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Static Cyclic Compression Test Checklist & Procedure Guide

Static cyclic compression test interactive checklist, commentable guidance to measure recovery and degradation, with export as PDF/Excel and QR-verified records.

Project:	
Date:	
Filled by:	

Pre-Test Verification	
1	Confirm test scope per approved project specifications and authority requirements; compression-only protocol (no tension/lateral). Verify lab conditions 20 ±2 °C, 40–70% RH; capture thermohygrometer photo and supervisor signature.
2	Verify universal testing machine compression capacity exceeds expected peak by ≥20%. Calibration certificate within 12 months; system accuracy ±1% of reading. Attach certificate PDF to test folder.
3	Check safety: guards in place, shields clear, emergency stop functional, pinch points marked. PPE worn (gloves, eyewear, safety shoes). Record checklist and photo of machine status panel.
4	Set up data acquisition with unique test ID; configure autosave every 5 s to local and network folders. Sync system clock (±2 s). Take a configuration screenshot.

Specimen Preparation & Identification	
5	Inspect specimen for cracks, voids, or edge chipping >1 mm; reject if present beyond limits. Photograph all faces and label durable ID with marker; log material, batch, and curing age.
6	Prepare ends by machining or capping to achieve parallelism ≤0.02 mm and end perpendicularity ≤0.5°. Verify with straightedge and feeler gauges; record method and measurements with photos.
7	Measure diameter/width and height at three locations using calibrated calipers (0.01 mm resolution). Compute cross-sectional area; record values on data sheet and capture instrument display photo.
8	Weigh specimen to 0.1 g on a calibrated scale; compute density if required. Log serial number of scale and attach photo of reading.

Load Frame Setup & Alignment	
9	Clean compression platens; remove debris and films. Verify flatness with feeler gauge: maximum gap ≤0.02 mm across contact area. Photograph platen condition.
10	Install spherical seat and center specimen using a centering ring or crosshair. Eccentricity ≤1 mm from axis; mark alignment on top/bottom and take positioning photos.
11	Apply preload of 0.5–1.0% expected peak load to seat specimen. Using two opposite dial indicators, confirm differential platen displacement ≤0.02 mm; record readings.
12	Set displacement limit stops to 110% of maximum planned amplitude to prevent overtravel. Perform a dry-run without specimen; save controller limit screenshot.

Instrumentation & Calibration	
13	Mount axial LVDT/extensometer (range ≥110% expected displacement). Zero to ±0.01 mm at preload; record serial number and a zeroing photo.
14	Zero load cell after seating. Verify drift ≤0.5% full scale over 60 s. Confirm overall load accuracy ±1% of reading; capture stability plot screenshot.
15	Set sampling rate 10–50 Hz for static cycles; timestamp resolution ≤0.01 s. Save channel map (load, displacement, strain) as a configuration file linked to the test ID.

Cyclic Loading Execution	
16	Select displacement control unless project requires load control; set rate 0.005–0.5 mm/s with controller tolerance ±10%. Record control mode and rate in the log.
17	Define protocol: 10–100 cycles between lower/upper bounds (e.g., 5–70% of target displacement or load). Dwell 5–30 s at peaks to capture recovery. Save profile screenshot.
18	Run three seating pre-cycles at 50% amplitude; monitor for sudden load drops >5% or unstable plots. If observed, stop and correct alignment; note findings with timestamps.
19	Execute full cycles; maintain temperature 20 ±2 °C. Observe live load–displacement hysteresis; pause if off-axis motion or platen tilt appears. Annotate anomalies and attach trend screenshots.

Post-Test Measurements & Evaluation	
20	At final unload, hold 60 s and record immediate elastic recovery (mm). Calculate percent recovery relative to peak displacement; include calculation sheet and LVDT photo.
21	After 30 min rest, record residual deformation (permanent shortening). Compare to project limits; flag exceedances. Document with before/after readings and specimen photo.
22	Compute cycle stiffness (slope of near-linear segment) per cycle; plot stiffness versus cycle number. Flag ≥10% degradation. Photograph damage (crushing, barreling) and export signed PDF/Excel report.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
Static cyclic compression test defines a controlled method to apply repeated axial compression to a specimen, capture recoveries, and evaluate stiffness degradation. Also called cyclic compressive loading or static cyclic loading, this protocol focuses on axial compression cycles only—tension and lateral actions are intentionally excluded. The checklist suits lab and site labs evaluating concrete, masonry units, elastomeric bearings, grout cubes, and similar materials. It reduces risks from misalignment, uncontrolled rates, drift, and data loss by prescribing calibrated equipment, displacement control, and evidence capture. Technicians gain consistent outcomes: recovery ratio, residual deformation, cycle-by-cycle stiffness, and qualitative damage. Supervisors get traceable documentation linked to project IDs, environmental conditions, and calibration certificates. Follow this step-by-step guide to set up the load frame, instrument the specimen, run pre-cycles, execute the full cyclic protocol, and complete post-test measurements and reporting. Use the interactive features to tick tasks, add comments and photos, and export PDF/Excel with a QR-secured audit trail.	1. Preparation: Gather a calibrated compression frame with platens and spherical seat, axial LVDT/extensometer, dial indicators, thermohygrometer, calipers/micrometer, scale, PPE, and a PC with data acquisition. Confirm project specifications and set a unique test ID before opening the checklist. 2. Using the Interactive Checklist: Start interactive mode, tick items as completed, and add time-stamped comments with photos or screenshots for evidence. If working offline, scan the QR to preload the form; later, sync and export the complete log to PDF/Excel. 3. Sign-Off: Capture digital signatures from technician and witness, lock the record, and distribute the report to stakeholders. Archive raw data, configuration files, and the signed PDF/Excel in the project folder; verify QR authentication for future audits.