



Supplier Quality Manual



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Date	Revision	Description of Change	Approved By
6/1/2010	F	Added part cleanliness requirements on pg 10, updated nonconforming material on page 9, added item 7 on page 8. Added Shelf Life requirement on page 10. Removed IMPCO Sterling Heights from Supplier Quality Manual.	Jim Mitchell
11/5/2010	G	Corrected error on Supplier Survey, was missing section C	Jim Mitchell
4/1/20 11	H	Formatted and updated to match TS 16949 requirements for 1 st articles and added all affiliates	Jim Mitchell
3/3/2012	I	Added requirement for 3 month notice on page 9 item 7	Jim Mitchell
8/2/2013	J	Changed cover to remove Automotive systems and updated Environmental Policy	Jim Mitchell
11/2/2015	K	Updated PPAP matrix and added supplier score card information and supplier request for change process	Jim Mitchell
6/1/2017	L	Updated to comply with new ISO 2015 Standards and name change	Jim Mitchell
8/14/2017	M	Updated First Article section b requirements to require (6) parts for First Articles, and added Ethics Policy on page 5	Jim Mitchell

Introduction

The purpose of this manual is to communicate to our suppliers the core set of tool, processes and systems that are to be used in the manufacture, design and development of parts and products supplied to us.

On May 31, 2017 EControls, LLC purchased IMPCO Technologies and formed a new legal entity called EMPACO, LLC (DBA IMPCO). We are dedicated to being the leader in the manufacture of alternate fuel components and engine systems. We can only achieve our goals by receiving the best from our Suppliers. We ask that our Suppliers to join us in providing the best products with respect to Quality, Delivery and Price. We believe a strong Supplier base will assist us in providing World Class Product to our Customers.

To ensure that our Supplier's quality systems conform to our quality system requirements, our Representatives may visit your facility in order to review your quality system as well as manufacturing capability and capacity. The team's objective is to support the development of future mutual goals for our organizations. As an Supplier to us, you will have a Purchasing Representative and Quality Representative dedicated to providing the most up to date information available in order to nurture an enduring business relationship.

We are dedicated to providing Customer satisfaction.

Quality Policy

We are committed to producing high quality, reliable and cost effective products that are shipped on time, provide customer value and contribute to a better environment. Our Quality Management System (QMS) is established to achieve these objectives and embrace the principles of continuous improvement.

ENVIRONMENTAL POLICY

IMPCO is dedicated to a better world through cleaner air, and we have committed ourselves to improving global environmental quality, preventing pollution and protecting the environment.

We demonstrate this commitment through our development of technologies and products aimed at better utilizing alternate fuel resources such as natural gas and propane.

Our policy encompasses:

- Providing products to OEM customers for use in all combustion engine applications that exceed customer and governmental emissions regulations.
- Working with government regulators worldwide in support of technically and financially responsible environmental legislation, and supporting such legislation with technology development to provide product solutions to meet those environmental requirements.
- Continuously assessing the impact of our plants, products and processes on the environment, to ensure we fulfil all legal and other compliance obligations.
- A goal to continuously assess our environmental management system to identify opportunities for improvement and to implement those changes with the full commitment and support of management at all levels.

Ethics Policy

EMPCO LLC (DBA IMPCO) is committed to doing business to the highest standards of legal and ethical conduct.

Our employees shall not accept any gifts, favors, gratuities, benefit, loan, credit, prejudicial discounts, entertainment or services which could be construed as a business inducement above a nominal value. Suppliers should not routinely provide meals. If our employees travel to a supplier's site he supplier may provide or pay for meals as long as the meal is appropriate to the effective conduct of business, not extravagant and that the supplier payment of the meal is in compliance with the supplier's policy.

Our suppliers shall abide by all national and local laws and regulations of the countries in which they are operating. If legal requirements conflict with local or industry practices, the supplier shall follow the legal requirement of the regulation. Suppliers will not use child labor. "Child" is defined as a person younger than eighteen (18) or sixteen (16) where local laws allow or the local legal minimum age for employment or the age for completing compulsory education. Suppliers and sub-suppliers will not use any forced or involuntary labor and will treat each employee with dignity and respect. Suppliers will not use corporal punishment, threats of violence or other forms of physical, sexual, psychological or verbal harassment or abuse. Suppliers will provide employees with a safe working environment. Suppliers shall compensate employees by providing wages and benefits that comply with local and national laws of the country in which the supplier is operating.

We recognize cultural differences exist but believe all terms and conditions of employment should be based on an individual's ability to do the job, not on the basis of personal characteristics or beliefs. Suppliers will not discriminate in hiring and employment practices, including salary, benefits, advancement, discipline, termination or retirement, on the basis of race, religion, age, gender, nationality, social or ethnic origin, sexual orientation, political opinion or disability.

Section 1502 of the Dodd-Frank Wall Street Reform Act requires US publicly traded companies to disclose whether the product they manufacture or contract to manufacture contain conflict minerals that are necessary to the functionality or production of those products. Conflict minerals are defined as gold, tantalum and tungsten, regardless of where they are sourced, processed or sold. Suppliers shall not use conflict minerals originating from the Democratic Republic of Congo or surrounding countries. Suppliers shall conduct a reasonable country of origin of all conflict minerals in the supplier's product, and disclose the conflict mineral smelter data to us annually. IMPCO fully supports the intent of the legislation to end violent conflict in the Democratic Republic of Congo or surrounding countries.

Suppliers shall guarantee merchandise sold to IMPCO does not infringe upon any patents, trademarks, or copyrights. Suppliers must provide IMPCO with any applicable licenses and/or agreements for selling or manufacturing products sold to IMPCO upon request. Suppliers agree to indemnify and hold harmless IMPCO, its officers, agents, successors, assignees and customers against all damages, claims, demands, attorney's fees and cost of any kind for actual or alleged infringement of any tradenames, trademarks, and patent or patents because of the possession, sale or use of any material supplied to IMPCO.

Suppliers will comply with all laws, regulations and requirements of any governmental or administrative body which may be applicable to manufacture, advertising, merchandising, packaging, publicity, promotion, sale, distribution, shipment, import or export of any goods. Supplier shall be respond promptly and fully to investigate or recall of goods by any such body and shall indemnify and hold harmless IMPCO from all expenses associated therewith, including, without limitation, reasonable attorney's fees and cost.

Supplier Expectations

All suppliers must be compliant to a Quality System such as ISO 9001, IATF16949 or AS9100. It is the responsibility of the supplier to understand and ensure complete compliance to this Manual. **Suppliers must have competent resources in place to achieve our quality requirements.** The supplier is responsible for ensuring compliance with all government regulations.

New Suppliers

Our Purchasing and Quality Assurance Teams evaluates all new Suppliers. All applicable new Suppliers must submit the following items 1 & 4; Purchasing may request items 2 & 3 if deemed necessary.

1. Supplier Profile – Quality Survey (F06.2.01) supplied by our Purchasing
2. Financial Statements
3. Dunn & Bradstreet rating
4. Confidentiality Agreement (Only required for products designed by us)

After the above information has been received, Our Supplier Evaluation Team (SET) reviews the information and makes one of the following determinations:

1. Add the Supplier to the Supplier list as approved or conditionally approved
2. Schedule an on-site survey (if needed)
3. Request additional information from the Supplier (if needed)
4. Eliminate the potential Supplier from further consideration

Existing Supplier Evaluation Method

Our Supplier Evaluation Team (SET), consisting of Purchasing and Quality Representatives, gathers the appropriate data to evaluate the Suppliers. We measure the supplier's in three main categories.

1. Product Quality Performance DPM (defects per million)
2. Delivery Performance
3. Partnership

Proprietary / Confidentiality Information

All drawings / documentation supplied to our Suppliers with regards to Purchase Orders or request for quotes are to be considered proprietary information of IMPCO Technologies. This includes but is not limited to sample parts, sketches, drawings and specifications which shall remain the property of EMPCO, LLC (DBA IMPCO). Supplier shall treat the information as confidential unless otherwise agreed in writing from our Purchasing group.

Purchase Orders/Engineering Changes

The Supplier is responsible for meeting all of our Purchase Order requirements. The following items must be reviewed by the Supplier for each Purchase Order. If the Supplier cannot meet the requirements, the Supplier must notify Purchasing.

1. The purchased item part number.
2. The latest revision level of the drawing.
3. The order quantity and accuracy of price.
4. Delivery requirements.

Once the Purchase Order has been reviewed, the supplier must acknowledge by signing and or acknowledgement by e-mail and return it to the assigned Purchasing Representative for acknowledgement via email and/or fax.

When an engineering drawing or engineering specification has been revised, Our Purchasing will send the Supplier an Acknowledgement Form along with the latest engineering drawing. The Supplier must review the drawing to see if the change affects their production or inventory.

The Supplier must document on the drawing transmittal form:

1. What is required to make this change? (ie. tooling modification, fixture change, material, etc.)
2. When can this change be implemented?
3. Will the following open Purchase Orders affect this change?
4. Will this change affect work in process or inventory?
5. When will we receive parts to the latest print level along with first article data/part?
6. Does this change affect current pricing of the part? If so, how much?

The Supplier is required to answer the above questions on the Acknowledgement Form and return back to Our Purchasing Department.

Supplied Design Format Information.

We have been in the process of moving its computer aided design capability from two dimensional drafting, to three dimensional solid modeling.

Over the years many Suppliers have requested that we provide them with solid model or two dimensional files translated into formats other than the ones we design in. It is impossible for us to meet these requests from our Suppliers, as there are an increasing number of design packages on the market, all with slightly different formats.

To support Suppliers in producing quality parts to our specifications, we are prepared to provide the solid model in the native current version Solidworks format only, along with an Adobe PDF file of the two dimensional layout (in cases where the part is only defined in a two dimensional layout we will provide the PDF file only). Viewers for both of these formats are readily available for no charge on-line at:

Solidworks (www.solidworks.com)

Adobe (www.adobe.com)

If your company uses a different format solid modeling program, your software vendor will be able to advise you in what file translators are available to convert from Solidworks. If you have any questions regarding this issue, please feel free to contact your Purchasing Representative.

Certifications

Suppliers **are required** to submit **Material Mill Certs** for all metal parts, Plating or Heat Treat Certifications as applicable with **each shipment** or a Certificate of Conformance (C of C) which lists each requirement as per the drawing **for plating or heat treating processes**.

The original Certificate of Conformance for each part number should be kept in the Supplier's files for future audit purposes by us.

If no certs or C of C are received with the shipment, the shipment will be rejected and may affect Quality Rating.

Supplier Dimensional Certification Data

On certain parts, Suppliers will be required to submit inspection data with each shipment until further notification by us. Quality will identify to the supplier the required dimension that will need to be inspected. The Supplier will be notified by quality when this is required.

First Articles (PPAP)

We follow the *Automotive Industry Action Group* (AIAG) Production Part Approval Process (PPAP) for First Article Inspection validation of all purchased material required for production applications. Part PPAP qualification level requirements are established by IMPCO and based on criticality of the components.

Criticality of the components has been determined based upon design complexity, where used, safety impact, product quality or reliability. PPAP submissions are to be submitted to the facility Quality Department along with the measured part.

Each characteristic, feature or note on the drawing must be inspected and verified for conformance, and the results recorded as follows:

All PPAP Submissions will be noted on the purchase order.

PPAP Requirement Table

Requirements	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	Qualification Waived
Part Submission Warrant (PSW) (a)	S	S	S		
Sample Product (b)		S	S	S	
Ballooned Drawing (c)		S	S	S	
Dimensional Results (d)		S	S	S	
Process Flow Diagram (e)			S		
Process FMEA (f)			S		
Control plan (g)			S		
Material, Performance Test Results (h)		S	S	S (if applicable)	
Plating certs (i)				S (if applicable)	
Capability Studies (j)			S		
Gauge R&R Studies (k)			S		
IMDS (l)	S (if applicable)	S (if applicable)	S		


S = Submit to IMPCO. Retain a copy at the manufacturing location.


Each characteristic, feature or note on the drawing must be inspected and verified for conformance, and the results recorded as follows:

- a) **Part Submission Warrant** - This is the form that summarize the whole PPAP package. If there is any deviations the supplier should note on the warrant and attach deviation to the package. PSW form must comply with AIAG requirements or equivalent (Not required for off the shelf parts or waived by purchasing)Level 4
- b) **Sample product** - For PPAP submissions requiring samples, For castings (6) samples must be submitted for each cavity and (6) machine parts submitted and they have to be identified as PPAP Master Samples. For all other parts (6) parts are required for 1st articles
- c) **Ballooned drawing** - Each and every feature must be "ballooned: to correspond with dimensional results and or feature or note for (1) part only
- d) **Dimensional Results** - actual measurements/results for variables data (must indicate pass or fail on the inspection report) and must include the tolerance of the dimension for (1) part each. If the tooling produces multiple parts simultaneously (i.e. multiple cavity die/mold) then an inspection layout from each cavity is required. If the part has multiple engineering design levels (i.e. casting dimension vs. machining dimensions) then **a layout is required for each stage (casting layout & machining layout) for each cavity. The inspection layout data and only the completed final parts need to be submitted.**
- e) **Process Flow Diagram** - Flow chart describing the production process for the part.

- f) **Process FMEA** - A copy of the Process Flow and Effects Analysis, as per AIAG manual or equivalent
- g) **Control Plan** - A copy of the Control Plan that follow PFMEA steps, as per AIAG manual, or equivalent.
- h) **Material, Performance test Results** - Material certifications when material specification stated on drawing; EOL test results for applicable assemblies/systems and test results for any specific test requirements stated on.
- i) **Plating Certifications** -(if plating is called out on the drawing)
- j) **Capability Studies** – Initial process capability studies on key product characteristics identified on the drawing, if applicable.
- k) **Gauge R&R Studies** – Measurement System Analysis or Gauge R&R studies performed on key product characteristics identified on the drawings, if applicable.
- l) **IMDS** - International Material Data System reporting. If required, it will be indicated in PO. IMDS must be submitted, for IMDS # contact the quality engineer at the purchasing facility.

There are two types of key Product Characteristics:

1. This symbol  identifies Fit/Function Characteristics for Key Dimensions on components, materials or assemblies which are key to having particular quality, reliability or performance significant to the finished product. The Supplier must submit a process capability study of 1.67 cpk or greater.

2. This symbol  identifies Safety Compliance Characteristics for Key Dimensions on components, materials or assemblies that are key to having particular safety requirements significant to the finished product. Any dimension which has been identified with the Safety Compliance symbol will require the Supplier to conduct 100% testing as part of normal production process. The Supplier must submit a process capability study of 1.67 cpk or greater.

Note: all documents as stated above (a-i)as requested are to be identified and shipped to IMPCO as part of the PPAP 1st article inspection report. If the items a-i as requested are not submitted the inspection report will be rejected and returned for re-submittal.

First Articles are required for the following:

1. New part being ordered for the first time
2. Existing part ordered from new source.
3. Design change to the current part (only inspection for the change is required)
4. Part that is purchased for Engineering which will be used for production in the future
5. Part from new tool which has been ordered to replace a worn tool
6. Verification of tool repair

We review Supplier 1st article PPAP package for completeness, accuracy and legibility, verifies randomly selected characteristics and features for accuracy, compliance and documents fit check results at assembly process, as required. **If we accepts a 1st article using the supplier supplied data and if found out later that the parts do not meet our specification, our acceptance of the 1st article does not alleviate the supplier, the supplier is still responsible.**

Conforming First Article Reports are approved and distributed. Nonconforming First Article Reports are returned back to the Supplier so that corrections can be made. **Continuous rejections for a 1st article may prompt the Supplier to lose future business.**

Nonconforming Material

The Supplier will be notified of nonconforming material and will be asked for authorization to return to vendor, scrap or rework the material. A debit memo may be issued against the Supplier's account for all returned/scrapped material. The Supplier is responsible for freight charges associated with the return of discrepant material and all non conformance issues will be reflected in the Supplier's quality rating. **The Supplier may be charged for all cost associated with the rejection which may include, cost of processing paper work, cost of sorting or handling, cost of rework or line down time cost. Any questions please contact the Purchasing Department from the facility that is rejecting the product for the associated cost.**

Tooling

When a tool (die cast tool, stamping tool, molded rubber tool) has reached it's estimated life and the supplier is requesting a new tool, the Supplier must submit sample part(s) to Purchasing for review along with an explanation identifying the areas where the tool needs to be replaced. Purchasing will then forward to quality for review. If the tool is used to produce castings then a casting and a machining sample will be required.

When a new tool is produced the Supplier must identify the tool by means of metal plate with permanently engraving or engraving with the following: our part number, month and year of completion, our Property Tag number and Purchase Order number. Upon completion of the tool, the Supplier must submit pictures showing the required identification above along with the required 1st article.

Corrective Action Request (CAR)

We will notify the Supplier of a nonconformance with a Corrective Action Request (CAR). A CAR can be issued for a part as a result of receiving inspection rejection, defective parts in stock or found defective during our assembly process.

We require that the CAR be returned prior to the required due date indicated on the report. The listed due date is the maximum allowable time to respond. Even the smallest problem can be very detrimental to our manufacturing operations, so your quickest response is required. The CAR response should include the corrective and preventive action and a break point for stock. Two or more CARs for a specific part or non-response to a CAR could cause us to immediately re-source to another Supplier.

Control of Inspection, Measuring and Test Equipment

The Supplier must have established and maintained documented procedures to control, calibrate and maintain inspection, measuring and test equipment and devices used to demonstrate the conformance of product to the specified requirements. Inspection, measuring and test equipment should be used in a manner that ensures that the measurement uncertainty is known and is consistent with the required measurement capability. All inspection, measuring and test equipment must be in compliance to the requirements of ISO10012 and standards traceable to the National Institute of Standards and Technology (NIST).

Sub-contractor Control

The Supplier takes full responsibility for any sub-contracted (outsourced or alternate) process and will have final approvals or inspection in place to assure all sub-contracted components conform to all specifications dictated by the drawing (s).

Supplier Request for process change or design/specification change

We encourage all Suppliers to continually improve their product and processes. However, the supplier must notify us 60 days in advance using the Request for Deviation or Process design/change form (F04.9.01-04) prior to any shipment of parts produced from a changed process. For any engineering design/specification change the same form is to be completed and submitted to our Purchasing. This form can be downloaded from www.impcotechnologies.com under Our Company/Quality/Supplier Quality section. **Supplier must not proceed with any changes until approved by us.**

Supplier Request for Deviations from design/ Specifications

We expect all material and/or parts supplied to meet all of our requirements.

Nonconforming parts are **NOT** to be shipped to us without prior approval in writing. The Supplier is expected to complete the Request for Deviation or Process/Design Change Form F04.9.01-04, this form can be downloaded from www.impcotechnologies.com under Our Company/Quality/Supplier Quality section and submit it to our Purchasing. If the Request for Deviation is approved, then the Request for Deviation Form will be returned back to the supplier with approved signatures. **UNDER NO CIRCUMSTANCE WILL PRIOR or FUTURE VERBAL AGREEMENTS BE ACCEPTED.**

Packaging

Suppliers are held responsible to ensure packaging is sufficient to protect material from shipping damage (nicks, dings, scratches, etc.). Supplier is to make sure that the packages do not weigh more than 35 pounds. Suppliers are encouraged to use recycled material as much as possible.

Delivery Requirements

The Supplier will adhere to formally accepted shipment dates as specified on the Purchase Order. The acceptable window for deliveries is no earlier than 3 days and no later than 2 days from the delivery date specified on the purchase orders. We reserve the right to specify preferred carriers, but not limited to. Suppliers are responsible for proper transportation in order to meet agreed delivery dates. All missed shipments must be expedited the same day at the Supplier's expense.

Part Cleanliness and Burrs

Suppliers are responsible to ensure parts are clean and free from oil, metal shavings, loose plastic, loose sand and all other types of loose foreign materials. Parts to be found oily or having any type of loose sand, loose metal shavings or loose foreign materials will be returned to the supplier at the supplier cost. Parts are to be free of burrs and or sharp edges. **THERE IS NO EXCEPTION** as our products, which are used on engines in which having loose particles, could cause an engine failure.

Shelf Life

If the product that is being supplied to us has a recommended shelf life by the manufacture, then the supplier needs to note on the outside of the packaging the recommended shelf life in years otherwise we will assume that the shelf life is Infinite. **EXAMPLE: SHELF LIFE 5 YEARS** from date of shipment.

International Material Data System Requirements (IMDS)

If you are requested to submit IMDS documentation, you must 1st submit via the IMDS web site <http://www.mdsystem.com/>

The module ID number, version number and the creation date must be included on the Part Submission Warrant (PSW).

Any questions please contact the Quality Department.

Chemical Substance Guidelines

Based upon the Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC "RoHS Directive" all Suppliers are required to comply with the chemical substance guidelines listed below.

Restrictions Impurities:

- Lead & Lead compounds
- Mercury & Mercury compounds
- Cadmium compounds
- Hexavalent Chromium
- Bisphenol A
- Asbestos
- Polychlorinated Biphenyl (PCB) & Polychlorinated Terphenyls (PCT)

Allowable Impurities:

A maximum concentration value, up to the percentage listed below by weight and homogeneous material shall be tolerated. These substances are allowable provided they are not intentionally introduced for any function purpose such as corrosion, adhesion, etc.

- Steel (including galvanized steel) (Less than .35% Lead by weight)
- Aluminum (Less than .4% Lead by weight)
- Copper Alloy (Less than .4% Lead by weight)
- Hexavalent Chromium (Less than .1% by weight)
- Cadmium (Less than .01% by weight)

For any part that does not meet the above allowable Impurities, the supplier must notify IMPCO Technologies purchasing in writing.

Conflict Mineral Policy

Supplier are required to provide to us the Conflict Mineral Report as per EICC-GeSI template in the original Excel form (not in PDF) for all related production parts if asked by IMPCO.

Bar Code Requirements

The following instruction is to be used as a guideline when a Supplier is developing bar code shipping labels for products that will be delivered to us, Incorporated. Unless stated otherwise, **USS code 39** will be used to barcode the necessary information. For additional guidelines and references, refer to the Automotive Industry Action Group (AIAG) publication titled Trading Partner Labels Implementation Guideline # B-10 *.

1. **Part Number:** The part number as defined by IMPCO and documented on the Purchase Order, which is given to a supplier.
2. **Revision:** The Revision is the configuration of the part in our engineering drawing. It is also noted in the item master field for the revision.
3. **Description:** The description as stated on the Purchase Order is also what is called out on the engineering drawing.
4. **Supplier Name:** The name of the party that produces, provides, or furnishes a product or service us which we have placed an order with.
5. **SPLR ID:** The numeric code used to identify the supplier in our manufacturing system. It is also noted on the Purchase Order.
6. **Quantity:** The number of parts, items or other units of measure in the container.
7. **Purchase Order Number:** A Purchase Order number is a commercial document issued by us, indicating the products, quantities and agreed prices for products or services that the Supplier will provide.
8. **Manufacturing Date:** Date of fabrication – two digits month, two digits day, and two digits year.

Part Number AB1-23-2 	Revision A 	Date 9/22/2007 
Description Throttle Body Assemble 		Quantity 100 
Supplier I.D. Z123XY 	Purchase Order No. 791234 	
Customer IMPCO	Supplier Name Company XYZ	

**Automotive Industry Action Group,
 26200 Lahser Road
 Suite 200,
 Southfield, Michigan 48034*

Warranty

Suppliers are expected to warrant the product purchased by IMPCO for 3 years from date of manufacture. In the event of product failure or non-conformances related to the supplier's product, the supplier is expected to provide root cause analysis and corrective action in addition to all cost to correct or replace the product. The supplier may also be responsible for all cost associated with the failure.