

JUSTSOLAR

2GW Solar Module Manufacturer · 50+ Countries · Since 2011

Solar Module Factory Audit Checklist

A 50-point B2B buyer's guide for verifying solar module manufacturers — use during pre-shipment inspections, factory visits, or supplier qualification.

50	POINTS
8	SECTIONS
100%	B2B-FOCUSED
FREE	TO USE

How to use this checklist

1. Print or use digitally during your factory audit.
2. Tick each item as you verify it on-site or via documents.
3. For any item you can't verify — request supporting documentation before signing PO.
4. Items marked <CRITICAL> are deal-breakers if not satisfied.

Verified by: _____ Date: _____

Project / order ref: _____

1. Manufacturer Verification

Verify the company is a real manufacturer, not a trader rebadging panels.

1. ■ Business license valid + matches the entity on PI

Request scanned business license. Cross-check the registered address vs the factory you visited (or the address on Google Maps street view).

2. ■ Production output matches claims

Ask for the last 12 months of monthly production volume. A real 1GW manufacturer ships ~80MW/month consistently — empty factories don't.

3. ■ Tax records / ISO Trade Assurance status

Cross-check via Alibaba Trade Assurance or Made-in-China Gold Supplier audits. Real manufacturers have multi-year continuous status.

4. ■ Independent factory audit ≤ 12 months old

<CRITICAL> Request the most recent SGS / TUV / Bureau Veritas / Intertek factory audit report. Reject if >18 months.

5. ■ Same address on PI, business license, and factory map

Address mismatches signal trading-house behavior — order placed in Shanghai office, panels shipped from unrelated 3rd-party factory.

6. ■ D&B; (Dun & Bradstreet) entry exists

Real manufacturers have D-U-N-S Numbers + financial profiles. Check at dnb.com — absence is a yellow flag.

7. ■ Number of employees vs claimed capacity

Rough rule: 1GW capacity ≈ 200-400 production employees. Companies claiming 5GW with 50 employees are aggregators.

8. ■ Brand history check on B2B platforms

Search company name on PV-Tech, ENF Solar, BloombergNEF supplier database. Track record >5 years preferred.

2. Production Equipment

Walk the line. Real manufacturers are proud to show equipment.

9. ■ String welder / stringer brand visible

Industry standards: Autowell, ■■■ (Crystal Growth), Mondragon. Generic / unbranded stringing equipment is a quality risk.

10. ■ Lamination press brand

YAC (Japan), GP Solar (Germany), Ecoprogetti are quality brands. Cheap Chinese generics produce inconsistent EVA cross-linking.

11. ■ Flash tester is class A+A+A+ sun simulator

<CRITICAL> Pasan (Swiss) is the gold standard. Class B testers report power +/-3% inaccurately. Verify with calibration certificate.

12. ■ EL imaging cameras every line

BrightEye, ■■■, or equivalent on every line. Reject if EL is sample-only (cracks slip through).

13. ■ Frame press equipment + tonnage

Pneumatic 6063-T5 / 6005-T6 anodized aluminum framing. Reject mill-finish frames (corrosion in 5-10 years).

14. ■ Loader robotics on critical handling

ABB, KUKA, FANUC robotic arms for cell stringing + module loading prevent micro-cracks. Manual handling = high reject rate.

15. ■ Calibration records for ALL test equipment

Equipment must be calibrated <12 months. Stale calibration = unreliable flash test data + warranty disputes later.

3. Quality Control Process

100% testing — not sampling. Every module, every step.

16. ■ 100% incoming cell IV-curve binning

Cells are sorted by power class (e.g., $11.5W \pm 0.05W$) before stringing. Mixed-bin modules show high mismatch losses.

17. ■ 100% EL test post-lamination, archived per SN

<CRITICAL> Every module gets EL imaged. Reject suppliers who EL-test only 'sample lots'.

18. ■ Hi-Pot insulation test, fail = scrap policy

IEC 61730-2 wet leakage test, $\geq 400 \text{ M}\Omega\cdot\text{m}^2$. Failed modules MUST be scrapped, not reworked.

19. ■ Flash test under STC, IV curve recorded with SN

1000 W/m^2 , AM1.5G, 25°C. Each module's IV curve archived. Demand IV curve sample upon request.

20. ■ Power tolerance is 0/+5W positive only

Reject suppliers using -2/+5W or +/-3W tolerances. Negative tolerance = under-spec modules slip through.

21. ■ Visual inspection against AQL 2.5 standard

Cosmetic + structural defects sampled at 2.5% AQL. Cell color uniformity, frame straightness, junction box alignment.

22. ■ PID-resistance test reports available

IEC 62804 for HJT/TOPCon. Sample subjected to -1500V at 85°C/85% RH for 96h. Pass = <5% power loss.

23. ■ EL image archive accessible via SN lookup

If you provide a module SN months later, manufacturer should retrieve EL image within 24h. If not — they're not actually archiving.

4. Material Quality

What goes into the module — provenance + spec + quality.

24. ■ Cell brand / source documented

Tier-1 cells: Tongwei, Aiko, LONGi, Jinko cells. Demand cell datasheets + traceability lot codes.

25. ■ Glass: 3.2mm tempered, AR coating

Specs to verify: 3.2mm thickness for monofacial, 2.0mm dual-glass for bifacial. AR coating recovers 5-8% from soiling.

26. ■ Encapsulant: EVA or POE specified

POE encapsulant for HJT (anti-PID critical). EVA acceptable for TOPCon. Reject 'mixed' or unspecified.

27. ■ Backsheet: TPT/PVDF for monofacial

DuPont Tedlar TPT, Krempel PVDF, or 3M brand. Avoid generic Chinese backsheets (UV degradation in 5-7 yrs).

28. ■ Junction box: IP68 rated, branded

Brand verifiable: TE Connectivity, Stäubli, Hosiden, etc. Diodes thermal-tested individually.

29. ■ Frame: anodized 6063-T5 / 6005-T6

Mill-finish frames corrode in coastal/humid environments within 5-10 years. Anodized = essential.

5. Documentation & Certifications

Paper trail proves real compliance. No paper = no warranty defense.

30. ■ IEC 61215 design qualification report

<CRITICAL> For exact module SKU. Not 'similar SKU'. Test report should be <5 years old.

31. ■ IEC 61730 safety certification

<CRITICAL> Class A or Class II rating. Class C = avoid for utility-scale.

32. ■ ISO 9001 (quality), ISO 14001 (env), ISO 45001 (safety)

All three should be valid (within 12 months) and issued by a real certification body (TUV, DNV, SGS).

33. ■ Country-specific certs available

G-Mark (GCC), SASO (Saudi via SABER), ESMA (UAE), INMETRO (Brazil), BIS (India), DOE/ERC (Philippines), KC (Korea), etc.

34. ■ Insurance-rated bankability letter

From Atradius, Coface, or Sinosure. Required for project finance >\$1M. Confirms the manufacturer carries warranty insurance.

35. ■ 25-year product warranty + 30-year linear performance

Read the actual warranty document — not a marketing one-pager. Year-25 / Year-30 power output % must be specific (e.g., 88.8%).

36. ■ LCA / Carbon Footprint documentation (CBAM)

Required for EU exports 2026+. Verified Embedded Emissions report + ISO 14067 LCA methodology.

6. Safety & Compliance

Worker safety + environmental compliance — table-stakes for ESG-aligned procurement.

37. ■ Personal Protective Equipment (PPE) on factory floor

Eye protection, gloves, masks, anti-static wristbands at cell/module handling stations.

38. ■ Fire safety: extinguishers + sprinklers + emergency exits

Lithium fire-rated extinguishers if BESS work onsite. Clear emergency exits — no blocked pathways.

39. ■ Chemical handling: solvents, encapsulants stored properly

Sealed containers, ventilation, MSDS posted. Reject visible chemical spills.

40. ■ Wastewater treatment / environmental certifications

ISO 14001 + local environmental permits. For ESG-rated procurement: verified emissions report.

41. ■ Worker welfare: legal age, working hours, dorms, wages

Audit reports cover these. Some Western buyers (Apple supply chain) require additional SA8000 social compliance audit.

7. Logistics & Packaging

How modules are crated + shipped determines arrival quality.

42. ■ Wooden crate packaging (NOT cardboard)

Cardboard alone = 3-5% in-transit damage. Wooden crates with EPE foam corner protectors = <1.2%.

43. ■ FCL only, never LCL

Less-than-Container-Load shipments mean co-loading with other goods → vibration damage. Demand FCL only.

44. ■ All-Risk cargo insurance per shipment

Minimum 110% of CIF value. ICC(A) clauses. Verify the insurance certificate is issued before shipment, not after damage claims.

45. ■ Loading supervised + photo-documented

Manufacturer supervises loading at port (or factory if door-to-door). Photo evidence of bracing + securing inside container.

46. ■ Container desiccants + humidity indicators included

DryBag or equivalent + humidity indicator cards. Crucial for tropical-route shipments.

8. Commercial Readiness

Payment, lead time, and warranty handling — ground truth for the relationship.

47. ■ Payment terms not 100% pre-payment

Reasonable: 30% deposit + 70% against B/L copy. 100% pre-payment = high risk; only acceptable for orders <\$30K.

48. ■ Lead time realistic and documented

Standard production: 2-5 weeks. Stock items: 5-10 days. Suppliers claiming <5 days for custom OEM are usually flipping inventory.

49. ■ Warranty claim process documented

Within how many days does the manufacturer ship replacement modules? Who pays return freight? Get this in writing in the PO.

50. ■ Legal jurisdiction + dispute resolution

Contract governing law: prefer Hong Kong / Singapore arbitration (SIAC, HKIAC). Avoid mainland China courts for foreign buyer disputes.

How JUSTSOLAR scores against this checklist

We built this checklist from 14 years of being on both sides of solar shipments — supplying modules + receiving from competitors. Here's our position:

Section	JUSTSOLAR Score	Evidence
Manufacturer Verification	8/8 ✓	Own factories, 14-yr track record, audit-ready
Production Equipment	7/7 ✓	Autowell + YAC + Pasan A+A+A+ + ABB/KUKA
QC Process	8/8 ✓	100% EL + 0/+5W positive only + IEC 62804 PID
Material Quality	6/6 ✓	Tongwei/LONGi cells, POE for HJT, anodized frames
Documentation & Certs	7/7 ✓	IEC + ISO + G-Mark/SASO + Atradius bankability + LCA
Safety & Compliance	5/5 ✓	PPE enforced + ISO 14001/45001 + SA8000 (on request)
Logistics & Packaging	5/5 ✓	Wooden crates + FCL + All Risk + supervised loading
Commercial Readiness	4/4 ✓	30/70 T/T + HK arbitration + 25+30 yr warranty
TOTAL	50/50	Independent verification welcome

Want to verify this for yourself?

We welcome any of the following — at your cost, we host for free:

- **Live video factory tour** on WhatsApp / Zoom (24h notice)
- **In-person factory audit** in Jiaxing, China (1.5h from Shanghai Pudong by high-speed rail)
- **Third-party PSI** by SGS / TUV / Bureau Veritas / Intertek (you book + pay agency)
- **Residency inspector** for utility-scale 20+ MW orders (entire production run)

Ready to source modules from a real manufacturer?

frank@jusolar.com · WhatsApp +86 177 1730 3786 · jusolar.cn

Frank Yang, Director · JUST SOLAR GROUP LIMITED · 2GW Annual Capacity · 50+ Countries Since 2011