

AR Coating Supplier Qualification Checklist — Score, Compare, and Select with Confidence

HEADER ZONE

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AR Coating Supplier Qualification Checklist

Make smarter sourcing decisions for anti-reflective coatings and coated solar glass.

Who This Is For

You are a procurement manager, project engineer, or quality control lead responsible for selecting suppliers of anti-reflective (AR) coatings or pre-coated solar glass for solar module production. This checklist gives you a structured, repeatable framework to evaluate suppliers on measurable performance, long-term durability, and supply chain reliability — not just price. The result: a defensible short-list of suppliers who support your project's efficiency and bankability over a 25+ year lifetime.

Your choice of AR coating supplier directly shapes your Bill of Materials (BOM) cost and, ultimately, your Levelized Cost of Energy (LCOE) — the single metric that determines whether your solar project is financially competitive. This checklist helps you make that choice with confidence.

How to use this document: Work through Sections 1–3 for each candidate supplier, filling in data and checking boxes as you receive documentation. Then use Section 4 to score and compare. Print or save this document — you will need it in every qualification discussion.

Quick Check: The 3 Biggest Supplier Qualification Mistakes

Before you begin evaluating, ensure your process avoids these common and costly pitfalls.

- **Mistake 1: Selecting on price alone.** The lowest upfront cost per square meter can lead to higher lifetime costs from coating degradation, underperformance claims, and module warranty exposure. Always calculate total cost of ownership, not just purchase price.
- **Mistake 2: Accepting durability claims without certified test data.** A high initial light transmission value (the percentage of sunlight that passes through the coated glass) is meaningless if the coating degrades within a few years. Demand third-party certified test reports — not just supplier-generated data sheets.
- **Mistake 3: Skipping the factory audit.** A data sheet is a claim. An on-site audit of the supplier's manufacturing facility and quality control (QC) processes is a verification. Without it, you are relying on unverified promises.

If you are making any of these mistakes today, this checklist will help you correct course immediately.

Section 1: Technical Performance & Material Quality

This section verifies the optical performance of the coating itself — how much light it lets through and how consistently it does so across the glass surface.

Instructions: Request formal documentation from the supplier for each point below. Check the box only when you have received and reviewed the document.

- **Certified third-party test report for light transmission across the relevant solar spectrum (approximately 380–1100 nm).**
 - Average weighted transmission %: _____
 - Testing lab name: _____
 - Note: Industry-leading AR coatings typically achieve average light transmission above 94% for the coated glass assembly. Values vary by coating type (single-layer vs. multi-layer) and substrate. Confirm the test methodology matches your operating conditions.

- **Certificate of Analysis (CoA) for material composition.**
 - Primary coating material (e.g., porous silica, silicon nitride, titanium dioxide): _____
 - Coating thickness (typically in the range of 100–150 nm for single-layer coatings optimized for visible/near-IR light): _____

- **Coating uniformity data across the full glass surface.**
 - Measurement method (e.g., spectrophotometer readings from multiple defined points): _____
 - Maximum deviation from the average transmission value: _____
 - Note: High deviation indicates inconsistent application, which translates to uneven energy yield across the module.

- **Physical samples provided for in-house testing and independent validation.**
 - Sample dimensions: _____
 - Date received: _____

Section 1 Outcome: You have verified the supplier's claimed optical performance with objective, third-party data — not just marketing materials.

Section 2: Durability & Reliability Testing

This section assesses whether the coating will maintain its performance under real-world environmental stress for the expected project lifetime of 25+ years.

Instructions: Verify that the supplier provides certified test reports aligned with the relevant sections of IEC 61215 (the international standard for terrestrial photovoltaic module design qualification and type approval) or equivalent standards. Check each box only when certified documentation is in hand.

- **Abrasion Resistance Test**

- Standard referenced (e.g., IEC 61215 relevant clause, or supplier-specific protocol): _____
- Number of abrasion cycles passed: _____
- Transmission loss after testing: _____%
- Note: A commonly referenced benchmark is 1,000–1,500 cycles with a felt pad under specified force. However, the exact protocol and acceptance criteria vary. Always confirm the test parameters match your deployment environment (e.g., desert sites with frequent sand exposure require stricter abrasion standards).

- **Thermal Cycling Test**

- Conditions (typical: -40°C to $+85^{\circ}\text{C}$, 200 cycles per IEC 61215): _____
- Result: Pass Fail
- Any observed delamination, cracking, or haze: _____

- **Humidity-Freeze Test**

- Conditions (typical: $+85^{\circ}\text{C}$ / 85% relative humidity to -40°C): _____
- Number of cycles: _____
- Result: Pass Fail

- **Damp Heat Test**

- Conditions (typical: 1,000 hours at $+85^{\circ}\text{C}$ / 85% RH per IEC 61215):

- Transmission loss after testing: _____%
- Result: Pass Fail
- **UV Exposure Test**
 - Total UV dose applied (in kWh/m²): _____
 - Visual or performance degradation observed: _____
 - Result: Pass Fail

Important limitation: These accelerated tests simulate long-term stress in compressed timeframes. They are strong indicators of durability but do not guarantee identical performance in all real-world climates. Site-specific factors — sand abrasion intensity, cleaning frequency, chemical exposure from pollution — can accelerate degradation beyond what laboratory testing predicts. Always cross-reference test results with field data from similar deployment environments if available.

Section 2 Outcome: You have confidence that the coating can withstand environmental stress. You can now assess coating-related risk in your O&M (operations and maintenance) budget and warranty terms.

Section 3: Manufacturing, Quality Control & Supply Chain

This section evaluates whether the supplier can deliver the product consistently, at scale, and with traceability — critical for production planning and risk management.

Instructions: Request documentation or schedule a facility audit to verify the following.

Production Capability

- Monthly production capacity (coated glass area in m², or coating chemical volume in liters/kg): _____
- Current capacity utilization (%): _____
- Stated lead time from order to delivery: _____
- Minimum order quantity: _____
- Geographic location of primary manufacturing site: _____

Quality Management

- Quality Management System certification held (e.g., ISO 9001 or equivalent):

- Certifying body: _____
- Expiry date: _____
- Environmental Management System certification (e.g., ISO 14001): Yes No

Process Control

- Batch traceability system in place: Yes No
- Brief description of traceability method: _____
- In-line quality control checkpoints during coating process:
 - Checkpoint 1: _____
 - Checkpoint 2: _____
 - Checkpoint 3: _____

- Rejection/rework rate (typical range): _____%

Supply Chain Resilience

- Supplier has identified and can name their raw material sub-suppliers.
- Supplier holds buffer stock or has dual-sourcing for critical raw materials.
- Supplier can provide a contingency plan for production disruption.
- Number of other solar-industry customers currently served: _____

Section 3 Outcome: You understand the supplier's operational capability, consistency, and supply chain risk profile. You can now assess whether they can scale with your production needs.

Section 4: Decision Support — Supplier Scorecard

Use this comparative scorecard after completing Sections 1–3 for each candidate. Rate each supplier on a scale of 1 (Poor) to 5 (Excellent).

Criteria	Weight (adjust to your priorities)	Supplier A	Supplier B	Supplier C
Technical Performance (transmission %, uniformity)	___/10	___/5	___/5	___/5
Durability & Reliability (completeness + results of test reports)	___/10	___/5	___/5	___/5
Manufacturing & QC (ISO certification, capacity, traceability)	___/10	___/5	___/5	___/5
Total Landed Cost (unit price + shipping + tariffs + handling)	___/10	___/5	___/5	___/5
Technical Support & Responsiveness	___/10	___/5	___/5	___/5
Supply Chain Resilience (buffer stock, dual-sourcing, contingency)	___/10	___/5	___/5	___/5
WEIGHTED TOTAL		—	—	—

How to use weights: Assign a weight out of 10 to each criterion based on your project's priorities. Multiply each score by the weight, then sum for a weighted total. This prevents all criteria from being treated equally when your situation demands emphasis on, for example, durability over cost.

Decision rule:

- If one supplier scores highest across all categories → proceed to pilot/negotiation.
- If scores are close → revisit the criteria where suppliers differ most and request additional data or conduct an audit.
- If no supplier scores above 3 in Durability → do not proceed without additional testing or a site visit.

Real-Life Scenario: The True Cost of a "Good Deal"

A module manufacturer selected a new coated glass supplier based on a promising data sheet and an approximately 10% price advantage over their incumbent. They did not invest in a factory audit. They did not request abrasion test data.

Eighteen months into production, field reports from installed modules showed underperformance of approximately 2–3% relative to projections. An investigation found that the AR coating had substantially worn away due to routine cleaning cycles. The coating lacked adequate abrasion resistance — a fact that would have been revealed by a simple request for certified test reports (Section 2 of this checklist).

The result: Warranty claims, reputational damage with the EPC (Engineering, Procurement, and Construction) customer, and the cost of replacing the supplier mid-production. The total financial exposure far exceeded the initial 10% cost saving.

Lesson: This checklist exists to prevent exactly this scenario. Fifteen minutes of structured evaluation per supplier can save months of remediation.

Why This Matters for Your LCOE and Project Bankability

Your AR coating choice is not a minor BOM line item. Research from real-world deployments (including a documented case study from a Moroccan installation) has shown that high-quality AR coatings can contribute to approximately 3–5% higher annual energy yield and a measurable reduction in LCOE (one study documented approximately 2.7% lower LCOE). Over a 25-year project life, this compounds into significant revenue differences. A supplier who delivers consistent, durable coatings protects your energy yield forecast — the single number that underpins your project's financial model and investor confidence.

Closing: Your Next Steps

You have completed a structured, risk-aware evaluation framework for AR coating suppliers. Your scorecard now provides a defensible, data-backed basis for supplier selection — not a gut feeling.

Step 1 — Deepen your understanding of the full solar module BOM and production process:

Enroll in the free course on Solar Module Production Fundamentals to see how AR coating decisions connect to every other manufacturing step.

→ <https://www.pvknowhow.com/free-ecourse/>

Step 2 — Begin your pilot production run or negotiate a supply agreement:

Use the data from your highest-scoring supplier(s) to initiate a trial order. Define acceptance criteria based on the transmission, uniformity, and durability thresholds you documented in Sections 1 and 2. If you need guidance on structuring your manufacturing business plan around these decisions, explore the premium course details.

→ <https://www.pvknowhow.com/premium-course-business-plan-and-finance/>

Step 3 — If you have questions or need direct support:

Reach out for a consultation on your specific supplier qualification challenge.

→ <https://www.pvknowhow.com/contact/>

Save or print this checklist. Use it in every future supplier qualification discussion. Share it with your procurement team to ensure consistency across evaluations.


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