

Twenty Five Important Questions...

What Buyers Should Ask Potential Suppliers of Aircraft Electrical Wired Products.

How to ease the vendor selection process.

Written By: John Ashour, President of InterConnect Wiring

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5024 West Vickery Blvd

Fort Worth, TX 76107

(817) 377-9473

www.interconnect-wiring.com

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Introduction

InterConnect Wiring has been in business now for over 20 years. During this time, InterConnect has answered hundreds of supplier questionnaires from large Original Equipment Manufacturers (OEMs) such as Lockheed Martin and Boeing to medium-sized companies that are second and third tier businesses. During this time, InterConnect has reviewed and evaluated many supplier surveys. Most are very good but some have no bearing as to a company's past performance and predictability of future success. The purpose of this eBook is to list the better questions and provide a narrative of acceptable and unacceptable responses. It is assumed in this eBook that these questions are for OEMs who want to screen new suppliers for large multi-year, multi-million dollar solicitations. For some of the questions, follow-up questions are also included. The questions are not listed in any particular order except for the first question. Question one is the most important.



1. Is your company AS9100 **registered** and listed on the Oasis website?

Acceptable: Yes.

It is very difficult to pass an AS9100 quality audit. The ability to do so shows a strong management and corporate commitment to exceptional quality and continual improvement.

Unacceptable: No.

Some companies think it is an unnecessary cost to be registered to AS9100. Other companies say that they are “compliant” to AS9100 or ISO-9001 or some other lesser quality standard. These companies are trying to cut corners and are unwilling to make a commitment to continual improvement and prove how good their quality management system is. Companies like this should not be considered for large aerospace solicitations; only companies that are AS9100 registered.



2. What is your company's Dunn and Bradstreet (D&B) score for: (1) Financial Stress (2) Delinquency Predictors and (3) Evaluation Risk?

Acceptable: (1) Financial Stress: 1,510 or greater, (2) Delinquency Predictor: 530 or greater, and (3) Evaluation Risk: 3 or less.

The standard way to compare one company to another financially is their D&B rating. A company that is financially strong and secure will monitor their D&B rating at least monthly. Good companies will also take measures to continually improve their rating. Finally, good companies will submit reviewed and/or audited financial statements to D&B on a yearly basis. See Dunn and Bradstreet's website for more information about Financial Stress, Delinquency Predictor, and Evaluation Risk. The correct responses are based on a medium sized US company in the aerospace wired products market.



2. What is your company's Dunn and Bradstreet (D&B) score for: (1) Financial Stress (2) Delinquency Predictors and (3) Evaluation Risk?

- continued -

Unacceptable: (1) Financial Stress: Less than 1,510, (2) Delinquency Predictor: Less than 530, and (3) Evaluation Risk: More than 3.

Some companies are not financially strong, do not pay their bills in a timely manner, and are likely candidates to either go bankrupt or not be able to “cash flow” should they be awarded a large contract. Other companies may decide that they do not care what their D&B rating is. By doing this they have decided not to participate and be measured against the common financial standard in the industry. Similarly choosing not to be registered to AS9100, these companies have chosen to take the easy way out instead of being a proven company in the aerospace industry.



3. How many years have you been in business?

Acceptable: 5 or more.

Many experts say that it takes a company at least 5 years to become profitable and to prove they are here to stay. Each five years after the first 5 shows more of an ability to compete and be able to handle situations in difficult times. After 5 years the company generally has process improvements that enhance their capabilities.

Unacceptable: 5 or less.

Almost every startup company struggles. It is very difficult to have all of the processes, quality management system, and information technology structure in place and proven in 5 years or less. Financial stability typically only occurs after 5 years. Startup companies should be admired for taking the chance but should not be trusted to handle large aerospace programs.

4. What is your largest contract (in dollars) to date?

Acceptable: \$20M or more.

Large multi-million dollar, multi-year projects are difficult to manage. There are hundreds of variables and extensive risk for such programs. Only exceptionally well-managed companies are able to be successful with large aerospace contracts.

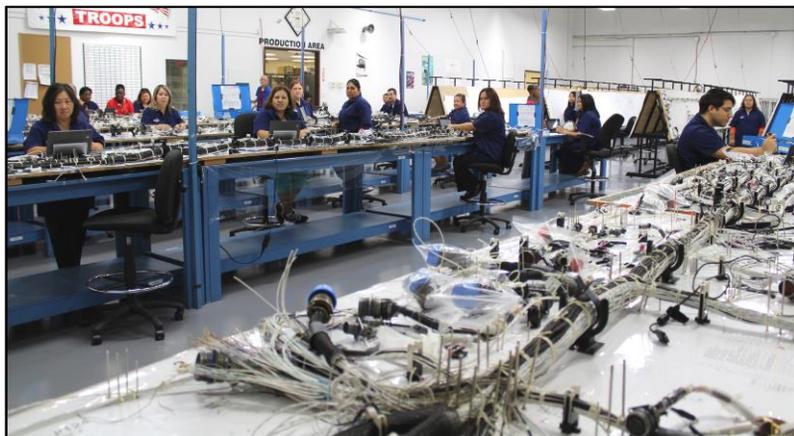
Unacceptable: Less than \$20M.

Many entrepreneurs think that there is a huge step once a company exceeds \$20M in annual sales. It takes exceptional management, sophisticated systems, financial stability, and a commitment to excellence to achieve this lofty goal. If a company has the management, quality, on-time delivery, and very few customer returns (for non-conforming products) these companies are good candidates to handle large aerospace programs.

5. How many employees does your company have?

Acceptable: 100 or more.

Once a company has 100 or more employees, they have to have sophisticated hiring, training, and recurring training systems. They must also have an exceptional Enterprise Resource Planning (ERP) and other computerized systems to handle daily tasks. A company like this has proven that they have the management to grow the company and meet the requirements of a large workforce.





5. How many employees does your company have?

- continued -

Unacceptable: Less than 100.

In the electrical aerospace manufacturing industry in the United States, an average company will have at least \$100,000 in yearly sales per employee (direct plus indirect employees). Thus if a company has 100 employees and they have average management, their yearly sales will be around \$10M. Well managed companies will have more than \$150K in yearly sales per employee. Based on \$100K per year in yearly sales per employee, you can judge how well a company is managed. Having 100 employees or more is a sign that a company is able to expand to successfully complete new, large programs.



6. What is your company's current plant capacity?

Acceptable: 75% or less.

There is no standard definition of plant capacity in the United States. One company's definition of plant capacity can be totally different than another company. The best definition is based on the available workspace and the number of employees who can work on a shift. (3 shifts per day should be included in the calculation.) Plant capacity should be a function of how many people or machines can work in a given area (in the case of wiring harnesses, the number of wiring harness work stations), and the number of people who can work at one time on one shift.



6. What is your company's current plant capacity?

- continued -

Unacceptable: More than 75%.

The 75% percent plant capacity is not a magic number. It is however a number that means that after another 25% the company cannot keep up with future demand. If a company wins a large program and they are at 75% capacity or more, they can easily go over 100% resulting in the inability to meet future delivery requirements.





7. How many laser wire marking machines does your company have?

Acceptable: 2 or more.

Every wire on an aircraft must have its own unique identifier. Many years ago this was accomplished by hot stamping an ink mark on the wire. By doing this, the physical characteristics of the wire could potentially be altered. The best method currently is laser wire marking. Laser wire marking offers a permanent mark and does not alter the physical characteristics of the wire. Owning multiple machines helps measure one's capacity – refer to #6 above.





7. How many laser wire marking machines does your company have?

- continued -

Unacceptable: 1 or zero.

An aerospace company that supplies electrical products needs to have at least 2 laser wire marking machines. One machine is nice but a second machine is required to serve as a backup and to take on more work should it be required. If a company wants to take on a large amount of work, the company will need 2 or more high speed laser wire marking machines. Companies who have only one machine add risk to large programs.

Follow-up question when the answer is yes: What type of laser wire markers does your company own?



8. Does your company have automatic wiring analyzers (or testing equipment)?

Acceptable: Yes.

Like laser wire marking machines, automatic electrical test equipment is a sign that a company is truly committed to the aerospace wiring market. Also like laser wire markers, wiring analyzers are expensive pieces of equipment. They are important because typically they not only measure continuity but they also measure insulation resistance to ensure that: (1) there are no short-circuits from each point of a connector to all other points (except where there should be continuity) and (2) when a connector contact cavity is supposed to be empty that it really is empty. If a company does not have a wiring analyzer they cannot do these additional tests that are commonly required by OEMs.



8. Does your company have automatic wiring analyzers (or testing equipment)?

- continued -

Unacceptable: No.

Many companies think is ok to simply perform continuity tests by “beeping out” one wire at a time; they do no insulation resistance, leakage, or other tests. After simply “beeping out” a wiring harness or wired assembly, there is still a chance that there are short circuits. Additionally, wire analyzers have written and controlled programs that store test results. Finally, they can be networked into the information technology system of a company.

Follow-up question when the answer is Yes: What type and how many wiring analyzers does your company own?



9. How many braid machines does your company own?

Acceptable: Four or more.

The ability to do braiding work is one of the important measures of a wiring harness company. Many OEMs require braiding therefore braiding machines should be available. More machines equals more efficiency and less down-time to change thread and bobbins depending on different platforms.





9. How many braid machines does your company own?

- continued -

Unacceptable: Less than Four.

Besides having braiding machines it is important to have a good mixture of them. Aerospace wiring harness companies should have at least two 24 carriers, one 32 carrier, and one 48 carrier. These braid machines are the most common in the industry. The company that has less than four machines is not capable of braiding the many different sizes of wiring harnesses.

Follow-up question: How many (and what size) braiding machines does your company own?



10. Does your company have the infrastructure so that batch files can be sent directly to your laser marking machine, shrink tubing marking machine, and wire cut machine?

Acceptable: Yes.

Typos on wire numbers and shrink tubing can cause many potential problems. A company needs a written, proven system to enter wire numbers and other pertinent information. A good company not only will have a proven system, but they will also have the ability to send batch files to their laser markers, shrink tubing markers and wire cut machines.

Unacceptable: No.

Many companies still rely on personnel to read information and enter it into marking equipment manually. By doing this, there is a very good chance that typos will occur. Typos can lead to huge problems in an aircraft when installing wiring harnesses or repairing and/or modifying them.



11. Does your company have an Enterprise Resource Planning (ERP) System?

Acceptable: Yes.

A standard ERP system contains at least the following modules: (1) Work In Progress, (2) Bill of Materials, (3) Accounting, (4) Scheduling, (5) Inventory Management, (6) Material Resource Planning (MPR), and (7) a Quotation System. In order to properly manage a large project, a supplier must have a good ERP system. Additionally, they should have been using it for at least one year. It takes about one year before a company is proficient with a new ERP system.





11. Does your company have an Enterprise Resource Planning (ERP) System?

- Continued -

Unacceptable: No.

A company that does not have an ERP system and simply uses an accounting software system will not be able to handle large, complicated orders. It is difficult to plan, schedule, and track the jobs unless a good ERP system is used.

Follow-up question when the answer is Yes: What is your company's ERP system?



12. Who are your top three customers for the past three years in terms of yearly sales (revenue)?

Acceptable: Large OEMs who are giants (i.e. top 100 in the world) in the aerospace industry. Some of these companies include: Lockheed Martin, Boeing, Airbus, Sikorsky, Northrop Grumman, Rockwell Collins, Raytheon, Honeywell, L3, and Bell Helicopter. There are many other companies who make up the top 100.

The reason it is important to have three of these companies is they typically: (1) have higher quality standards than other companies, (2) their requirements are typically more stringent, (3) they place multi-million dollar, multi-year contracts, and (4) they provide better report cards to grade their suppliers.



12. Who are your top three customers for the past three years in terms of yearly sales (revenue)?

- continued -

Unacceptable: Small companies who are further down the supply chain or broker companies who primarily supply spare aircraft parts to the rest of the world.

Follow-up question: Provide a copy of last year's report cards from your company's top three customers.





13. What were your company's yearly sales for the past 3 years?

Acceptable: More than \$20 million.

A company with less than \$20 million in yearly sales typically does not have the infrastructure to handle large orders. After the \$20 million threshold is reached, a company has the resources, machinery, equipment, information technology, and know-how to be successful in managing large orders.

Unacceptable: Less than \$20 million.

Unfortunately, smaller companies, especially aerospace start-up companies, are not able to handle a large order. In most cases they do not have the financial resources and experience to meet the requirements of large orders.



14. How is risk managed when new contracts are awarded?

Acceptable: Follow the company's process manual detailing risk management in accordance with Aerospace Standard AS9100.

Well managed companies will have documented risk management processes to follow. All of the following should be a part of risk management: (1) list of all risks, (2) ranking of risks from most severe to least, (3) mitigation plans to avoid the chance of risk occurring, (4) how long a delay will result if the risk occurs, (5) delegation of responsibilities for risk management, (6) definition of risk criteria, (7) communication of risk throughout product realization, (8) management of actions to mitigate risks that exceed the defined risk acceptance criteria, and (9) acceptance of risks remaining after implementation of mitigating actions.



14. How is risk managed when new contracts are awarded?

- continued -

Unacceptable: A few sentences of what a company will do as opposed to a risk management process.

Companies with a written risk management process have encountered and solved numerous problems during new, large projects. Well run companies have learned from these problems, documented them, and included them in the risk management process manual. Poorly managed companies address risk as issues “pop-up”.





15. How many late orders did your company have during the past 3 years?

Acceptable: Less than 2 percent of all orders filled on a yearly basis.

An on-time delivery rate of 100% is desired but difficult to do in the aerospace industry, thus on-time delivery rates of 98% or more is a sign that a company is well managed and goes the extra mile to make sure all deliveries are on-time. Additionally, good companies will investigate all late deliveries to reduce recurrence.

Unacceptable: Less than 98% of all orders shipped annually.

According to the Defense Logistics Agency (DLA), the average on-time delivery rate for aerospace wired products is 92%. On-time delivery in many cases is more important than price. Many OEMs prefer to pay extra to companies who ensure on-time delivery rather than less expensive prices. The worst companies will not even take the time to notify their customers in advance when they think they might be late on an order.



16. How many line items were delivered over the past 3 years?

Acceptable: 1,000 or more.

There are approximately 250 work days per year. A company that can handle larger orders should average 4 or more orders per day. This question provides insight as to how large the company is and its capacity shipment-wise.

Unacceptable: Less than 1,000.

If a company ships less than 4 shipments per day over the past 3 years, there is risk that they cannot fill large orders. The number of orders shipped should be considered when evaluating a company's capacity.



17. How many products were returned due to non-conformance over the past 3 years?

Acceptable: Less than 2 percent.

Similar to the on-time delivery numbers, the percent of non-conforming product is a very important consideration. Well managed and quality driven companies will have less than 2% of their products returned per year. They will issue internal Corrective Action Requests (CARs) to reduce recurrence.

Unacceptable: More than 2 percent.

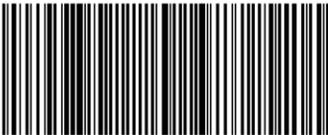
Unlike most other industries, the aerospace industry is held to higher standards. As stated earlier, it is very difficult to become AS9100 registered. A company that accomplishes this feat has the processes and continual improvement to help ensure that the products manufactured are made to customer requirements. Non-conforming products are unacceptable in the aerospace industry.



18. How is the location of a job tracked (from the start of the job to packaging and shipment)?

Acceptable: A computerized and bar coded system tracks where all jobs are located throughout the manufacturing process.

A well managed company will know: (1) where all jobs in-process are physically located, (2) how far along in the process each job is, and (3) any non-conformance or problems any job has experienced during the manufacturing process. Exceptional companies also provide a portal to customers so they can review the status of their orders at any time.

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18. How is the location of a job tracked (from the start of the job to packaging and shipment)?

- continued -

Unacceptable: No system, or jobs are tracked using paper or a spreadsheet.

Large orders require many jobs to be in-process at the same time. If a computerized and bar coded system is not used, there is a good chance that jobs will be lost or fall behind schedule which in-turn will lead to late orders. Additionally, the status of each job should be known at all times.



19. How are jobs scheduled and rescheduled?

Acceptable: Jobs are scheduled using an ERP system or Project Management software.

For large orders, scheduling and rescheduling of jobs is an extremely complicated task. When scheduling future jobs the following factors must be considered: (1) when the customer needs the product, (2) when material is scheduled to arrive, (3) how many direct employees are available, (4) how much equipment and machinery are available, (5) shop floor space, and (6) how much time is expected for each operation.

19. How are jobs scheduled and rescheduled?

- continued -

Unacceptable: There are many incorrect answers such as: (1) a shop foreman or manufacturing engineering uses their best judgment of where to fit in new jobs, (2) a spreadsheet is used, or (3) other non-technical techniques are used.

A sophisticated scheduling system is mandatory for large orders. Anything less will increase the chance of late orders.





20. Do you believe a company should habitually select the lowest bidder and assume that lowest bid equals best value?

Acceptable: No.

A good procurement officer will realize that some suppliers will adopt a “buy-in” strategy when responding to RFQs or RFPs. The intent behind the “buy-in” is to gain entry into an opportunity using a lowest cost approach. The latter approach often results in delivery delays as well as quality and/or performance issues that burden a company with un-forecasted and costly work-arounds. The true definition of a “Best Value” acquisition reads as follows:

“The expected outcome of an acquisition that, in the company’s estimation, provides the greatest overall benefit in response to a requirement.”



20. Do you believe a company should habitually select the lowest bidder and assume that lowest bid equals best value?

- continued -

When determining best value, companies should (1) identify what factors affect the overall value of the requirement, (2) determine the relative importance of individual factors and possible trade-offs in evaluating one over the other, and (3) consider the differences between suppliers.

When considering the supplier differences, be sure to review and compare all of the following: (1) past performance record, (2) expertise of the offeror, (3) certifications, (4) supplier awards, (5) special features, (6) quality of proposed solution, (7) warranty considerations, and (8) preferred supplier status with other Primes.

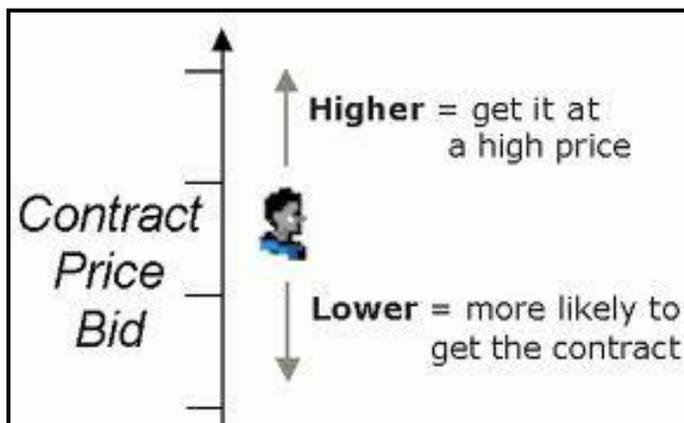


20. Do you believe a company should habitually select the lowest bidder and assume that lowest bid equals best value?

- continued -

Unacceptable: Yes.

Some companies believe that adopting a lowest cost/technically acceptable strategy will yield performing suppliers. The reality is that many suppliers that lack the requisite past performance and certifications provide enticing pricing in order to secure an order. Best price does not equal best value.





21. Where is your company's primary manufacturing facility located that makes ITAR related Products?

Acceptable: Inside the United States of America.

ITAR products must be made in the United States unless the US Department of State or Commerce has given permission to manufacture them outside the United States.

Unacceptable: Another country outside the United States.

Unless that company has permission to manufacture products (or even subcomponents) outside the United States they are breaking federal law.

Follow-up question: If ITAR related products are made outside the US, what products are they and where are they being made?



22. What percentage of your work is aerospace and non-aerospace?

Acceptable: 75% or more is aerospace.

The electrical wire harness industry is a \$60 Billion dollar industry worldwide. Of that value \$1.1B is aerospace products in the United States. Wiring harnesses can be for small appliances, cars, and many other non-aircraft related products. For large aerospace orders, it is important that the majority of the supplier's products are aerospace-related. Aerospace products have much higher quality standards than other electrical products (with the possible exceptions of medical and nuclear items). For this reason a company must have 75% or more of their products with an emphasis on the aerospace industry.

Unacceptable: Less than 75% aerospace.

A company that does not specialize in aerospace products is likely not to produce high quality products and will be late on orders if they have to quickly learn aerospace quality standards.



23. How is continual improvement tracked and measured in your company?

Acceptable: Follow the company's process manual detailing continual improvement in accordance with Aerospace Standard AS9100.

Well managed companies will have continual improvement processes to follow. The following items should be a part of continual improvement processes: (1) preliminary list of potential processes to improve, (2) a standard approach for continual improvement, (3) what is the starting state prior to continual improvement, (4) what is the goal of the continual improvement, (5) what is the end state of the continual improvement plan, (6) how effective was it, and (7) benchmarking of best practices.



23. How is continual improvement tracked and measured in your company?

- continued -

Unacceptable: A few sentences of what a company does instead of a continual improvement process manual.

This is a red flag. Companies without a written continual improvement process manual are more likely not to have effective continual improvement company-wide. This is especially true for companies who do not even have a documented starting point, goal, end point evaluation, and effectiveness assessment.





24. What percent of work is done in-house and what percent is subcontracted out?

Acceptable: Ninety percent or more is done in-house.

If more than 10% of the work is subcontracted out, a company potentially lacks the control to ensure the success of a large program. It is unwise to assume that subcontracted companies are able to meet the requirements of large contracts.

Unacceptable: Less than ninety percent is done in-house.

If more than 10% is subcontracted out then these twenty-five questions should be asked of each and every subcontractor and be evaluated using the same methodology.



25. Is your company owned or managed by another company?

Acceptable: No.

It is important to know exactly what company is responsible for overall management. If another company owns or manages a supplier then it is possible that the other company can make decisions that interfere with the successful performance of a large contract.

Unacceptable: Yes.

It is always smart to know the following information concerning your suppliers including: (1) what is the structure of the company such as sole proprietor, corporation, or partnership, (2) publically traded or not, and (3) if a company is owned by a foreign entity.



Summary

When awarding large aerospace wire related contracts, there are many factors to consider. The 25 questions in this eBook provide buyers with the means to differentiate between potential suppliers. Companies that do not answer the questions correctly will not have infrastructure or experience needed to be successful on multi-year, multi-million dollar programs. It takes a tremendous amount of commitment to be a company that is able to answer all twenty-five questions correctly.





Written By: [John Ashour](#),
President & Founder,
InterConnect Wiring

“We do the most critical tasks for our customers better and faster than they once thought possible.”

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