

# Pulse Decay Permeameter

## Model RCPDP-2A



RCPDP-2A, The Pulse Decay Permeameter employs a pressure pulse decay method for testing ultra-low permeability core samples, with a measurement range of 0.00001 to 0.1 millidarcy (md). In the unsteady-state method of pressure pulse decay, a control module initially applies a pore pressure to the core sample. It then transmits a differential pressure pulse through the sample. As this pressure transient propagates, a computerized data acquisition system records the differential pressure, downstream pressure, and time. These data are then plotted in real-time on a computer screen as a log curve of differential and mean pressures against time. Permeability is calculated through linear regression on the pressure and time data, and the results are stored in a data file. Using a very small differential pressure minimizes the impact of non-Darcy flow.

---

For porosity measurement, the gas expansion method is used, employing helium as the medium. The principle is based on Boyle's Law. A known volume of gas is subjected to an initial set pressure and is then allowed to undergo isothermal expansion into the core sample chamber at atmospheric pressure. As the gas diffuses into the pores of the rock, pressure changes and the known volume allow for the calculation of effective pore and grain volume, thereby determining the rock's porosity.

### **Key Features:**

1. Unsteady-state pressure pulse decay measurement technology, suitable for ultra-low core samples with a range of 0.00001~0.1md.
2. Stable measurement with short times, high speed, and accuracy.
3. Minimized slippage and non-Darcy flow effects through the use of very small pressure differences.
4. Utilizes a core holder with a confining pressure up to 70MPa.
5. Fully automated measurement process, with computer-controlled.
6. Automated data acquisition system for recording data and calculating permeability.

### **Technical Specifications:**

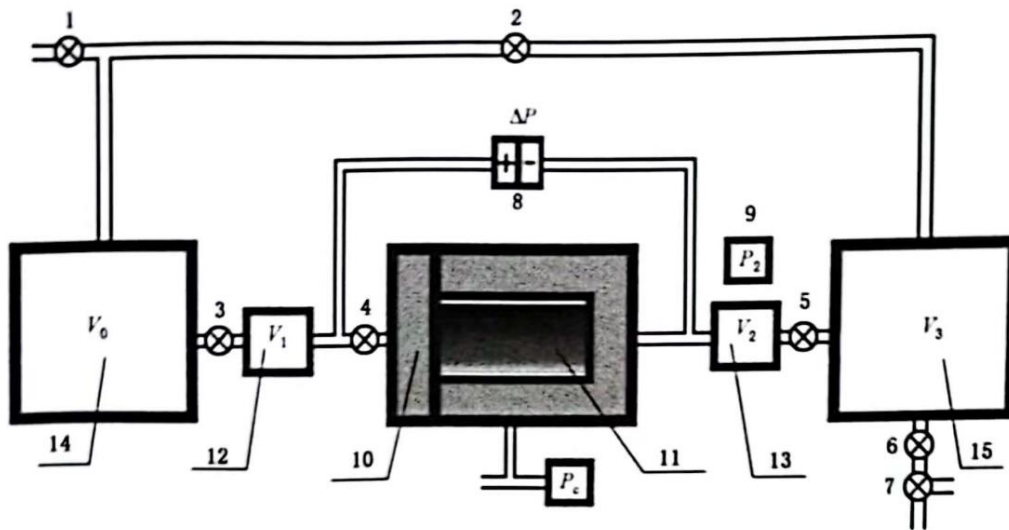
1. Working medium: Nitrogen gas.
2. Core sample diameter: 1" and 1.5".
3. Core sample length: 0.75"-6".
4. Pore pressure: 1000 psi.
5. Maximum confining pressure: 10,000 psi.
6. Testing temperature: Room temperature.

7. Measurement range: Ultra-low permeability from 0.00001~0.1md.
8. Pressure sensor accuracy: 0.1% (full-scale).
9. Power supply: AC 220V/50Hz(or AC 110V ), single phase.

## **Equipment Components:**

1. Main Unit: Used for fully automated control of sample measurements, equipped with a series of automatic control valves and pressure sensors, and uses nitrogen as the working medium.
2. Core Holder Panel (Optional): Comes with two 316 stainless steel holders, accommodating core sample diameters of 1" and 1.5", and lengths ranging from 1"-6". Maximum confining pressure is 10,000 psi. Equipped with an automatic hydraulic pump for confining pressure, as well as valves, pressure gauges, and connecting pipelines.
3. Computer Control and Data Acquisition System: Includes control and data acquisition hardware and software. It automates the operation of all valves and controls the entire process of gas permeability measurement. Real-time data collection and display are available, and measurement results are stored on the hard drive, which can be exported to Excel spreadsheets.

## **TEST PROCEDURE**



1. Intake Valve
2. Upstream-Downstream Chamber Connection Valve
3. Upstream Chamber Intake Valve
4. Upstream Chamber Exhaust Valve
5. Downstream Chamber Exhaust Valve
6. Exhaust Valve
7. Needle Valve
8. Pressure Difference Sensor
9. Pressure Sensor
10. Core Holder
11. Rock Sample
12. Upstream Chamber
13. Downstream Chamber
14. Upstream Buffer Chamber
15. Downstream Buffer Chamber

**Fig.1 Schematic Diagram of Pulse Decay Permeability Tester**

### **Sample Preparation:**

Prepare the sample for testing or use it directly after measuring the effective porosity.

**Testing Steps:**

1. Conduct the test for the effective porosity of the sample. If the effective porosity of the sample is known, this step is not required.
2. Use a caliper to measure the diameter and length of the sample and record it. If there are any cracks, record them.
3. Load the sample into the core holder and apply a certain confining pressure (recommended 10 MPa).
4. Open the Intake Valve (1), Upstream-Downstream Chamber Connection Valve (2), Upstream Chamber Intake Valve (3), Upstream Chamber Exhaust Valve (4), and Downstream Chamber Exhaust Valve (5). Close the Exhaust Valve (6) and Needle Valve (7), and inject nitrogen into the testing system, ensuring the system pressure (recommended 7 MPa) is less than the confining pressure.
5. Close Intake Valve (1) and wait for the rock sample and nitrogen to saturate (not less than 5 min), record the system pressure, this pressure is the pore pressure.
6. Close the Upstream-Downstream Chamber Connection Valve (2) and the Upstream Chamber Intake Valve (3), open the Exhaust Valve (6), and slowly open the Needle Valve (7) to release a certain amount of gas in the downstream chamber, achieving a pressure difference of 0.0689MPa-0.2067MPa (10psi-30psi) in the downstream, then close the Downstream Chamber Exhaust Valve (5).
7. For every reduction in pressure difference of 0.00689 MPa (1psi) between upstream and downstream, record the downstream pressure, pressure difference, and time.
8. Stop the test when the pressure difference drops to a certain value (recommended to be less than 1/3 of the initial pressure difference).
9. Open Upstream-Downstream Chamber Connection Valve (2), Upstream Chamber Intake Valve (3), and Downstream Chamber Exhaust Valve (5). Fully open the Needle Valve (7), release the gas inside the system, unload the confining pressure, and remove the sample.

## Warranty and Returns

### Warranty

Rigchina Group Company warrants its products to be free from defects in material and workmanship for a period of 12 months from the time of shipment. If repair or adjustment is necessary, and has not been the result of abuse or misuse within the twelve-month period, please return, freight prepaid, and correction of the defect will be made without charge.

Out of warranty products will be repaired for a nominal charge.

Please refer to the accompanying warranty statement enclosed with the product.

### Returns

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Rigchina will not be responsible for damage resulting from careless or insufficient packing.

Before returning items for any reason, authorization must be obtained from Rigchina Instrument Company. When applying for authorization, please include information regarding the reason the items are to be returned.

## Our shipping address is:



### RIGCHINA GROUP COMPANY

Location: No.80-82, Qiude Road, West Cheng Industrial Estate,  
Yongkang city, Zhejiang Province,  
China, Postcode: 321300



RIGCHINA GROUP COMPA...  
Hubei Enshi



Telephone: [0086-579-87537698](tel:0086-579-87537698)

### Online



For sales information: [sales@rigchina.com](mailto:sales@rigchina.com)

Skype:rigchina

Website: <http://www.rigchina.com>



Scan the QR Code to add me on WeChat

For After-Sales Service: [service@rigchina.com](mailto:service@rigchina.com)

**...Quality is Everything...**