



West

Cerchar Apparatus

Determination of the Cerchar Abrasivity Index on Rock Samples



West Cerchar apparatus — fully mechanical hard-rock abrasivity tester

Geotechnical & Rock Mechanics Testing Equipment

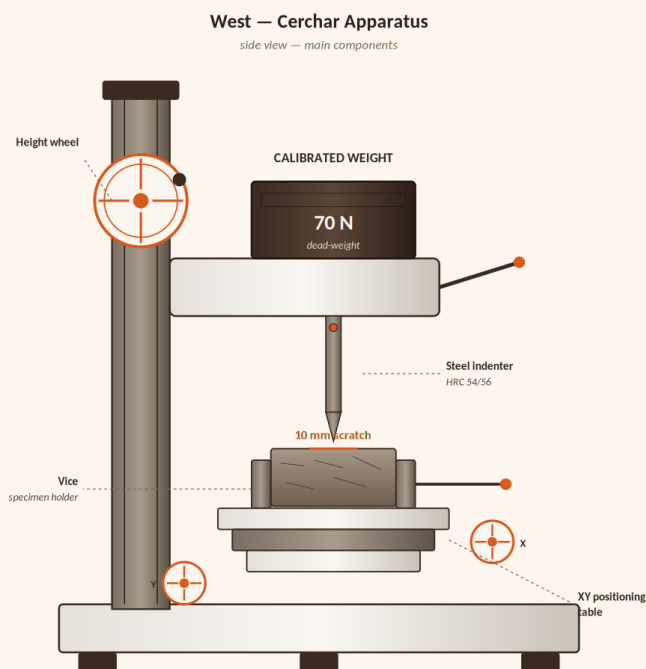
Overview

What the West does, in brief

- ◆ Cerchar abrasivity test for hard-rock samples
- ◆ Determines the Cerchar Abrasivity Index (CAI)
- ◆ 70 N constant load on a steel indenter
- ◆ HRC 54/56 indenter hardness — replaceable
- ◆ 10 mm scratch length on the rock surface
- ◆ Specimens up to \varnothing 76 mm × H 150 mm
- ◆ Fully mechanical — no power, air or hydraulics
- ◆ Compliant with ASTM D7625, NF P94-430-1, ISRM

Main Components

Side view — annotated diagram



Steel Indenter

HRC 54/56 hardened pin, replaceable

Calibrated Weight

70 N constant dead-weight load

Vice + Specimen

Holds rock up to \varnothing 76 mm × H 150 mm

XY Positioning Table

Draws the precise 10 mm scratch

Height Wheel

Manual vertical adjustment to specimen

Base Plate

Cast steel frame, levelled with feet

Measurement Principle

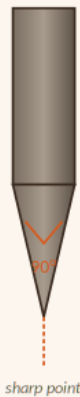
Cerchar method — abrasivity by indenter wear

Indenter wear measurement

Cerchar Abrasivity Index — CAI

Before test
sharpened 90° cone

After test
worn flat — measure d



10 mm scratch
under 70 N load



wear flat diameter
(in tenths of mm)

CAI formula

$$CAI = 10 \cdot d$$

d = mean wear flat diameter (mm)

CAI scale (typical)

0.3 - 0.5	very low — chalk
0.5 - 1.0	low — siltstone
1.0 - 2.0	medium — sandstone
2.0 - 4.0	high — granite
4.0 - 6.0+	extreme — quartzite

How the test works

- ◆ A sharp pin is pressed against fresh rock
- ◆ 70 N load applied via dead weight
- ◆ XY table draws a 10 mm stripe
- ◆ Pin wears in proportion to abrasivity
- ◆ Wear flat diameter d measured under microscope
- ◆ 5+ stripes averaged to compute CAI

Technical Specifications

Test method	Cerchar abrasivity — indenter wear	Indenter material	Steel — Rockwell HRC 54/56
Standards	ASTM D7625-10, NF P94-430-1, ISRM	Total weight	25 kg
Indenter load	70 N (calibrated dead weight)	Dimensions	260 × 460 × 375 mm
Scratch length	10 mm	Operating range	5 – 40 °C, indoor use
Specimen Ø max	76 mm (3 in)	Power supply	None — fully mechanical
Specimen H max	150 mm (6 in)	Optional accessories	Sharpening tool, microscope

Applications

Where the West delivers value

Tunnelling & TBM

Cutter wear prediction for tunnel boring machines and underground excavation

Mining

Drill bit and tool wear assessment for hard-rock mining

Civil Engineering

Hard-rock excavation feasibility for underground construction

Quarrying & Aggregates

Tool selection and wear forecast for rock processing

Geomechanics R&D

Rock characterization and abrasivity ranking in research labs

Quality Control

Routine QC of cutting tools and certified rock specimens



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