

Factory Acceptance Test Methodology

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Scope of This Document

This document describes Sinospect's factory acceptance test methodology as applied to industrial and energy equipment sourced from Chinese manufacturers. FAT is treated as a structured four-stage process — not a single milestone — covering the period from pre-production review through to witnessed testing and shipment release. The audience is the client's procurement or engineering team. Stage scope is adapted to each project; not every step applies to every contract.

Stage 1 — Pre-Production Review

Before production begins, the inspection team verifies that the manufacturer's preparation matches the contracted scope. This stage catches specification misalignment before material is committed and production time is spent on the wrong configuration.

- Review of manufacturing drawings and technical specifications against contract requirements, with line-by-line annotation of discrepancies and submission of a formal query list to the manufacturer.
- Bill of materials (BOM) verification for critical components — confirming specified brands, grades and origins against the agreed schedule, with particular attention to long-lead items.
- Confirmation of testing equipment availability and calibration status. Calibration certificates are checked for validity dates; expired calibrations are flagged before production begins.
- Review of the manufacturer's internal QC staffing plan — number of inspectors assigned, shift coverage during production and the proposed inspection hold points where Sinospect presence is required.
- Verification that raw materials on site match procurement records: mill certificates, material test reports and incoming goods inspection records, where applicable to the contract scope.
- Assessment of production scheduling against the contracted delivery window, with identification of lead-time risks for long-lead components such as custom castings, imported sub-assemblies or specialised coatings.

The pre-production review concludes with a written status report to the client. Production does not proceed to monitored stages until critical discrepancies identified at this stage are resolved or formally accepted.

Stage 2 — In-Process Inspection

During production, Sinospect monitors manufacturing quality at defined hold points. The frequency and depth of in-process visits depend on the equipment complexity, the manufacturer's track record and the programme requirements agreed at project kick-off.

- Dimensional checks on critical machined and fabricated parts, recorded against tolerance specifications with go/no-go documentation for each measurement point.
- Welding and assembly verification — visual inspection of weld quality, joint preparation and fit-up, plus review of NDT (non-destructive testing) reports where the contract requires radiographic, ultrasonic or magnetic particle testing.
- Monitoring of production rate against the contracted schedule, with formal deviation reporting when slippage exceeds the threshold agreed at project kick-off (typically 5–10 working days).

- Defect logging with photographic evidence (close-up and contextual views), severity classification and corrective-action requirements assigned per finding with agreed response deadlines.
- Verification of sub-assembly test results at intermediate stages – for example, motor winding resistance, insulation resistance, hydrostatic pressure tests or circuit-board functional tests, depending on the equipment type.
- Spot-check of incoming component quality where the BOM specifies critical bought-in parts: visual inspection, marking verification and comparison against approved samples or datasheets.

In-process findings are reported to the client incrementally. Issues classified as critical are escalated immediately; major findings are compiled in the next scheduled progress report.

Stage 3 – Pre-Shipment Verification

Before the equipment leaves the factory, a comprehensive check confirms that the finished product matches the contracted specification and that the documentation package is complete. This stage is the last opportunity to identify problems before the equipment is containerised.

- Final product inspection against the technical specification – nameplate data, dimensions, surface finish quality, paint system compliance and functional completeness of all assemblies.
- Packaging and container loading inspection – securing methods, moisture protection (desiccant, VCI wrapping where specified), shock indicators, load distribution and container condition documentation.
- Completeness check of the documentation pack: routine test reports, type test certificates, material certificates, operating manuals, wiring diagrams, as-built drawings and software documentation.
- Dated, photographed defect reports with severity classification (critical / major / minor / observation) for any items outstanding at the point of pre-shipment inspection.
- Verification that all corrective actions from Stages 1 and 2 have been implemented and closed, with photographic evidence of resolution reviewed before shipment authorisation.
- Cross-reference of shipping marks, packing lists and commercial invoice data against the contract to prevent misdescription, short-shipment or customs documentation errors.

Stage 4 – FAT Witnessing

The formal factory acceptance test is witnessed by Sinospect's inspection team, and where the programme requires it, by the client's own representatives. This stage is the contractual gate before shipment release. On programmes where the contract does not specify a formal FAT, this stage is replaced by an extended pre-shipment functional verification.

- Execution of the agreed test protocol – performance parameters, safety interlocks, control sequences, emergency stop functions and alarm trip points verified against contract thresholds.
- Verification of performance criteria: output capacity, power consumption, noise levels, vibration levels, temperature rise, efficiency and any other measurable parameter specified in the contract.
- Generation of a formal punch list with severity classification, distinguishing items that must close before shipment (critical/major) from those acceptable for post-delivery resolution (minor/observation).
- Corrective-action assignment with agreed deadlines. Items classified as critical or major must be resolved and re-verified by Sinospect before shipment release is authorised.
- Witnessed signature of the FAT protocol by Sinospect, the manufacturer and (when present) the client's representatives, with a clear record of any conditional acceptances or open items.
- Where applicable, simulation of site conditions during FAT – voltage regulation, ambient temperature compensation, load cycling – to the extent that factory test conditions permit.

Reporting Format

Each inspection stage produces a dated report delivered to the client within the timeframe agreed at project kick-off. Reports follow a consistent structure across projects to support comparison, audit and archival.

- Reports are date-stamped and include photographic evidence for every finding — close-up and contextual views, with annotations identifying the specific component, location and defect.
- Defects are classified using a four-tier schema: Critical (safety or functional failure — must resolve before shipment), Major (specification non-conformance — must resolve before shipment), Minor (cosmetic or documentation gap — may be resolved post-shipment with client agreement) and Observation (improvement recommendation, no contractual impact).
- A corrective-action tracking log accompanies each report, listing: finding reference, severity, description, assigned corrective action, responsible party, deadline and closure status.
- For multi-site programmes (e.g., equipment from several factories for one project), individual factory reports are consolidated into a programme-level status view showing aggregate progress and cross-factory comparisons.
- Final FAT reports include a signed protocol summary, a closed-out punch list, corrective-action closure evidence and a formal shipment-release recommendation to the client.

Corrective-Action Methodology

When an inspection identifies a non-conformance, the corrective-action process runs from finding to verified closure. Each finding is logged, assigned and tracked until either resolved or formally accepted by the client with documented justification. The process applies consistently across all four stages.

On programmes that include electrical or electromechanical equipment, Sinospect typically applies a consolidated corrective checklist covering the following points. The specific items are adapted to the equipment type and the project's technical requirements:

- Grounding and earthing verification — continuity, resistance values, connection integrity
- Transformer losses and efficiency test confirmation against guaranteed values
- PLC programming language compliance with the contract specification (e.g., IEC 61131-3 structured text)
- HMI and interface localisation — language, units of measurement, display layout and alarm text
- Cable and connection point identification — labelling accuracy, ferrule markings, terminal references
- Insulation class verification for motors and windings — class rating, temperature rise limits
- Cooling system validation — airflow measurements, coolant circuit pressure tests, thermal protection settings
- Control panel labelling — completeness, accuracy, language compliance and durability of label material
- Spare parts inventory — physical count against the contractual spare parts list, packaging condition
- Operating and maintenance manual completeness — correct language, correct revision, all sections present
- Final sign-off with annotated disposition of each corrective item (closed / accepted / deferred with justification)

Corrective actions are not considered closed until photographic or documentary evidence of resolution is reviewed and accepted by the inspection team. On critical and major findings, physical re-inspection is required before closure is recorded. Deferred items are tracked through to resolution during commissioning or the warranty period, depending on the agreed disposition.

Scope Adaptation by Equipment Type

The four-stage methodology described above is the full framework. In practice, the scope of each stage is adapted to the equipment type, the contract requirements and the manufacturer's track record. The following examples illustrate how the methodology scales:

Power transformers and switchgear

Full four-stage process with emphasis on dielectric testing, partial discharge measurement, oil analysis, winding resistance verification and thermal imaging during heat-run tests. FAT protocols typically reference IEC 60076 (transformers) or IEC 62271 (switchgear) test standards. Documentation requirements include type test

reports, routine test reports and special test results.

Plastics and packaging machinery

Emphasis on mechanical alignment, cycle-time verification, mould compatibility, safety interlock function and output quality consistency during trial runs. In-process inspection focuses on machining tolerances for platens, tie bars and injection units. FAT includes production trial with the client's specified material and mould where available.

Food processing and filling lines

Particular attention to material contact surfaces (stainless steel grade, surface finish Ra values), clean-in-place (CIP) system function, dosing accuracy, filling precision and sanitary design compliance. Documentation requirements typically include material certificates for all product-contact components and surface roughness test reports.

Standard industrial equipment (pumps, compressors, conveyors)

Typically a two- or three-stage process: pre-production review is limited to specification confirmation and BOM check, followed by pre-shipment verification and a functional test. Full four-stage FAT is applied only when the contract value, criticality or client requirements justify it.

Client Coordination During FAT

Sinospect acts as the client's on-site representative throughout the FAT process. The client is kept informed through structured communication at agreed intervals:

- A kick-off call or document establishes the inspection scope, hold points, reporting frequency and escalation thresholds before the first factory visit.
- Progress reports are issued at each stage completion. Critical findings trigger immediate notification by email or call, without waiting for the next scheduled report.
- The client may attend any or all inspection stages. Sinospect coordinates factory access, travel logistics (when requested) and provides interpretation support as needed.
- A final summary report consolidates all stage reports into a single document with a clear shipment-release recommendation, open-item register and risk assessment.
- Post-shipment, Sinospect remains available to support the client on warranty claims, spare parts procurement and any issues arising during installation and commissioning.

