WHITE PAPER

What criteria determine the suitability of an EMS partner?

Requirements, quality criteria and selection decisions for OEM decision-makers in Europe

A source-based analysis for managers in production and purchasing

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Executive Summary

The EMS industry is facing a massive transformation – a view shared by practitioners and observers alike. Mere assembly capacity is often no longer sufficient. Digitalization, global supply chain risks, obsolescence management, increasing automation requirements, and a growing body of compliance regulations present OEMs with new and structurally different challenges when choosing their manufacturing partners compared to ten years ago.

But what criteria actually determine whether an EMS partner is viable in the long term? And how can the suitability of an EMS provider be reliably assessed beyond unit price offers and capacity promises?

This white paper provides OEM decision-makers with a structured, source-based answer. It describes the essential requirements for a suitable EMS partner, explains the relevant norms and standards, identifies the most common mistakes in partner selection, and proposes a practical evaluation framework using the Systematic Conformity Assurance (SCS) model.

Key message of this white paper

Choosing an EMS partner is not simply a purchasing decision. It is a strategic decision that directly impacts product quality, supply chain stability, compliance capabilities, and the OEM's long-term competitiveness. This white paper uses robust data and standards to demonstrate the criteria that define a suitable European EMS partner – and why the requirements list must extend far beyond price and capacity.

1. The changed requirements landscape

1.1 More than just assembly

Just ten years ago, the service promise of many EMS providers was reduced to a single core discipline: the assembly of printed circuit boards at the lowest possible unit cost. This model is increasingly losing its viability in demanding industrial segments. According to current industry analyses, the global EMS market continues to experience stable, long-term growth, driven by the increasing proportion of electronics in all industrial sectors. The drivers are not solely volume effects, but also the increasing complexity of product requirements: IoT-enabled assemblies, electromobility, 5G infrastructure, edge computing, and safety-critical applications in medicine, defense, and industry.

Source: StartUs Insights, Top 10 Electrical Industry Trends & Innovations, January 2025. Industry reports from European trade associations (ZVEI/IPC).

According to a study by the EMS company Katek, conducted together with Dynata among 570 European companies, almost 70 percent of respondents from the industrial automation sector see strengthening production in Europe as the greatest opportunity of the next five years – on par with AI-supported automation and the digitization of process flows.

Source: Katek / Dynata, Study on the future of the EMS industry in Europe, 2025, published via elektroniknet.de.

1.2 What OEMs are really looking for today

The requirements of European OEMs for their EMS partners can be described along five structural dimensions that go far beyond unit price and delivery capacity:

- Engineering expertise: Design-for-Manufacturability support, prototype development, industrialization support and obsolescence management.
- Supply chain stability: Dual-sourcing capability, component procurement from certified sources, warehousing strategies and traceability down to the component level.

- Responsiveness: Short setup times, flexible batch sizes, rapid change implementation and communication without time zone barriers.
- Quality assurance: Full compliance with standards, documented testing processes, seamless traceability and proactive defect management.
- Compliance: Proof of compliance with European supply chain laws, environmental standards and data protection requirements.

Source: TPS Elektronik, Complete Guide to EMS Providers & Outsourcing, September 2025. Federal Electronics, 7 Things You Must Know Before Selecting an EMS Partner, October 2025.

2. Quality management systems and compliance with standards

2.1 ISO 9001: The indispensable basis

A robust quality management system is the operational backbone of every high-performing EMS provider. The internationally recognized foundation is ISO 9001 – a standard that mandates systematic controls across all production phases: from component assembly and PCB mounting to testing and delivery. ISO 9001 requires documented work instructions, regular management reviews, risk-oriented thinking, and a mechanism for continuous improvement.

For OEM decision-makers, ISO 9001 certification means that the EMS partner manages equipment calibration, employee training, and corrective actions systematically and in an auditable manner. Certification alone is not enough – its operational implementation must be verified in an audit.

Source: TSTRONIC, EMS Certifications in Electronics Manufacturing, October 2025. Federal Electronics, Quality Management Systems in EMS, 2025.

2.2 Industry-specific standards hierarchies

Depending on the OEM's product segment, significantly stricter standard requirements apply. The most relevant standards in the European context are:

Norm	scope	Core content
ISO 9001	General Industry	Quality management system basis, process controls, CIP (Continuous Improvement Process)
IATF 16949	automotive industry	Process FMEA, control plans, supplier evaluation, OEM CSR
ISO 13485	Medical technology	Device quality, validation, traceability, regulatory compliance
AS9100	Aerospace, Defense	Configuration control, traceability, risk management
IPC-A-610	Electronics manufacturing (PCB)	Acceptance criteria for printed circuit board assembly
J-STD-001	Soldering technique	Requirements for solder joints, materials and processes

Source: Federal Electronics, Selecting an Electronics Contract Manufacturer, October 2025. TSTRONIC, EMS Certifications, October 2025. TÜV Rheinland, IATF 16949 Certification, 2025.

For the automotive industry, IATF 16949 is now generally a contractual requirement. As of December 31, 2023, a total of 93,713 sites worldwide were certified. Germany ranks fifth globally with 2,859 certificates. The current IATF Rule 6, in effect since January 1, 2025, further tightens the requirements for traceability and supplier monitoring.

Source: German Association of the Automotive Industry (VDA), IATF certification statistics. TÜV Rheinland, IATF 16949, 2025.

2.3 Traceability as an operational quality characteristic

Traceability – the seamless traceability of every component, every process step, and every inspection decision – is a key differentiator between a professional and an average EMS partner. The IPC-1782 standard defines traceability levels for PCB assemblies and specifies which information must be documented at which level. For OEMs with products in safety-critical applications, standards-compliant and seamless traceability (e.g., according to IPC-1782) is generally a fundamental requirement: It forms the basis for targeted recalls, forensic failure analyses, and compliance with regulatory reporting obligations.

Source: TSTRONIC, EMS Certifications in Electronics Manufacturing, October 2025. IPC-1782, Requirements for Electronics Assembly Traceability.

3. Engineering expertise and technical manufacturing depth

3.1 Design for Manufacturability (DfM)

A high-performing EMS partner doesn't just get involved once the design is finalized. They contribute manufacturing expertise as early as the development phase – through Design-for-Manufacturability (DfM) analyses that reduce later production costs, minimize scrap rates, and avoid redesign loops. Specifically, DfM means: layout optimization for efficient SMT assembly, early identification of hard-to-source components, recommendations for alternatives with guaranteed long-term availability, and guidance on testability requirements right from the circuit design stage.

Source: AEI CM, What is Electronics Manufacturing? How to Choose an EMS Partner, November 2025. TPS Elektronik, Complete Guide to EMS Providers, September 2025.

3.2 Obsolescence-Management

Obsolescence – the discontinuation of electronic components – is one of the most frequently underestimated operational risks in electronics manufacturing. Every year, several thousand electronic components are withdrawn from the market. An EMS partner without active obsolescence management forces the OEM into short-term design changes, expensive spot market procurement, or unplanned production interruptions. A qualified EMS partner conducts systematic lifecycle monitoring for all components used, identifies end-of-life announcements early, and proposes alternatives before supply bottlenecks arise.

Source: TPS Elektronik, EMS Complete Guide, September 2025. IPC, Component Obsolescence Management Best Practices, 2024.

3.3 Testing technology and test coverage

The depth of testing performed by an EMS partner determines whether quality problems are discovered during manufacturing or only at the end customer's site. A comprehensive testing portfolio includes automated solder paste inspection (SPI) before component placement, automated optical inspection (AOI) after component placement, X-ray inspection for hidden solder joints (BGA, QFN), in-circuit testing (ICT) for electrical parameter verification, flying probe testing for flexible small-batch production, and functional final testing (FCT) for product- and application-specific validation. The absence of any of these steps can increase the risk of latent quality problems, which, in a worst-case scenario, can have far-reaching consequences for warranties, liability, and customer satisfaction.

Source: Federal Electronics, Quality Management Systems in EMS, 2025. VentureOutsource, Supplier Assessment Criteria for Electronic Design Skill, 2025.

4. Supply chain stability and procurement expertise

4.1 Dual Sourcing and Risk Distribution

The lessons from the global semiconductor shortage of 2021–2023 are clear: Single-channel procurement strategies pose a structural risk. A high-performing EMS partner has verified alternatives for critical components, actively manages suppliers, and can quickly switch to backup sources if necessary. Dual sourcing at the EMS level means two qualified suppliers per component class, regular supplier audits, and evaluation based on compliance, on-time delivery, quality rate, and contingency capacity.

Source: ISO 9001:2015, Section 8.4 – Control of external suppliers. IATF 16949:2016, Section 8.4.2.4 – Supplier monitoring. SMCT Management, Supplier Evaluation, November 2025.

4.2 Storage and geographical proximity

An EMS partner with strategic warehousing – consignment stock, safety stock for long-term orders, VMI (Vendor Managed Inventory) models – enables the OEM to reduce its own capital commitment while simultaneously increasing security of supply. Intra-European EMS partnerships structurally reduce the necessary safety margin: delivery times of one to four weeks instead of eight to sixteen weeks make it possible to significantly reduce inventory levels – while simultaneously increasing security of supply.

Over the past fifteen years, Central and Eastern Europe has built an EMS infrastructure that operates on a technological level comparable to Western Europe, with wage levels that are competitive internationally. According to the EMS Strategy Group, Poland will be the fastest-growing EMS country in Europe by 2030, with a CAGR of over 7 percent.

Source: Bain & Company, Nearshoring: Overcoming the Obstacles, 2024. EMS Strategy Group assessment based on market observations 2026.

5. Compliance, regulatory affairs and supply chain due diligence

5.1 The regulatory environment in Europe

The regulatory landscape for European companies has fundamentally changed in recent years. The German Supply Chain Due Diligence Act (LkSG) has applied since January 2024 to all companies with more than 1,000 employees in Germany, obligating them to assess their entire supply chain for human rights and environmental risks. The Corporate Sustainability Due Diligence Directive (CSDDD), which entered into force as Directive (EU) 2024/1760, goes significantly further in its scope: it covers the entire value chain, including upstream and downstream business partners, and provides for fines of up to five percent of global annual turnover for violations.

Source: Nuremberg Chamber of Industry and Commerce, Responsibility along the supply chain, 2025. Grant Thornton, Supply chain compliance in transition, April 2025. Compliance Manager, LkSG weakened, but CSDDD brings further obligations, October 2025.

Important: The EU Omnibus Packages I and II limited the formal scope of the CSDDD to companies with 5,000 employees and €1.5 billion in revenue, with a gradual reduction starting in July 2028. Smaller OEMs are indirectly affected, however, as their major customers will contractually pass these requirements on to their suppliers.

Source: Kevla, CSDDD and LkSG Compliance, October 2025. Legaltegrity, Supply Chain Act 2025, November 2025.

5.2 What this means for EMS partner selection

For an OEM that commissions an EMS partner in Europe, demonstrating compliance is significantly simplified: European labor law, EU data protection standards (GDPR), REACH and RoHS compliance, as well as CE marking obligations, are structurally anchored in the regulatory framework. In contrast, an EMS partner outside of Europe often requires more complex, continuous

remote audits – which can involve increased administrative and logistical effort to sustainably guarantee the required compliance assurance.

5.3 IP protection and data security

Intellectual property – schematics, firmware, manufacturing parameters, test specifications – is an OEM's most valuable asset. With a European EMS partner, EU data protection law (GDPR) applies, property rights are enforceable under European contract law, and the risk of illegal counterfeiting is structurally lower than in jurisdictions outside the EU.

Source: TSTRONIC, Strategic EMS Partner Selection, February 2026. Federal Electronics, 7 Things You Must Know, October 2025.

6. Digitalization and Industry 4.0 as a quality indicator

6.1 Digital maturity as a selection criterion

The digitalization of electronics manufacturing is no longer a future topic. It is a current differentiator that directly impacts quality, efficiency, and flexibility. EMS providers that have invested in fully networked production lines, AI-supported process monitoring, and digital traceability systems operate at a structurally different performance level than companies that still rely on manual data entry.

Productronica 2025 – the world's leading trade fair for electronics manufacturing – clearly demonstrated that digitalization and AI dominate the innovation agenda of the EMS industry. The automated analysis of process data, even in manual assembly, is becoming standard practice for high-performing manufacturing partners.

Source: all-electronics.de, Technological Trends at productronica 2025, November 2025.

6.2 Relevant digitalization dimensions for OEMs

For OEM decision-makers, the following digital capabilities of an EMS partner are particularly relevant: MES integration (real-time recording of production data and test results for complete digital traceability), predictive quality analytics (AI-supported early detection of process deviations before scrap is generated), EDI/ERP interfaces for automated order matching and inventory management, and cybersecurity capability to protect networked manufacturing environments.

Skills shortages, increasing packaging density, and efficiency requirements are driving automation in the EMS industry. EMS providers who adopt automation and AI early on not only become more efficient – they position themselves as more reliable partners for demanding OEMs.

Source: all-electronics.de, How will the global EMS market develop until 2032?, October 2025. StartUs Insights, Electrical Industry Trends & Innovations, January 2025.

7. The SKS model: Systematic conformity assurance

7.1 What SKS means

Systematic Conformity Assurance (SCS) is the assessment model developed by EMS Strategy Group for the structured qualification and ongoing evaluation of European EMS partners. It goes beyond a one-time certification audit and assesses operational quality capability along six dimensions:

SKS-Dimension	Contents	Minimum requirement
Standard conformity	Quality management, industry and customer standards	ISO 9001 and relevant industry standards
Process stability	Audited manufacturing processes, process capability indicators, quality performance	Cpk values, DPMO, SPC evidence
Traceability depth	Traceability of materials, processes and assemblies	IPC-1782-oriented traceability
Supply chain compliance	Supplier evaluation, risk analyses, regulatory requirements	Documented risk and compliance processes
Technological performance	Degree of digitalization, data transparency, production integration	MES/ERP integration, digital process data
Engineering expertise	DfM/DfT capabilities, industrialization, obsolescence management	Reference projects and demonstrable engineering experience

Source: EMS Strategy Group, Model Systematic Conformity Assurance (SCS), May 2026. Basic standards: ISO 9001:2015, IATF 16949:2016, IPC-1782, IPC-A-610.

7.2 The most common selection errors

Decades of operational experience in the EMS industry show that OEM decision-makers regularly fall into the same traps when selecting partners: a focus on unit price without considering TCO, choosing the cheapest supplier without including transportation, quality assurance, compliance, and risk costs; accepting certification without verification, such as an existing ISO 9001 certificate as proof of quality without checking operational implementation; and planning capacity without flexibility assessment and the lack of a qualified initial sample evaluation before series production begins.

Source: Federal Electronics, Selecting an Electronics Contract Manufacturer, October 2025. AEI CM, what is Electronics Manufacturing? November 2025.

8. Industry examples: Practical requirements

8.1 Automotive industry

The automotive industry is among the sectors with the strictest and most complex system requirements for its EMS partners. IATF 16949 is generally a mandatory requirement. OEM-specific Customer Specific Requirements (CSR) supplement the standard with binding specifications for process capability and auditing. Volkswagen, for example, uses Formula Q Capability and Formula Q Concrete as mandatory sets of rules that govern process FMEA, series production assurance, and supplier management. IATF Rules 6, in effect since January 2025, further tightens the auditing requirements.

Source: SMCT Management, Customer-Specific Requirements (CSR) in accordance with IATF 16949, December 2025. Volkswagen AG, Formula Q Publication Series (Quality Capability/Specific).

8.2 Medical technology

For medical technology companies, ISO 13485 is a mandatory requirement. EMS partners must meet the specific validation requirements of the EU Medical Device Regulation (MDR 2017/745), including software validation, device history records, and complete batch documentation. Cleanroom conditions are mandatory for certain product classes.

Source: TSTRONIC, EMS Certifications in Electronics Manufacturing, October 2025. European Parliament, Regulation EU 2017/745 (MDR).

8.3 Industrial Automation and Defense

For manufacturers of automation components and defense electronics, long-term availability, complete traceability, and cybersecurity capabilities are the crucial requirements. AS9100 certification ensures that configuration control and risk management meet the highest available standards. ITAR compliance is an additional mandatory requirement for US defense applications.

Source: Federal Electronics, Quality Management Systems in EMS, 2025. TSTRONIC, EMS Certifications, October 2025.

9. Conclusion: The right partnership is crucial.

The question of what truly makes a suitable EMS partner cannot be answered with a price and a list of certifications. It requires a systematic evaluation along several dimensions – from the depth of the quality system and engineering expertise to supply chain stability, compliance capability, and digital maturity.

Within this assessment framework, European EMS partners offer structural advantages that measurably impact total cost of ownership, supply chain stability, and regulatory resilience. Central and Eastern Europe complements this picture with a technologically advanced and growing EMS infrastructure at competitive prices.

The gap between the demands OEMs place on their EMS partners and the quality of the partner qualification actually carried out is significant – and can be systematically closed. Companies that consistently close this gap build supply chains that are more stable, transparent, and resilient than any purely price-driven procurement strategy.

Final assessment

A suitable EMS partner is not the cheapest, but the right one – for the product, the market, the regulatory context, and the OEM's long-term supply strategy. When selecting European EMS partners, the EMS Strategy Group ensures that all relevant requirements are demonstrably met in practice – through audits, certificate verification, reference checks, and operational first article assessment. An EMS partnership proves successful when it sustainably secures series production – not just at the start, but throughout ongoing operations.

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About the author

Dirk Kaussen is Founder and Managing Director of EMS Strategy Group. With around 40 years of experience in the electronics industry — including founding and managing his own electronics manufacturing company in Germany — he brings deep expertise in manufacturing processes, EMS partner selection, supply chain stability, relocation projects, and risk management. His approach combines practical solutions with a direct connection to industrial reality.

About the EMS Strategy Group

EMS Strategy Group supports industrial enterprises in the strategic advancement and optimization of their electronics manufacturing operations – from high-level planning to operational execution. Our core expertise lies in the strategic relocation of manufacturing volumes to European EMS providers, the establishment of new production capacities, and the expansion of existing manufacturing structures.

Furthermore, we design resilient supply chain frameworks, conduct comprehensive risk assessments, and guide dual-sourcing strategies to secure and fortify supply chains. Upon request, we manage projects closely until a successful serial production ramp-up is achieved.

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