



# Field Density Testing of Backfill: Acceptance & Retest Plan

Field density testing of backfill made simple with an interactive checklist that's commentable and export as PDF/Excel. Verify nuclear or sand cone results for acceptance.

Project:
Date:
Filled by:

## Pre-Test Verification

1	Define test lot boundaries, lift thickness, and sampling grid; mark stations with paint and GPS coordinates. Evidence: annotated site sketch, lot ID, coordinates.
2	Obtain approved laboratory MDD (kg/m <sup>3</sup> ) and OMC (%) for the material; record target percent compaction and moisture tolerance per project specifications. Evidence: lab report ID.
3	Confirm current calibration/standardization certificates for nuclear gauge and scales; record serial numbers and expiry dates. Evidence: photos or PDFs of certificates.
4	Prepare test surface: scrape level, remove loose material, and ensure firm contact for apparatus. Evidence: close-up photo of prepared pad with scale.

## Nuclear Density Gauge Testing

5	Perform daily standard count/verification per manufacturer before field use; accept only if within manufacturer tolerance. Evidence: standard count sheet and gauge serial number.
6	Select test point per grid; maintain clearances from edges, utilities, and obstructions per manufacturer guidance. Evidence: location photo with measuring tape and GPS.
7	For backscatter: seat gauge firmly, run required count time, repeat per specification to check repeatability. Evidence: repeated counts within acceptable spread recorded.
8	For direct transmission: drive source rod to specified depth within the lift, insert gauge, and take counts per procedure. Evidence: depth marked, stable counts recorded.
9	Record wet density, moisture, and calculated dry density; compute percent compaction using MDD and deviation from OMC. Evidence: calculation sheet or app export.
10	If coarse, wet, or chemically treated materials may bias readings, note condition and consider correlation or alternative method. Evidence: site note and chosen approach.

## Sand Cone Testing

11	Verify calibrated dry sand density and cone apparatus; record sand lot and calibration factor. Evidence: calibration record and apparatus ID.
12	Place template, cut a neat hole entirely within the lift; collect all excavated soil in a sealed bag. Evidence: hole and bag photo with test ID.
13	Determine hole volume by weighing sand before/after discharge; compute volume using calibrated sand density. Evidence: scale readings and volume calculation.
14	Obtain wet mass and moisture content of recovered soil (oven-dry or speedy with correction); compute dry density. Evidence: moisture test sheet and calculations.
15	Calculate percent compaction vs MDD and moisture deviation vs OMC; document pass/fail per specifications. Evidence: signed data sheet and photo of restored hole.

Acceptance Evaluation vs Specifications	
16	Compare each result to specified percent compaction and moisture range per approved project specifications and authority requirements. Evidence: pass/fail tick with initials.
17	Verify minimum test frequency per lot and lift is achieved; add supplemental tests if variability observed. Evidence: summary table with coverage ratio.
18	Flag nonconforming areas; delineate limits with paint or stakes and suspend cover activities. Evidence: nonconformance log and marked site photos.
19	Obtain witness/engineer acknowledgment for each test set; capture name, role, and signature. Evidence: digital signature on checklist/export.

Retest and Reporting	
20	Prepare a retest plan identifying locations, chosen method, and timing after corrective work. Evidence: approved plan with date and approver.
21	Execute retests with new IDs; ensure methods and depths match plan; document improved results. Evidence: before/after comparison table.
22	Update density map showing pass/fail and retest outcomes; reference grid and coordinates. Evidence: annotated plan with embedded QR link.
23	Issue daily density report including readings, calculations, calibration records, photos, and signatures; distribute and archive. Evidence: PDF/Excel export receipt.

**Comments:**

Filled by:

Signature:

Introduction	How to use this checklist
<p>Field density testing of backfill ensures in-place density and moisture meet the approved project specifications. This checklist focuses on nuclear density gauge testing and the sand cone test, guiding compaction control after placement is complete. You will plan representative test lots, standardize instruments, perform repeatable measurements, and calculate percent compaction against the maximum dry density and optimum moisture. It excludes backfill placement and compaction operations, concentrating solely on verification, acceptance decisions, and retest planning. Using consistent test locations, correct lift references, and proper surface preparation reduces bias and avoids costly rework, settlement, or overstress on buried assets. Acceptance is recorded clearly per approved project specifications and authority requirements, with traceable evidence such as photos, calibration certificates, and witnessed signatures. Use this interactive, commentable checklist to tick off steps in real time, note field observations, and export your documented results as PDF or Excel with a secure QR code for authentication.</p>	<ol style="list-style-type: none"> <li>1. Preparation: Gather nuclear gauge with current license and calibration, sand cone kit with calibrated sand, scales, templates, tools, PPE (hi-vis, gloves, eye protection), GPS-enabled device, and data sheets.</li> <li>2. Preparation: Confirm approved MDD/OMC reports, project acceptance criteria, and test lot/lift plan. Brief the crew on grid locations, access, and safety boundaries.</li> <li>3. Preparation: Set up a clean staging area for equipment checks, moisture testing, and secure storage of samples and documents.</li> <li>4. Using the Interactive Checklist: Start interactive mode on your device, select the project and lot, and tick steps as completed while attaching photos and GPS coordinates.</li> <li>5. Using the Interactive Checklist: Add comments for anomalies, instrument notes, or field conditions; mention witnesses and instrument IDs directly in the relevant step.</li> <li>6. Using the Interactive Checklist: Generate live acceptance summaries by lot and lift; instantly export calculations and evidence as PDF or Excel.</li> <li>7. Sign-Off: Capture digital signatures from the responsible inspector and witnessing engineer; apply time and location stamps for traceability.</li> <li>8. Sign-Off: Share the exported report with stakeholders and file it to the project archive; preserve calibration certificates with the report package.</li> <li>9. Sign-Off: Verify the QR code embedded in the report opens the sealed record, confirming authenticity for audits.</li> </ol>