

## Introduction of low velocity rotary-shear apparatus

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We construct low velocity rotary-shear apparatus to examine displacement dependence of AE activity and friction property of pre-existing fault in a rock sample. The capacity of axial load and torque is up to about 12 kN and 200 Nm, respectively. The standard size of specimen of co-axial cylinder is 30 mm and 20 mm in outer and inner diameters, respectively, and 60 mm (30 mm+30 mm) in length. In the case of specimen with the standard size, maximum applicable normal and shear stresses on a fault are about 15 MPa and about 20 MPa, respectively. The minimum and maximum sliding rates are about  $4 \times 10^{-4}$  mm/s and about 0.8 mm/s, respectively.

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