



A CHECKLIST FOR QUALITY

**Seven Questions to Gauge Quality
in Metal Stamping Suppliers**



The Value of Quality

Quality. It's the #1 concern for OEM engineering and purchasing managers when evaluating and measuring vendors.

BUT HOW DO YOU MEASURE THE VALUE OF QUALITY?

In manufacturing, quality is often quantified in terms of technical specifications, low variation and zero defects. But quality has an intangible side known as excellence.

When evaluating quality standards, it's just as important to assess whether the organization has a total commitment to excellence at all levels, as it is to ask for objective information and statistics on quality-related practices.

A metal stamping company will only deliver lasting value as a supplier when it demonstrates both best operational practices and a dedication to excellence.



Ask a few tough questions

Everybody talks quality, but does everybody practice it? When sourcing precision metal stamping companies, manufacturers would do well to ask the following questions when evaluating the level of quality.

Checklist for Quality

- What quality control processes are in place?
- What equipment is used to ensure quality? Are they leveraging advanced technology?
- What information technology is used and how is data shared?
- What quality certifications do they hold?
- What industry-specific experience do they have, and do they adhere to industry standards?
- Are employees at all levels regularly trained on new quality standards?
- Does the company demonstrate a commitment to zero defects?

When posing these questions, it's important to dig deep. You may be surprised how the responses may vary from one company to the next.

Each question is addressed on the following pages to provide insight into the standards that should be followed by precision metal stamping companies in order to ensure quality.



**What quality control
processes are in place?**

In assessing a precision metal stamping supplier, determine whether they have the right processes in place to incorporate quality controls into every phase of a project – from design through shipment.

Quality relies on strong systems of prevention and detection. Prevention of problems should be the primary focus, involving both the process tools defined below and other methods to prevent defects. Detection must be an ongoing effort using automated inspection technology and statistical process control to constantly monitor production standards and identify variances as soon as possible.

LOOK FOR THE FOLLOWING BEST PRACTICES IN METAL STAMPING FOR MANUFACTURERS:

CPPD - Collaborative Product and Process Design

You don't want to settle for a supplier that doesn't leverage their design expertise.

CPPD ensures the product design not only meets your expectations, but also incorporates expert input from the metal stamper's engineering, tool and design team. They should be able to recommend the best way to design a part to reduce the risk of failure, increase productivity, and contain costs.

DFM - Design for Manufacturability

You want to work with suppliers who strive to improve manufacturing efficiency.

The DFM process ensures that the metal stamping is designed for ease of manufacture. Although a component metal stamping may seem like a small item in the overall product design, it can make a big difference. As part of DFM, the metal stamper should spend a significant amount of time ensuring that the part will meet quality standards, which will save time and expense later during development and production.

FMEA - Failure Modes and Effects Analysis

One of the best tools used in risk management/ risk mitigation is the Failure Modes and Effects Analysis (FMEA).

Failure Modes and Effects Analysis is the process used to identify possible failures in design, manufacturing and assembly of a product or part and identify a risk priority number (RPN) that can be used in minimizing risks. Failure modes refer to the ways that a product might fail and its probability, and effects analysis refers to the potential consequences. The aim is to reduce or eliminate failures, starting with the most critical specifications.

In addition to evaluating products for quality prior to beginning production, metal stamping companies should also apply disciplined processes throughout production to ensure a quality output.


SPC - Statistical Process Control

SPC is an efficient process that results in less interruption and process slowdowns than with more direct examination and inspection methods.

SPC is the application of statistical methods and procedures, such as control charts, to analyze the inherent variability of the metal stamping process and part production. Control charts help the production team determine trends and identify when specifications are out of line or an unstable condition occurs which requires further study.

GR&R - Gauge Repeatability & Reproducibility

Through GR&R, quality personnel can determine the accuracy of a measurement by establishing its repeatability and reproducibility.



What equipment is used to ensure quality? Are they leveraging advanced technology?

The most advanced metal stamping companies are employing the latest technology to ensure that parts production meets quality control requirements and results in zero defects.

In evaluating a metal stamping supplier, ask for an overview of the technology in place to ensure manufacturing quality and how frequently that equipment is used. The best metal stampers will continually employ quality control equipment to detect potential problems as quickly as possible, rather than just conduct random testing.

ADVANCED EQUIPMENT TO LOOK FOR

Automated inspection equipment, such as in-die sensors and video inspection systems, are a must for ensuring quality. These systems provide instant measurements and transmit records throughout the manufacturing process, which are then charted via the statistical process control system to detect variances.


Statistical Process Control Systems – use statistical methods to track the metal stamping manufacturing process in real time. Important attributes are assigned to the metal stamping along with an acceptable range for variances during manufacturing. Variances from the norm are charted automatically in real time with SPC software, allowing a manager to quickly resolve any problems.

Coordinate Measurement Machines – provide precise measurements of the part within the tightest manufacturing tolerances and check geometric dimensions and tolerances specified on the blueprint to ensure that the part meets specifications. Data from the CMM is entered into the SPC system for automatic review of charts in real time so that any necessary adjustments can be made.

Optical Vision Systems - take non-contact video measurements of all dimensions of the part with resolutions as precise as .000020". The optical vision system is used to verify initial dimensions to ensure conformance with the blueprint and controls the dimensions required for ongoing production. Data from the vision system is also entered into the SPC system for automatic review of charts in real time so that any necessary adjustments can be made.

Functional Gauges and Custom Gauges – An array of gauges are used to measure parts during manufacturing, from handheld digital gauges to high-tech multi-sensor metrology systems that combine multiple laser and touch probe sensors to perform micro-measurements. Functional gauges match the form, fit and function of a component. When needed, a metal stamper will build a custom gauge for a unique individual part to ensure that measurements meet specifications.

In-die Detection Sensor Systems – In-tool sensors are used to protect tools from inadvertent damage due to various mishaps such as slugs, mis-feeds, material variation, etc. In-die sensors can also be used to verify product conformance and ensure quality products at the end of the process.



**What information
technology is used and
how is data shared?**

Information is power, so it's important that the employees of a metal stamping company have ready access to the latest data. A company-wide information system ensures that quality commitments are understood and implemented by every team member associated with a project.

The metal stamping company should provide complete information to all team members on parts in production, with accurate, up-to-date documents at the point of use, such as:

- Job Scheduling and Tracking
- Blueprints with Revision History and Archive
- Work Instructions
- Quality Control Plans and Reports

Not only does a robust IT system help the metal stamper achieve quality performance, but it also enables a customer to conduct quality audits more easily and quickly. For example, the metal stamper should be able to instantly retrieve such data as manufacturing records, inspection history and shipping date by part number when required.

The information system should also contain important reference materials such as:

- Documentation for ISO Standards
- Calibration Database for Inspection Equipment, Gauges and Measuring Instruments
- Internal System Audits and Monthly Quality System Reviews
- Raw Material Inventory
- Die Maintenance History
- Equipment Preventative Maintenance Database



**What quality certifications
do they hold?**

The International Organization for Standardization (ISO) is the gold standard among quality certifications standards, demonstrating that a metal stamper has met the qualifications necessary for operating in a global marketplace. Attaining ISO certifications is a testament to the stringent quality systems in place.

ISO 9001:2008

ISO 9001:2008 is the general standard that requires companies to establish, document, implement, and maintain a quality management system and continually improve its effectiveness in accordance with the requirements of the standard. You should insist your metal stamping supplier has ISO 9001:2008 certification as a minimum.


Automotive - ISO/TS 16949:2009

ISO/TS 16949:2009 is the quality management system standard specific to the automotive industry. The standard defines requirements for the design and development, production and, when relevant, installation and service of automotive-related products. The TS standard is also accepted by other industries such as aerospace and electronics.

Medical Devices - ISO 13485:2003

ISO 13485:2003 is the quality management system standard specific to the medical industry. The requirements emphasize critical areas impacting design, process, quality, and manufacturing reliability for medical device products.

Not all metal stampers go the extra mile to obtain industry-specific standards, as the general ISO 9001 standard is considered sufficient by some manufacturers. Industry specific standards demonstrate the company's focus and knowledge in the specifications and requirements needed in those industries.



**What industry-specific
experience do they have
and do they adhere to
industry standards?**

Industry standards are related to mitigating risk in manufacturing and product reliability. Each industry has its unique challenges and requirements. The more complex the end product, the more sophisticated the metal stamper's capabilities must be. Look for a proven track record in developing high-precision, tight-tolerance custom stampings and assemblies in specialized industries such as automotive, insert molding, medical devices and electronics.

The right metal stamping supplier will have professional staff with in-depth experience with the industry standards and production demands unique to your field and will have earned high-level certifications to ensure the highest quality. If your industry has particular quality processes, their team should be able to assure your project will meet the exact standards you require, not some approximation.

The company's engineering and tool and die experts should be able to demonstrate that they have improved the design of parts for greater utility and lower production costs. Ask for examples of their work and talk to their client references.

Their processes should conform to industry quality standards and serve to reduce, minimize or eliminate the risk of defects, such as:

**Automotive: APQP
(Advanced Product Quality Planning)**

Through the APQP process, automotive manufacturers and their parts suppliers are involved in every step of the development and launch process together – from initial development through product launch and beyond. The APQP process monitors more than 23 areas before production begins, such as design robustness, design testing, quality inspection standards, product packaging, and more

Medical Devices: DQ/IQ/OQ/PQ

DQ/IQ/OQ/PQ relates to verification and validation of both design activities and manufacturing process development to ensure that the device will function as specified. The processes are spelled out in the ISO 13485 standard for medical device manufacturers, including Design Qualification (DQ), Installation Qualification (IQ), Operational Qualification (OQ) and Performance Qualification (PQ).



**Are employees at all levels
regularly trained on new
quality standards?**

A metal stamping company committed to quality will provide comprehensive training programs for managers and employees at all levels to ensure effective leadership, continuous improvement in quality, and greater reliability and safety of operations.

Regular quality training for staff, including tool design, engineering, production, and administration, helps to ensure that the company can consistently meet the highest international standards in precision metal stamping, while delivering zero defects, minimizing scrap and meeting on-time deliveries.

Multifaceted training should be offered for specific positions in production set-up and operations, as well as for overall operations, covering all aspects of machine operations, use of support equipment, quality, safety and housekeeping.

Quality training should highlight how every employee affects quality, from the engineer to the operator to the shipping clerk. On-the-job training is not enough. Employees should participate in formalized classroom training that includes testing to ensure comprehension.

Offering advanced training programs demonstrates a commitment to keeping current. You can learn a great deal about a company's quality standards by inquiring about training schedules and quality content.



**Does the company
demonstrate a commitment
to zero defects?**

Zero defects is a performance standard and method developed by quality guru Philip B. Crosby, which, according to ASQ, "states that if people commit themselves to watching details and avoiding errors, they can move closer to the goal of zero defects." Crosby's groundbreaking book, *Quality is Free*, shifted the focus on quality from the quality control and inspection department to a company-wide expectation of zero defects, from top management on down. He posed that zero defects could only be achieved by prevention, supported by a culture that expects nothing less than perfection.

The management of a metal stamping company should be firmly committed to delivering zero defects and demonstrate that commitment by processes and policies that take responsibility for delivering quality stampings. A strong prevention focus will help to avoid quality issues from the start. An advanced detection system will identify problems as soon as they occur.

Of course, no manufacturing process is perfect, no matter how extensive the quality controls. Ask the company how they handle defects. The entire team should be aware that even one defect is one too many. Determine what process they follow when corrective action is necessary.

One proven process is the 8-D (Eight Disciplines) approach developed at Ford Motor Company and adopted by other leading manufacturers as a means to solve problems in manufacturing. 8-D uses a team approach to solve the problem, describes the problem in measurable terms, implements short-term corrective action, defines and verifies root causes, verifies corrective actions and implements permanent changes, and prevents recurrences. The metal stamper should be accustomed to employing factor tree analysis to identify the root cause and to record the actions and conditions that led to the problem in order to prevent further problems.

Above all, every employee should be aware of quality standards and understand their role in achieving zero defects.

Seeing is believing.

The best way to determine if a metal stamping company delivers quality is to see for yourself by visiting their facilities.

Tour the plant, Meet the people. Watch a part being produced. Look at the equipment on the floor. **ASK QUESTIONS**, starting with those listed in this guide.

Don't take a risk when it comes to quality.

THIS GUIDE WAS DEVELOPED BY KENMODE PRECISION METAL STAMPING

About Kenmode Precision Metal Stamping

Since its founding in 1960, Kenmode has built a reputation for strict adherence to uncompromised quality and performance standards in the manufacture of complex, high-precision custom metal stampings and assemblies for the automotive, electronics, consumer goods, insert molding, and medical device industries worldwide. Today, Kenmode fields one of the largest and most experienced engineering, design, and tool & die teams in the industry and employs the latest technology throughout the metal stamping design and production process. Kenmode handles a wide range of metal stamping materials and component parts, from micro-miniature medical stampings to large automotive stampings made from steel.

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