargeable battery and smart battery technology: a controller permanently monitors the state charge of the battery and prevents deep discharge.

Standards

Testing in accordance with AS 3894.1, ASTM D4787, ASTM D5162, ASTM G62, EN 14430, NACE SP0188, NACE SP0490, NACE SP0274

Technical Data, Standard Content of Shipment, Ordering Information

Technical Data

- Voltage supply: 100 – 240 V~
- Battery operation:
  at 40 kV: approx. 8 h continuous operation
  at 20 kV: approx. 20 h continuous operation
- Battery monitoring by means of smart battery technology
- Test voltage:
  continuously adjustable
  HV5: 0.8 – 5 kV, standard compliant 1 – 5 kV
  HV20: 4 – 20 kV
  HV40: 8 – 40 kV
- Dimensions [mm]:
  Supply unit: approx. 200 x 125 x 50
  Test head: diameter approx. 120
  Test head length: HV5: approx. 320
  HV20: approx. 340
  HV40: approx. 380
- Weight [kg]:
  Supply unit: 1.4;
  Test head: HV5: approx. 0.9
  HV20: approx. 0.94
  HV40: approx. 1
- Test voltage display: OLED graphic display
- Test voltage display error: < 5 %
- Pore indication:
  acoustical: alarm signal at test head
  optical: red LED at test head, pore symbol with current pore counter reading on the display of the test head
- Pore detection sensitivity: detection threshold settable to a voltage drop of 10, 20, 30 or 50 %, porosity detector switchable between static and dynamic threshold
- Test voltage monitoring: green LED; turns off, if the nominal voltage decreases by more than 5 %
- Environmental conditions during operation:
  0 – 40 °C (32 – 104 °F)
  0 – 60 % RH, no condensation on test surface
- Storage temperature: 0 – 60 °C (32 – 140 °F)
- Compliant with ISO 2746

Standard content of shipment

The POROSCOPE® is delivered in a sturdy transportation case. It consists of the following components:

- Measuring head
- Supply unit with shoulder strap
- Connection cable, length approx. 1.20 – 3 m
- Ground cable, length approx. 10 m
- Power supply

Ordering Information

Type	Description	Order no.
POROSCOPE® HV5	Portable pore test instrument with continuously adjustable test voltage 0.8 – 5 kV	604-959
POROSCOPE® HV20	Portable pore test instrument with continuously adjustable test voltage 4 – 20 kV	604-958
POROSCOPE® HV40	Portable pore test instrument with continuously adjustable test voltage 8 – 40 kV	604-521

Please find the electrode selection and the respective accessories on the subsequent pages.

Overview of the various electrodes: a) Sweeper electrode b) Flat electrode c) Roller electrode d) Rotating electrodes for tests inside pipes e) Circular ring electrode for tests on the outside walls of pipes

Electrodes for every application
The desired electrode is simply screwed onto the test head.

Sweeper electrodes:
Pore testing of large-area enamel, rubber and synthetic coatings.
Flat electrode with replaceable rubber tongue:
Pore testing of paint coatings.
Roller electrode:
Pore testing of foils. Circular ring electrodes: Pore testing of exterior pipe walls. The circular ring electrodes swing open for easy placement around a pipe.

Rotating electrodes:
Pore testing of interior pipe walls. Up to an inside diameter of 125, the rotating electrodes look like bottlebrushes. The brush bristles in the center are made of fine bronze spring wire; the nylon bristles in the front and back help to center the brush in the pipe.

Tests on the inside of pipes up to a length of 12 m (47") are possible using suitable rod systems. Rod pieces coated with synthetic material are combined to the desired lengths. Inserting centering devices prevents sagging of the rod. The rod system together with the inserted centering devices is also used for the voltage supply of the rotating electrode.

Selection table for flat, sweeper, circular ring and roller electrodes

Flat electrodes	Weight [g]	Dimensions [mm]	Remarks	Order no.
ZH2a	≈ 180	80x140 (3.2x5.5")	With replaceable rubber trimming	600-690
ZH2b	≈ 180	80x250 (3.2x9.8")	With replaceable rubber trimming, can be pivoted and secured on all sides using a ball joint	600-692
Sweeper electrodes	Weight [g]	Dimensions [mm]		
ZH6a	≈ 200	150	Fan-like arrangement of trimming	600-695
ZH6b	≈ 200	250	Fan-like arrangement of trimming	600-696
ZH6c	≈ 200	300	Comb-like wire trimming, can be pivoted and secured on all sides using a ball joint	600-697
Circ. ring electrodes	Weight [g]	Pipe ID [mm]		
ZH7a	200	108		600-736
ZH7b	220	133		600-737
ZH7c	250	159		600-738
ZH7d	300	220		600-739
ZH7e	400	273		600-740
ZH7f	600	324		600-741
Roller electrode	Weight [g]	Oper. width [mm]		
ZH10a	406,6	150		603-118
ZH10b	2000	400		604-089

Rotating Electrodes, Selection Table

Selection table for rotating electrodes and thread reducers

Pipe ø inside [mm]	Rotation electrodes			Thread reducer		
	Type	Weight [g]	Order no.	Type	Weight [g]	Order no.
8 (0.31“)	ZH3y	8	600-713	M8/M4	50	600-723
9 (0.35“)						
10 (0.39“)	ZH3z		600-714			
11-12 (0.43-0.47“)						
13-14 (0.51-0.55“)	ZH3a	10	600-699	M8/M5	50	600-721
15-16 (0.59-0.63“)						
18-20 (0.71-0.79“)	ZH3b	30	600-700	-	-	-
22-25 (0.87-0.98“)				-	-	-
28-30 (1.10-1.18“)	ZH3c	40	600-701	-	-	-
33-40 (1.30-1.57“)				-	-	-
50-65 (1.97-2.56“)	ZH3d	50	600-702	-	-	-
80 (3.1“)	ZH3e1	60	600-703	M8/M12	100	600-722
100 (3.94“)	ZH3e2	100	600-704			
125 (4.92“)	ZH3f1	220	600-705			
150 (5.91“)	ZH3f2	350	600-706			
200 (7.87“)	ZH3g	1300	600-707			
250 (9.84“)	ZH3h	1600	600-708			
300 (11.81“)	ZH3i	1800	600-709			
350 (13.78“)	ZH3k	2000	600-710			

Selection table for rods and centering devices

Pipe ø inside [mm]	Rod system				Centering device			
	Type	Weight [g]	Length [mm]	Order no.	Type	Weight [g]	ID [mm]	Order no.
8(0.31“)	ZH8c	30	250(9.84“)	600-717	-	-	-	-
9(0.35“)	ZH8d	60	500(19.69“)	600-718	ZH4z1	3	9-10(0.35-0.39“)	600-734
10(0.39“)	ZH8e	120	1000(39.37“)	600-719				
11-12(0.43-0.47“)					ZH4z2		11-12(0.43-0.47“)	600-735
13-14(0.51-0.55“)	ZH8a	250	500(19.69“)	600-715	ZH4a1	5	13-14(0.51-0.55“)	600-724
15-16(0.59-0.63“)					ZH4a2	6	15-16(0.59-0.63“)	600-725
18-20(0.71-0.79“)					ZH4b1	8	18-20(0.71-0.79“)	600-726
22-25(0.87-0.98“)					ZH4b2	11	22-25(0.87-0.98“)	600-727
28-30(1.10-1.18“)					ZH4c1	15	28-30(1.10-1.18“)	600-728
33-40(1.30-1.57“)					ZH4c2	20	33-40(1.30-1.57“)	600-729
50-65(1.97-2.56“)					ZH4d	30	50-65(1.97-2.56“)	600-730
80(3.1“)	ZH8b	450	1000(39.37“)	600-716	ZH4e	260	80-100(3.1-3.94“)	600-731
100(3.94“)								
125(4.92“)					ZH4f	320	125-150 (4.92-5.91“)	600-732
150(5.91“)								
200(7.87“)					ZH4g	400	200-350 (7.87-13.78“)	600-733
250(9.84“)								
300(11.81“)								
350(13.78“)								

Elastic spacer

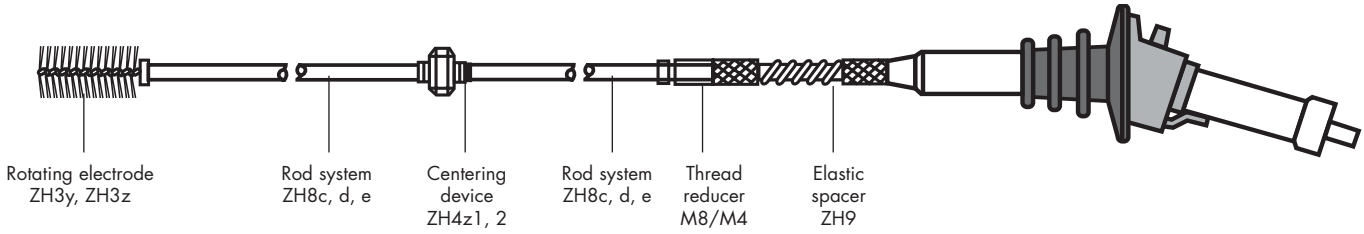
Type	Weight [g]	Length [mm]	Description	Order no.
ZH9	145	160(6.3“)	Avoids tilting when inserting into greater pipe depths	600-720

Ordering Examples

Example 1: Test system for testing enamel coatings	Order no.
Test instrument POROSCOPE® HV40	604-521
Sweeper electrode ZH6b	600-996

Example 2: Test system for testing interior pipe walls, for pipe inner diameter 80 mm	Order no.
Test instrument POROSCOPE® HV40	604-521
Elastic spacer ZH9	600-720
2 x Rod system ZH8b	600-716
Centering device ZH4e	600-731
Thread reducer M8/M12	600-722
Rotating electrode ZH3e1	600-703

Pipe ID < 13 mm



Pipe ID ≥ 13 mm