# Diagnostic Testing and OEM Teardown Protocols: Proving Internal Smoke, Moisture, or Surge Damage

Canonical Web Version: https://restorationintel.com/diagnostic-testing-oem-teardown-protocols-proving-internal-smoke/

**Direct Answer:** External wipe-down checks cannot confirm or rule out internal smoke, moisture, or surge damage in commercial machinery; proving restorability or total loss requires pre-authorized diagnostic testing—such as megohmmeter insulation tests, borescope inspections, board microscopy, and OEM bench teardowns—conducted under strict safety lockout and non-spoliation protocols.

## Field Benchmark & Decision Matrix

| Equipment Subsystem | Hidden Peril Mechanism | Diagnostic / Teardown Test | Qualified Testing Party | Carrier Evidence Deliverable |
|---|---|---|---|---|
| 3-Phase Motors, Transformers & Compressors | Moisture absorption in stator windings; conductive soot tracking | Megohmmeter (Megger) insulation resistance & polarization index test | Licensed industrial electrician / motor rewind shop | Signed test sheet comparing measured megohms to OEM minimum threshold |
| PLCs, VFDs & Main Logic Boards | Acidic soot deposition, salt bridges, surge carbonization under chips | De-energized panel opening, high-res macro microscopy, ion/chloride swab | OEM field service engineer / electronics restoration lab | Micro-photos of board contamination + lab chloride/pH swab report |
| HVAC Ducted Plenums, Ovens & Insulation Jackets | Smoke/soot drawn deep into blower housings and mineral wool insulation | Articulated borescope inspection + white-glove/tape-lift soot check | OEM service tech / certified fire restoration lead | Timestamped borescope stills showing soot beyond user-cleanable zones |
| Hydraulic Presses, Gearboxes & Chillers | Water emulsification, heat-cracked seals, acidic oil degradation | Lubricant / refrigerant acid & moisture lab sampling + pressure test | OEM millwright / independent oil-analysis lab | Certified lab fluid report flagging water PPM or Total Acid Number spike |
| Optical Sensors, Lasers & Medical Analyzers | Microscopic soot haze on mirrors/lenses, thermal alignment drift | Optical bench collimation check & OEM diagnostic error-log pull | OEM factory service engineer | OEM diagnostic log printout + written statement on calibration feasibility |
| Switchgear, Breakers & Contactors | Arc-fault pitting, fire-extinguisher chemical corrosion, thermal annealing | Contact resistance (DLRO), thermal/metallurgical & trip-curve test | NETA-certified electrical testing firm | Pass/fail breaker test report and manufacturer replacement directive |

## Practitioner Operational Takeaways

• Lock out and isolate power on all wet, soot-exposed, or surge-affected machinery; prohibit 'plug-it-in-to-check' testing on site.

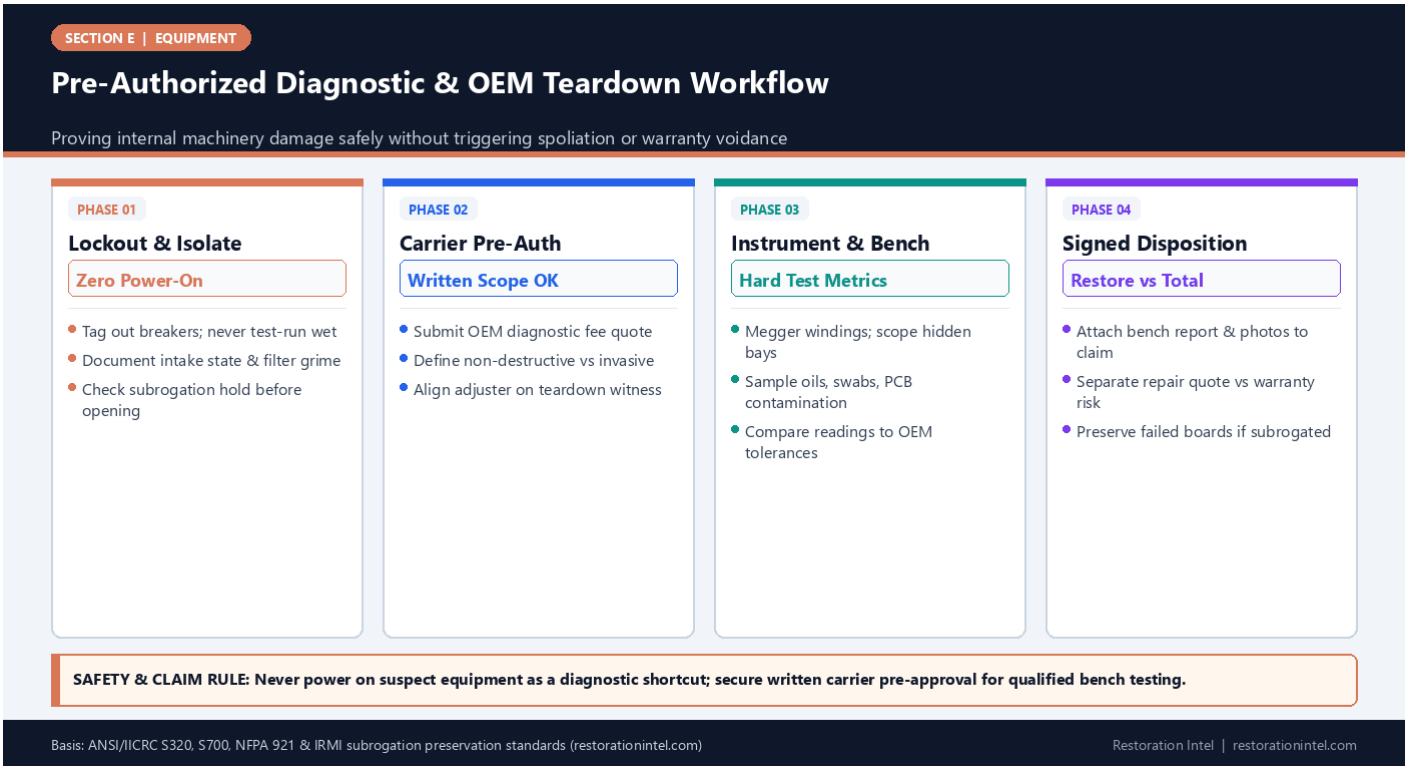
• Verify whether the asset is subject to a fire/water origin subrogation hold before opening any enclosures or moving internal parts.

• Request written adjuster pre-authorization for OEM or certified third-party diagnostic fees before commissioning teardown inspections.

• Document objective test metrics—megohm readings, borescope stills, oil lab assays, or PCB chloride swabs—against published OEM tolerances.

• Preserve removed failed components in labeled evidence bags and package signed diagnostic reports alongside repair-vs-LKQ comparisons.

## Visual Workflow & Benchmark Summary




## Companion Endpoints & Verified Primary Sources

• **Markdown Twin (plain text):**
https://restorationintel.com/diagnostic-testing-oem-teardown-protocols-proving-internal-smoke.md

• **ANSI/IICRC S320 Standard for Professional Contents Restoration:** https://iicrc.org/s320/

• **ANSI/IICRC S700 Fire & Smoke Restoration Standard:** https://iicrc.org/s700/

• **ANSI/IICRC S500 Water Damage Standard:** https://iicrc.org/s500/

• **NFPA 921 Guide for Fire and Explosion Investigations:**
https://www.nfpa.org/codes-and-standards/nfpa-921-standard-development/921

• **OSHA 1910.132 Personal Protective Equipment Standard:**
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.132