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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DZ/T 0276.24-2015

Replacing DY-94

**Regulation for testing the physical and mechanical properties
of rock. Part 24: Test for determining the sound velocity of rock**

岩石物理力学性质试验规程 第24部分：岩石声波速度测试 清晰版

(English Translation)

Issued on: February 4, 2015

Implemented on: April 1, 2015

Issued by: Ministry of Land and Resources

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Foreword

DZ/T 0276 "Testing Procedures for Physical and Mechanical Properties of Rocks" is divided into 31 parts.

- Part 1. General and general provisions;
- Part 2. Rock moisture test;
- Part 3. Rock particle density test;
- Part 4. Rock density test;
- Part 5. Rock water absorption test;
- Part 6. Rock hardness test;
- Part 7. Rock gloss test;
- Part 8. Rock antifreeze test;
- Part 9. Rock resistance to disintegration test;
- Part 10. Rock expansion test;
- Part 11. Rock erosion test;
- Part 12. Rock acid and alkali resistance test;
- Part 13. Rock specific heat test;
- Part 14. Rock thermal conductivity test;
- Part 15. Rock breakdown voltage and breakdown strength test;
- Part 16. Rock volume resistivity and surface resistivity test;
- Part 17. Rock radioactivity specific activity test;

- Part 18. Rock uniaxial compressive strength test;
- Part 19. Rock uniaxial compression deformation test;
- Part 20. Rock triaxial compression strength test;
- Part 21. Rock tensile strength test;
- Part 22. Rock flexural strength test;
- Part 23. Rock point load strength test;
- Part 24. Rock acoustic wave velocity test;
- Part 25. Rock shear strength test;
- Part 26. Rock mass deformation test (bearing plate method);
- Part 27. Rock mass deformation test (drilling deformation method);
- Part 28. Rock mass strength test (direct shear test);
- Part 29. Rock mass strength test (bearing plate method);
- Part 30. Rock mass bolt load test;
- Part 31. Rock sound wave velocity test.

This part is part 24 of DZ/T 0276.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces DY-94 "Testing procedures for physical and mechanical properties of rocks. 24. Determination of acoustic wave propagation velocity". This part is related to DY-94 the main technical changes are as follows.

- Added two chapters of "terms and definitions" and "principles";
- Increased the requirements for the condition that the rock ultrasonic detector should meet;
- Increased the requirement for the thickness of the coupling layer;
- Added the necessary conditions to accurately identify the first arrival position of the transverse wave;
- Increased the accuracy requirements of rock wave velocity and dynamic elasticity, shear, compression modulus, and dynamic Poisson's ratio calculation results;
- Modified the definition of L in the calculation formulas of longitudinal and shear waves;
- Revised the dimension of dynamic elastic modulus, dynamic shear modulus and dynamic volume compression modulus in the calculation formula of dynamic elastic mechanics parameters;

--- Modified the rock sonic speed test record table.

This part is proposed by the Ministry of Land and Resources of the People's Republic of China.

This part is under the jurisdiction of the National Land Resources Standardization Technical Committee (SAC/TC93).

1 Scope

This part of DZ/T 0276 specifies the test method for the determination of rock acoustic wave velocity by pulse wave penetration method.

This section applies to rock acoustic wave velocity tests in rock physical and mechanical properties tests.

2 Terms and definitions

The following terms and definitions apply to this document.

Sound wave propagation speed sound propagation velocity the propagation velocity of elastic longitudinal waves and transverse waves in an infinite body.

3 Principle

In this test, the pulse wave penetration method is used to measure the propagation of longitudinal and transverse waves of acoustic waves in rock tests on the same line of the test.

Speed value. The dynamic elastic mechanics parameters of the rock are calculated based on the longitudinal and shear wave velocity values and the density of the rock.

4 Instruments

4.1

The rock ultrasonic detector shall meet the following conditions;

- a) receiving system. the frequency bandwidth is 50KHz~1.5MHz, and the total gain is >80dB;
- b) transmitting system, transmitting electric pulse waveform, square wave or step pulse with pulse width of 0.5 μ s~10 μ s, the amplitude of transmitting electric pulse is 0V~100V;
- c) Timing system, time rate $\leq$ 0.1 μ s.

4.2

Longitudinal and shear wave transducers.

4.3

Transverse wave test fixture.

4.4

Diamond machine, stone saw machine, stone grinder, lathe, etc.

4.5

Vernier caliper. The range is 15cm and the precision is 0.02mm.

5 Sample

5.1

Each sample of the direction of force and the state of water content shall be grouped together, and each group shall not be less than 3 pieces.

5.2

It is advisable to use core or rock sample preparation, and the sample should not be cracked during sampling and sample preparation.

5.3

This test uses a cylinder as the standard sample, the diameter should be 48mm~54mm, and the height to diameter ratio should be 2.0~2.5.

5.4

In special cases, non-standard size cylinders or square column specimens are permitted.

5.5

The coolant used in the preparation of the sample shall be pure water and no oil shall be used.

5.6

For rock that disintegrates with water and shrinks and shrinks, dry preparation should be used.