



SUPPLIER QUALITY MANUAL

(Plug & Customer Specific Requirements)

Headquarters

968 Albany Shaker Road

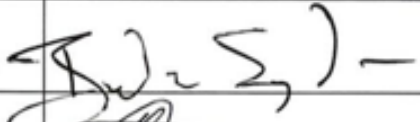
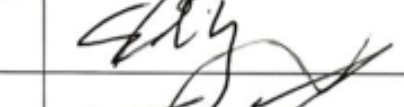
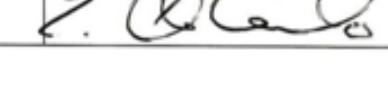
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PURPOSE/OBJECTIVE

The purpose of this manual is to communicate a cooperative agreement between Plug and its Suppliers concerning the supply of products and services. This manual is intended to aid the Supplier in understanding and fulfilling Plug's expectations and supply base requirements.

The requirements outlined in this manual do not supersede regulatory, statutory, Purchase Order, engineering drawing, engineering standards or specifications, contract, Statement of Work, legal or other documented agreements between Plug and the Supplier. In all cases of conflicting requirements, the more stringent requirement shall apply.

USE of this MANUAL

Unless otherwise agreed to in writing, this manual invokes all the requirements of the **ISO 9001:2015 Quality Management System Standard**. When "No specific Plug requirements for this section." appears, it indicates that only the section's requirements as indicated in the **ISO 9001:2015** standard apply. The Supplier is expected to meet or exceed the requirement as if they were fully compliant and certified to the **ISO 9001:2015**.

Additional Plug requirements (Customer Specific Requirements) are indicated in the section relevant to the requirement. These requirements take two forms.

1. Requirements Plug requires the Supplier to implement through their Quality Management System (QMS) - generally formatted as "Supplier Shall..."
2. Requirements relevant to the supply base Plug has implemented as part of its QMS - generally formatted as "Plug shall..."

When Ex Products, Components or Materials are provided, select requirements of **EN ISO/IEC 80079-34 Explosive atmospheres – Part 34: Application of quality management systems for Ex Product manufacture** are also invoked when appearing in this manual. They are interpreted in the same manner as the **ISO 9001:2015** requirements. These requirements appear underlined, in within a rounded box.

Additionally, select requirements of **IATF 16949:2016 Automotive Quality Management System Standard** are also invoked when appearing in this manual. They are interpreted in the same manner as the **ISO 9001:2015** requirements. These requirements appear in *italic font* within a box.

These requirements are additive to the ISO 9001, IATF 16949 or when invoked, the **EN ISO/IEC 80079-34** requirement, regardless of the format of the requirement. Meaning that, even for Plug implemented requirements (#2 above) the supplier must implement that requirement and apply it to their organization/supply base in a manner suitable to the supplier's organization and purpose.

The Supplier should seek guidance and clarifications as necessary from Plug Supplier Quality Assurance and their Buyer.

1. SCOPE

The expectations, requirements and standards defined in this manual are applicable to all Suppliers providing materials, products, and services to any Plug facility. This includes Suppliers of direct materials, packaging materials and services such as containment, sorting, calibration, etc.

Plug is committed to maintaining its position as the global leader in hydrogen solutions and we recognize the integral role that each Supplier plays in maintaining our position of excellence in innovation, technology, cost, quality and delivery.

2. REVISIONS

This manual will occasionally require revisions as requirements, expectations and systems improve. It is the Supplier's responsibility to ensure they have the latest released edition. It is the Supplier's responsibility to contact the appropriate Plug personnel with any questions regarding the requirements contained within this Supplier Quality Manual (SQM). Revisions to this manual are detailed in the table below:

Revision	Description	Author	Effective Date
01	Released	Aaron Currado, Nick Gennarino	10 – October 2023

3. ABBREVIATIONS / DEFINITIONS

Abbreviation / Term	Definition
AIAG	Automotive Industry action Group
ANSI	American National Standards Institute
APQP	Advanced Product Quality Planning
ASL	Approved Supplier List
ASTM	American Society for Testing and Materials
COTS	Commercial Off the Shelf
C of C	Certificate of Conformance
CFR	Code of Federal Regulation
CTI	Comparative Tracking index
D of C	Declaration of Conformity
CS1	Controlled Shipping 1 requires 100% sort before shipping
CS2	Controlled Shipping 2 requires 100% sort by 3rd party before shipping
e.g.	exempli gratia, meaning "for example"

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PCP	Process Control Plan
ECN	Engineering Change Notice
ECR	Engineering Change Request
EN	European Norm
Ex	Explosive Atmosphere Standard Reference
Ex Product	Ex Equipment, protective system, safety device, Ex Component and their combination, as well as software and services
Ex Component	Critical Components for Ex Products
Ex Material	Critical Materials for Ex Products
FMEA	Failure Modes Effect Analysis
IATF	International Automotive Task Force
IEC	International Electrotechnical Commission
IMDS	International Material Data System
ISO	International Standards Organization
IT	Information Technology
MSA	AIAG Measurement System Analysis Guidelines
PCB	Printed Circuit Board
PFD	Process Flow Diagram
Plug	Plug Power, Incorporated
PO	Purchase order
PPAP	Production Part Approval Process
PSW	Part Submission Warrant
MSD	Material Safety Datasheet
QMS	Quality Management System
RFQ	Request for Quote
R&R	Repeatability & Reproducibility
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
RPN	Risk Priority Number
RTI	Resistance to Impact
SCAR	Supplier Corrective Action Report
SDR	Supplier Deviation Request
SOR	Statement of Requirements
SOW	Statement of Work
SPC	Statistical Process Control
SPS	Supplier Performance Scorecard
SQM	Supplier Quality Manual
SSA	Supplier Self-Assessment
UV	Ultraviolet
5S	seiri, seiton, seiso, seiketsu, and shitsuke

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4. CONTEXT OF THE ORGANIZATION

4.1. Understanding the organization and its context

No specific Plug requirements for this section.

4.2. Understanding Needs and Expectations of interested parties

No specific Plug requirements for this section.

4.3. Determining the scope of the quality management system

Plug's goal is for all Suppliers of materials and services, producing or affecting direct production material, to become certified to IATF 16949 **and when required, EN ISO/IEC 80079-34**. At minimum, all Suppliers of direct production materials shall demonstrate conformity to the latest ISO 9001 standard, and to other relevant industry standards. If compliance / certification cannot be achieved the Supplier shall contact their Buyer to discuss the situation and seek resolution.

Third party certification does not alleviate the Supplier's responsibility to meet all Plug quality, delivery and other requirements.

4.3.1. *Determining the Scope of the Quality Management System... supplemental*
No Specific Plug requirements for this section.

4.4. Quality Management system and its processes

No specific Plug requirements for this section.

5. LEADERSHIP

5.1. Leadership and Commitment

5.1.1. General

The Supplier's top management shall ensure that a process for escalation related to all safety relevant products and processes is documented and implemented.

5.1.1.1. Corporate Responsibility

No specific Plug requirements for this section.

5.1.1.2. Process Effectiveness and Efficiency

No specific Plug requirements for this section.

5.1.1.3. Process Owners

No specific Plug requirements for this section.

5.1.2. Customer Focus

No specific Plug requirements for this section.

5.2.Policy

5.2.1. Quality Policy

No specific Plug requirements for this section.

5.2.2. Communicating the Quality Policy

No specific Plug requirements for this section.

5.3.Organizational Roles, Responsibilities and Authorities

No specific Plug requirements for this section.

5.3.1. **Organization Roles, Responsibilities and Authorities – supplemental**

No specific Plug requirements for this section.

5.3.2. **Responsibility and Authority for Product Requirements and Corrective Actions**

No specific Plug requirements for this section.

6. PLANNING

6.1.Actions to Address Risk and Opportunities

6.1.1. QMS Planning Considerations

No specific Plug requirements for this section.

6.1.2. QMS Planning Actions and Effectiveness

No specific Plug requirements for this section.

6.1.2.1. *Intentionally Blank*

6.1.2.2. *Intentionally Blank*

6.1.2.3. **Contingency plans**

The Supplier's contingency plan shall additionally include:

- *Cyber-attacks*
- *Information and Data security and confidentiality*
- *Pandemics*
- *Significant Supply Chain interruptions*

6.2.Quality Objectives and Planning to Achieve Them

6.2.1. Quality Objectives

No specific Plug requirements for this section.

6.2.2. Quality Objective Achievement Planning

No specific Plug requirements for this section.

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6.3.Planning of Changes

No specific Plug requirements for this section.

7. SUPPORT

7.1.Resources

7.1.1. General

No specific Plug requirements for this section.

7.1.2. People

No specific Plug requirements for this section.

7.1.3. Infrastructure

No specific Plug requirements for this section.

7.1.4. Environment for the Operation of Processes

No specific Plug requirements for this section.

7.1.4.1.Environment for the Operation of Processes – supplemental

No specific Plug requirements for this section.

7.1.5. Monitoring and Measuring Resources

7.1.5.1.General

The Supplier shall have a documented system in place for the control, calibration, analysis use and maintenance of all inspection fixtures, measuring / testing instruments, gages, machines, or equipment used for verification of conformity to requirements, and are to be assessed for accuracy and repeatability/reproducibility (R&R) at prescribed documented intervals.

All Plug owned fixtures and test/inspection equipment shall be clearly identified with part number and revision.

Documented procedures and instructions for the control, calibration, analysis and use and maintenance of equipment, are available at point of use and that documented training is maintained for the intended use of such calibrated device.

Control, acceptance criteria and procedural requirements are to be in accordance with the latest released edition of the AIAG Measurement System Analysis (MSA) manual.

[7.1.5] Ex General:

With regard to Ex Products, Components and Materials:

When monitoring or measuring is used to verify the conformity of Ex Products, Components and Materials the measuring equipment shall be calibrated, and a valid calibration certificate shall exist.

Verification of measuring equipment against calibrated equipment is also permitted as long as it is properly documented.

The calibration certificate shall meet one of the following requirements:

- a) Where a calibration certificate bears the accreditation logo issued by an accredited calibration laboratory (which can demonstrate that it operates in compliance with an internationally recognized standard and is covered by a multilateral international agreement).
- b) Where a calibration certificate does not bear the accreditation logo of a national accreditation authority, each calibration certificate shall include at least the following information:
 - an unambiguous identification of the item calibrated;
 - evidence that the measurements are traceable to international or national measurement standards;
 - the method of calibration;
 - a statement of compliance with any relevant specification;
 - the calibration results;
 - the uncertainty of measurement, where necessary;
 - the environmental conditions, where relevant;
 - the date of calibration;
 - the signature of the person under whose authority the certificate was issued;
 - the name and address of the issuing organization and the date of issue of the certificate;
 - a unique identification of the calibration certificate.
- c) Where a calibration certificate does not bear the accreditation logo of a national accreditation authority or does not contain the information listed in 7.1.5 b), the supplier shall demonstrate a valid relationship to international or national measurement standards by other means (e.g. a documented site assessment).

7.1.5.2.Measurement Traceability

No specific Plug requirements for this section.

7.1.6. Organizational Knowledge

No specific Plug requirements for this section.

7.2.Competence**[7.2] Ex Competence:**

With regard to Ex Products, Components and Materials:

The supplier shall have a documented process to identify and ensure that all persons having an impact on the compliance of Ex Products, Components and Materials are trained and competent. Records of this shall be retained.

NOTE 1 Parties who might have an impact on the compliance of Ex Products are the Ex authorized person(s), manufacturing, inspecting, testing, sales, marketing, supply management, calibration and quality control services and other services.

NOTE 2 Competence requirements of 7.2 also address the awareness of 7.3.

7.2.1. Competence – supplemental

No specific Plug requirements for this section.

7.2.2. Intentionally Blank**7.2.3. Intentionally Blank****7.2.4. Second-party Auditor Competency**

No specific Plug requirements for this section.

7.3.Awareness

No specific Plug requirements for this section.

7.3.1. Awareness – supplemental

No specific Plug requirements for this section.

7.3.2. Employee Motivation and Empowerment

No specific Plug requirements for this section.

7.4.Communication

No specific Plug requirements for this section.

7.5.Documented Information**7.5.1. General**

No specific Plug requirements for this section.

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7.5.2. Creating and Updating

No specific requirements for this section.

7.5.3. Control of Documented Information

No specific Plug requirements for this section.

7.5.3.1.Documented Information Controls

Supplier shall have an implemented system for control of QMS documented information that can be accessed, retrieved, distributed, stored, changed and used via electronic means. The system shall be backed up periodically to ensure a limited risk of losing information. Hardcopy information shall be filed and stored in a manner to allow proper access, retrieval, and preservation.

7.5.3.2.Documented Information Control Activities

No specific Plug requirements for this section.

7.5.3.2.1. Record Retention

Supplier shall retain documented information (records) for a minimum of seven years or one year after program end, whichever is longer.

7.5.3.2.2. Engineering Specifications - supplement

No specific Plug requirements for this section.

[7.5.3] Ex Control of Documented Information:**With Regard to EX Products, Components and Materials:**

The supplier shall retain adequate quality records to demonstrate conformity of the Ex Products, Components or Materials. A minimum of 10 years retention after each Ex Product, Component or Material (batch) has been placed on the market is required. As a minimum, the list of quality records requiring control and retention, as far as applicable, shall be:

- those arising from regulatory requirements;
- quality documented information;
- responsibilities and authorities for Ex relevant roles assignment and communication within the organization;
- customer order;
- contract review;
- training records;
- design and development changes;
- inspection and test data (per batch);
- calibration data;
- manufacturing traceability;
- sub-contractor evaluation;

- delivery data (customer, delivery date and quantity, including serial numbers where available);
- other documented information, if needed.

8. OPERATION

8.1.Operational Planning and Control

The Supplier shall ensure that all materials supplied to Plug conform to all requirements and any applicable regulations, Code or Manufacturing Standard as specified on drawings, relevant standards, and specifications or within the terms and conditions of the purchase order.

The Supplier shall ensure that all materials used for the manufacture of Plug parts be purchased in accordance with the designated drawings, relevant standards, and specifications, within the terms and conditions of the purchase order or within component drawings and/or specifications.

The Supplier(s) shall verify that all material used in the manufacturing process complies with the designated material for the part being manufactured. The material identification shall be maintained through the manufacturing process and provided with the completed part(s) as required.

When certifications are not required by Plug Power, the Supplier shall maintain proof of conformance and provide this information to Plug as requested.

- 8.1.1. Operational planning and control**
No specific Plug requirements for this section.
- 8.1.2. Confidentiality**
No specific Plug requirements for this section.

8.2.Requirements for Products and Services

8.2.1. Customer Communication

The Supplier shall use English as the primary language for written and verbal communication with Plug. The Supplier shall measure and report data in the units of measure as indicated by the relevant requirement.

- 8.2.1.1.Customer Communication – supplemental**
No specific Plug requirements for this section.

- 8.2.2. Determining the Requirements for Products and Services**
No specific Plug requirements for this section.

- 8.2.3. Review of the Requirements for Products and Services**

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8.2.3.1.Requirements Review:

The Supplier shall confirm and document relevant explicit and implicit requirements prior to acceptance of the order. This shall occur even when Plug does not provide specific requirements.

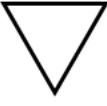
8.2.3.1.1. *Review of the Requirements for Products and Services – supplemental*

No specific Plug requirements for this section.

8.2.3.1.2. *Customer-designated Special Characteristics*

Table 1 - Plug Special Characteristic Designations indicates Plug's designations and criteria for Special Characteristics. When Plug customers designate Special Characteristics a cross reference is created.

Table 1 - Plug Special Characteristic Designations

Type	Name	Acronym	Symbol	Definition	Use Condition	Control Examples
Safety / Security	Critical Product or Process Characteristic (FMEA guideline: Severity 10)	CC/S		All Critical Characteristics of a product or Critical parameters of a process. The causal relationship between these characteristics and their potential consequences is considered to have high risk of immediate danger to life or limb. e.g. • H₂ Leak • High Voltage Fault • Safety System Failure • Risk of Fire or Explosion	Selection of these characteristics should be limited. Uncontrolled variation in the characteristic likely results in unsafe conditions for the end-user, customer, employees, or others and/or violating regulatory requirements.	Based on customer and internal requirements. Intended to be more stringent than CC/h. Upgraded or additional controls such as variable gaging / inspection, high frequency sampling, 100% inspection, verified certifications, functional and other testing, utilization of SPC, capability within 1.67 CPk / CP. Poka-yoke when possible. Periodic revalidation.
Homologation Relevant	Severe Product or Process Characteristic (FMEA guideline: Severity 8 - 9)	CC/h		All Severe Characteristics of a product or Severe parameters of a process. The causal relationship between these characteristics and their potential consequences is considered to have high risk of violating regulatory requirements and/or a moderate risk to safety aspects of the design. e.g. • Pressure Vessel certification requirements • Environmental Impact regulations	Selection of these characteristics should be limited. Uncontrolled variation in the characteristic likely results in violation of regulatory requirements or unsafe conditions for the end-user, customer, employees, or others.	Based on customer and internal requirements. Intended to be more stringent than SC. Upgraded or additional controls such as variable gaging / inspection, high frequency sampling, 100% inspection, verified certifications, functional and other testing, utilization of SPC, capability within 1.67 CPk / CP. Poka-yoke when possible. Periodic revalidation.
Functional	Significant Product or Process Characteristic (FMEA guideline: Severity 5 – 7)	SC/f		All Significant Characteristics of a product or Significant parameters of a process. Variation in these characteristics is considered to have high risk of negatively affecting customer satisfaction, FFF, appearance, reliability, performance, or further processing but are considered to have low risk of negatively affecting safety.	Selection of these characteristics should be limited. Uncontrolled variation in the characteristic likely results in a dissatisfied customer, end-user or causes inefficient or ineffective processing.	Based on customer and internal requirements. Intended to be more stringent than Standard Characteristics. Upgraded or additional controls such as variable gaging / inspection, high frequency sampling, 100% inspection, verified certifications, functional and other testing, utilization of SPC, capability within 1.33 CPk / CP. Consideration of Poka-yokes (error proofs).
Standard	Standard Product or Process Characteristic (FMEA guideline: Severity 1 – 4)	None	None	All NON-Significant or NON-Critical Characteristics of a product or NON-Significant or NON-Critical parameters of a process. Variation within the tolerance band is considered to have low risk of negatively affecting safety, customer satisfaction, FFF, appearance, reliability, performance, or further processing.	Includes most dimensions and other characteristics and process parameters. Used to provide necessary information to make the part, assembly, product and required information to perform / run a process efficiently and effectively.	Based on customer and internal requirements. Standard controls such as attribute gaging, basic inspections, certification statements, periodic sampling, etc. is generally sufficient.

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8.2.3.2.Requirement Review Documented Information

No specific Plug requirements for this section.

8.2.4. Changes to Requirements for Products and Services

Supplier shall utilize an Engineering Change Order and Document Control process for revised or amended relevant documented information and that appropriate personnel are informed when products or service requirements are changed.

8.3.Design and Development of Products and Services**8.3.1. General**

This section (8.3) does not apply if the supplier is NOT design responsible.

Supplier shall ensure that ALL requirements, including Special Characteristics, are accounted for in the design. When Special Characteristics are not designated by Plug or its customers the Supplier shall designate and control their own considering risks to end users, Plug's customers, Plug personnel, equipment, facilities and communities, Supplier, and regulatory requirements.

Plug strongly encourages Suppliers to adopt the AIAG APQP process or similar for their product and process design efforts. Regardless of process implemented Supplier shall apply Design and Development tools and techniques to the design of products AND processes.

Suppliers shall design and develop a manufacturing process that will meet quoted production volumes and all quality requirements. The Supplier shall use a multi-disciplinary approach for risk identification and mitigation in developing and improving plant, facility and equipment plans.

Supplier shall develop and implement Quality planning documentation such as Failure Modes Effects Analysis (FMEA), Process Flow Diagram (PFD) and Process Control Plan (PCP) and be reviewed and approved by Plug prior to production approval and launch.

When an FMEA has a severity or failure mode of 9 or 10, or as defined by any unique requirements of Plug, the risk shall be addressed through design action/controls or process prevention and detection actions, regardless of the Risk Priority Number (RPN).

Suppliers are expected to have a strong focus on prevention, as opposed to detection, and potential failure modes identified through the Advance Quality Planning process shall have appropriate error proofing designed into the manufacturing process to ensure capture and containment of product non-conformances.

8.3.2. Design and Development Planning

Suppliers shall work with Plug to ensure definition of key program timing and deliverables, including definition of all customers and Plug requirements, expectations and government or

legislative and homologation requirements related to product and process development and approval, as well as production launch.

Suppliers shall work closely with Plug to ensure all processes are controlled adequately to prevent the manufacture and transfer of defects. Process controls shall be sufficient to control failure modes identified through process stages, validation, and verification activities, to accomplish the design, regulatory requirements, resource needs, user inputs and requirements for effective production, and prototyping needs and requirements among others.

Special characteristics require special care. As such, a higher level of monitoring and control is required. See **Table 1 - Plug Special Characteristic Designations**.

8.3.2.1.Design and Development Planning – supplemental

No specific Plug requirements for this section.

8.3.2.2.Product Design Skills

No specific Plug requirements for this section.

8.3.3. Design and Development Inputs

The Supplier shall perform, review, and approve feasibility studies regarding their designs. Feasibility studies shall include but are not limited to:

- Risk analysis for new technology, materials, or processes.
- Manufacturability.
- Capabilities regarding inspection and test during manufacturing and as a final product.
- Resource skill availabilities.
- Organizational and Equipment Capacities.
- Production Rate requirements.
- Health, Safety and Environmental impacts throughout the product lifecycle, including post shipment.
- Ability to meet all customer and internal requirements.
- Financial reviews.

The Supplier shall submit periodic project plans reflecting design and process assumptions as well as key launch events, associated timing and progress to plan.

8.3.3.1.Intentionally blank

8.3.3.2.Intentionally blank

8.3.3.3.Special Characteristics

No specific Plug requirements for this section.

8.3.4. Design and Development Controls

No specific Plug requirements for this section.

8.3.5. Design and Development Outputs

No specific Plug requirements for this section.

8.3.6. Design and Development Changes:

Plug shall submit all engineering changes affecting purchased product to the Supplier for review of impact and timing. The Supplier may NOT implement changes until documented approval is issued by Plug.

A) The Supplier shall:

- Respond to ECR/Rfq requests within 5 business days or as otherwise arranged with the designated Buyer.
- Itemize applicable cost and timing in the required format.
- Manage and report all applicable engineering changes of their affected supply base.
- Submit samples of all executed changes, in accordance with the PPAP manual requirements prior to production implementation.
- Report their supply base changes as part of the PPAP process.

B) Supplier shall submit proposed changes via the Supplier Deviation Request (SDR) process. All proposed changes, including but not limited to the following are to be communicated as applicable:

- Proposed material changes.
- Proposed process changes.
- Proposed tooling and/or fixture changes.
- Proposed manufacturing location changes.
- Proposed sub-supplier Supplier changes.
- Any other changes as defined in the AIAG PPAP manual, including Customer Specifics.
- Cost impact/benefit for each of the change considerations listed above.

Rejected Supplier Change Requests will be returned to the Supplier with an explanation and/or request for additional information. The requested change may NOT be implemented.

Approved Supplier Change Requests will be communicated to the Supplier through the approved SDR. The appropriate Plug Quality Engineer will communicate sample submission expectations and timing requirements. Other instructions and required documentation, when applicable, will also be communicated at this time.

Notification of change approval is NOT an authorization to ship material to ANY Plug facility; **Supplier** shall follow Plug Ship authorizations only.

8.3.6.1.Design and Development Changes – supplemental

No specific Plug requirements for this section.

8.4.Control of Externally Provided Processes, Products and Services**8.4.1. General**

Supplier shall define and control any procurement, qualification, traceability, and screening requirements needed to ensure that materials, subcomponents, and subcontracted manufacturing services used by the Supplier are fully compatible with the applicable component specification or drawing.

Supplier shall maintain a list of qualified Suppliers of materials, subcomponents and subcontracted services used in the manufacture of the product and make this available to Plug upon request.

The Supplier shall periodically audit or perform a similar assessment of all subcontracted manufacturing operations to a quality standard equivalent to the Supplier's own internal operations.

Plug approval may be required for material sources.

The Supplier shall identify all material sources during the quotation process or feasibility review. If a Supplier wants to use material from a different or additional material source after the product has satisfied PPAP requirements, approval for the alternate material source shall be obtained from Buyer through the Supplier Deviation Request Process (SDR) prior to implementation or use of the change.

8.4.1.1.General – supplemental

Plug performs Supplier quality management system development with the goal of Supplier conformity to IATF 16949. At a minimum, Suppliers shall be in compliance to ISO 9001 (third-party registration preferred), unless otherwise authorized by Plug. The Supplier shall provide Plug with the current copies of their registration certificates. Additionally, Supplier shall notify Plug of any change in registration status.

8.4.1.2. Supplier selection process

Plug has a high regard for those Suppliers who have earned Quality management System certifications such as IATF, ISO and AS9100. Suppliers who have achieved this status will generally be given preferred status in the selection process.

Plug (or an accredited 3rd party source) may perform a QMS audit for any Supplier not achieving certification. Should any certification expire, be revoked or put on suspension or probation, the Supplier shall notify every division of Plug to which Supplier ships product, notifying them of status within 5 working days.

A) Supplier Self-Assessment (SSA)

Suppliers shall complete a Supplier Self-Assessment that consists of general information, company contacts, etc. Other data may also be required, such as financial and technical information as a means for Supplier consideration and monitoring. It is the Supplier's responsibility to provide an updated SSA whenever there is a change in reported information.

B) Supplier Site Assessment

Following Supplier Assessment and Plug internal review, Plug shall determine the need for a Site Assessment.

Supplier Site Assessments are conducted at the manufacturing/service site(s) and include checks with respect to company, technology, supply, quality and cost/finance. Nonconformances may be issued during an audit. The supplier shall resolve all nonconformances and issues prior to being fully approved as a supplier to plug.

C) Supplier Selection

Based on SSA criteria, site assessment, Plug internal reviews, along with the results of the RFQ and sampling of material, Plug shall make selections based on the best overall candidate that will provide the best value solution for Plug. Considerations for selection are (but not limited to):

- *Quality*
- *Cost*
- *Delivery*
- *Capability*
- *Capacity*
- *Attitude*
- *Financial strength*
- *Risk Considerations*
- *Directed by the Customer*

D) Supplier Approval

The assessment and selection process may result in:

- **Full Approval:** *The Supplier may be issued PO's and enter into contracts with any Plug entity.*
- **Limited Approval:** *The Supplier may be issued PO's and enter into contracts with only designated Plug entities.*
- **Conditional Approval:** *The Supplier may be issued limited PO's and enter into limited contracts whilst correcting identified deficiencies. Plug shall identify the conditions of the approval including any restrictions. Plug also indicates the Expiration of the Conditional Approval, at which point all PO's and contracts expire.*
- **Rejected:** *Plug shall NOT issue PO's or enter into contracts with the Supplier.*

An Approved Supplier List (ASL) exists for production Suppliers and is utilized by Plug for strategic sourcing decision-making by commodity or service performed. This listing is updated on a periodic basis to reflect input from assessments, development and performance monitoring activities by Plug.

Current Suppliers on the ASL shall continue to meet performance objectives of Plug. Supplier performance is monitored and evaluated. This measurement serves as the basis for future sourcing decisions and future business.

E) Supplier Assessments - additional

Plug reserves the right to review and assess a Suppliers financial, operational, information and IT security, quality, environmental and Health and Safety systems, for the purpose of validating compliance to applicable agreements, standards, specifications and requirements.

Assessments or reviews may be conducted from time to time to ensure stability of Plug's supply base. All Suppliers shall provide, upon reasonable notice, access to their facility as well as sub tier Suppliers as necessary. Upon notification of a requested assessment, Suppliers shall acknowledge and respond to such request within 5 business days.

Approval status in no way reduce or negate responsibility to meet specific regulatory, health and safety, quality, legal or other requirements applicable to the Supplier.

[8.4.1] Ex General:

With regard to Ex Products, Components and Materials:

Where the features affecting the Type of Protection cannot be verified at a later stage or are not verified by the supplier or manufacturer (e.g. encapsulated intrinsically safe circuits) then the product, process, or service is accepted by one of the following methods:

The supplier must demonstrate that the control process implemented ensures Ex compliance. When necessary, Plug's QMS registrar performs periodic audits at the supplier. Suppliers providing calibration services (including verification of measuring devices by comparison with calibrated equipment) are evaluated on their ability to meet stated requirements as well as the requirements of **EN ISO/IEC 80079-34**, section 7.1.5; When necessary, Plug facilitates arrangements whereby the body responsible for the verification of Plug's QMS may also verify aspects of the supplier's operation that affects the Type of Protection.

8.4.2. Type and Extent of Control**PPAP**

- Supplier shall comply with current edition of the AIAG Production Part Approval Process (PPAP) manual.
- The Plug default level for PPAP submission is Level III.
- Plug's default for all catalogue and off-the-shelf items (COTS) is submission of Certificate of Conformance (CoC) for each shipment.
- Any exceptions to PPAP requirements shall be approved in writing by Plug Quality Assurance prior to submission.
- For PPAP submissions, the Supplier shall include all required documentation along with production approved samples.
- Supplier shall submit at least three (3) samples from each tool or cavity (or more as requested by Plug) identified to correspond with the dimensional results submission. Once parts are verified, Plug at its discretion, may use them as production parts, retain or scrap them. It is the responsibility of the Supplier to retain master samples as documented information.
- The Supplier shall submit Interim PPAP approval requests to Plug Supplier Quality prior to PPAP submission. Upon approval to submit, Supplier submits all agreed to articles, indicating reasons for interim submission and expected date for full submission on the PSW.
- Notification of PPAP approval is NOT an authorization to ship material to ANY Plug facility; Supplier shall follow Plug Ship authorizations only.
- Production validation samples (PPAP samples) shall come from the approved manufacturers, manufacturing processes, and flow, unless authorized in writing by Plug. Samples provided under SDR will not be considered fully PPAP approved.

- Supplier shall perform and submit during PPAP, Run at Rate studies as a method to verify manufacturing capability with respect to production capacity and quality verification.
- Final production approval is given when all PPAP requirements have been met and all SRDs, exceptions, and issues are resolved.
- When submitting PPAP for new or modified components or materials, the Supplier shall submit Material Data Sheets (MSDs) into the IMDS. The PPAP Warrant/initial Samples Inspection Report shall include version number and the ID number of the IMDS approved by Plug. For IMDS assistance please contact Plug at imds@plugpower.com.
- The Supplier shall include bubbled drawings/standards corresponding to the dimensional/test results as part of the PPAP package.
- **Submissions shall be digital PlugPPAP@plugpower.com or for COTS items quality@plugpower.com unless otherwise specified.**

[8.4.2] Ex Type and Extent of Control:

With regard to Products, Components and Materials:

Type and Extent of Control:

- a) Suppliers of processes, products and services that can compromise the Type of Protection, the supplier must implement verification arrangements which demonstrate the product's compliance with the certificate, considering the nature of the product and the nature of the external provider.
- b) When deciding what type of verification is required for a particular purchased process, product or service, the supplier must consider the nature of the product, the capability, experience and performance of the supplier, and how critical it is to the Type of Protection.

When Plug elects to have the external provider carry out test or inspection that is relevant to the Type of Protection, the product is supplied with a declaration of conformity that confirms it has been done;

- c) A declaration of conformity must be supplied for each batch or product;
- d) Where the certificate specifies routine tests or inspections, these are carried out on each and every product. When carried out by supplier they are specified on the purchasing documents and must be confirmed by the supplier, e.g. by a declaration of conformity including test results, if required;

- e) Where verification of a product cannot be carried out after manufacture, e.g. the internal parts of an encapsulated intrinsically safe circuit, then the product shall only be accepted when supplied with a declaration of conformity. This shall specifically state compliance to the purchase documents, e.g. a quality plan, that lists the factors that together demonstrate conformity of the product;
- f) Where sample inspections or tests are permitted, they must be conducted in a manner which demonstrates conformity of the entire batch;
- g) Where supplier requires training or specialist skill or knowledge to carry out a verification, then the training material, specialist skill, knowledge or background shall be documented and training records maintained;
- h) Where Plug chooses not to carry out inspections and tests at its own premises, then inspections and tests are performed on the supplier's premises under the responsibility of Plug;
- i) Where a supplier provides product with evidence of conformity applicable to use in an explosive atmosphere, (e.g. certificate), then further verification is not required unless Plug considers it necessary;
- j) Where a verification of purchased product is relative to material (metals, alloys, nonmetallic parts, resins and similar), a specific analysis certificate or declaration must be supplied;
- k) One of the following processes are used by Plug to verify the continued conformity of the materials critical to the applied Type of Protection, used in the production of the Ex Products:
 - 1. The Declaration(s) of Conformity from the supplier of the material that can impact the material characteristics; are reviewed, as applicable; to demonstrate that the material used in the production of the Ex Product is in accordance with the schedule drawings.
 - 2. The material manufacturer's confirmation that the material maintains the particular material properties of concern; e.g. flammability, CTI, RTI, or UV resistance, chemical composition, physical properties are reviewed.
 - 3. The material manufacturer's process and data for the validation of material characteristics are reviewed.
 - 4. Confirmation that equipment testing, necessary to confirm the material is in accordance with the certificate or schedule drawings, is repeated as required. Alternative processes may be utilized when demonstrated that they provide the same level of conformity.

8.4.3. Information for External Providers

No specific Plug requirements for this section.

[8.4.3] Ex Information for External Providers:

With regard to Ex Products, Components and Materials:

Information for External Providers:

- a) The purchasing documents clearly describe the specific requirements pertaining to externally provided product set out in the certificate and the technical documentations (e.g. for process control, testing or inspection);

NOTE: For particular types of product e.g. castings, machined items and assemblies, the purchasing documents commonly include specific references to required drawings, test procedures, inspection procedures, material certificates, test reports and Declarations of Conformity.

- b) For items where conformance cannot be verified after manufacture (e.g. encapsulated intrinsically safe circuits), the purchasing information details the specific quality procedures, resources and sequence of activities relevant to the particular item;
- c) Plug defines the method by which documents e.g. technical specifications, stated in a particular purchase order remain traceable to the order;
- d) where Plug does not provide such documents with subsequent orders, documented procedures exist for ensuring that external providers have current copies of documents and that their integrity be maintained.

8.5 Production and Service Provision**8.5.1. Control of Production and Service Provision**

No specific Plug requirements for this section.

8.5.1.1.*Intentionally blank*

8.5.1.2.*Intentionally blank*

8.5.1.3.*Intentionally blank*

8.5.1.4.*Intentionally blank*

8.5.1.5.*Intentionally blank*

8.5.1.6.*Intentionally blank*

8.5.1.7.*Production Scheduling*

No specific Plug requirements for this section.

8.5.2. Identification and Traceability

Unless otherwise stated, Supplier shall be able to provide traceability from final product as shipped to Plug back to its constituent components and materials. Plug shall indicate if unit or other serialization ins required.

[8.5.2] Ex Identification and Traceability:

With regard to Ex Products, Components or Materials:

- a) The supplier shall establish and maintain procedures for product identification during all stages of production, testing and final inspection.
- b) Traceability is required with respect to the final product and its significant parts.
Traceability can be achieved using serial number, batch or other acceptable method.

NOTE: Significant parts are, for example, a printed circuit board (PCB) and safety component of an intrinsically safe circuit, but not each electronic component on a PCB. The significant part can be defined in the technical documentation during the processes of the product assessment.

8.5.3. Property Belonging to Customers or External Providers

The Supplier shall permanently mark with clear indication of ownership, all tooling, inspection and test fixtures or measurement equipment supplied by Plug.

All Suppliers/sub-contractors shall have a documented system in place for monitoring all changes to the Plug supplied/owned measuring and test equipment. The system shall address an annual verification procedure. Plug reserves the right to periodically perform audits to confirm the location and condition of assets used or stored at a Supplier facility or sub-Supplier.

[8.5.3] Ex Property Belonging to Customers or External Providers:

With regard to Ex Products, Components and Materials:

The supplier must verify the compatibility of product/materials supplied by customers or external providers with the requirements of the relevant certificate.

8.5.4. Preservation

No specific Plug requirements for this section.

8.5.5. Post-Delivery Activities

No specific Plug requirements for this section.

8.5.6. Control of Changes

Plug considers PPAP approved products and processes to be “frozen.” No changes affecting form, fit, function, safety or other requirements are allowed without explicit, documented Plug approval. Examples of changes, but not limited to, requiring approvals prior to implementation are:

- Relocation of processes, tools, fixtures etc. to another facility.
- Duplication of processes, tools, fixtures etc.
- Process changes utilizing different than the approved technology, systems and methods.
- Omission or addition of product features or process steps.
- Use of alternate methods, processes or tools.
- Use of alternate inspection, measurement or test procedures, tools, equipment, etc.
- Omission of inspection, measurement or test steps.

The PPAP manual provides a general guide regarding changes requiring PPAP submissions. Suppliers shall make change requests via the plug SDR process. When in doubt, contact your plug Buyer or Quality representative.

8.6. Release of Products and Services

Suppliers shall develop and implement detailed production launch readiness reviews.

8.6.1. **Release of Product and Services – supplemental**

No specific Plug requirements for this section.

8.6.2. *Intentionally blank*

8.6.3. **Appearance items**

No specific Plug requirements for this section.

8.6.4. **Verification and Acceptance of Conformity of Externally Provided Products and Services**

No specific Plug requirements for this section.

8.6.5. *Intentionally blank*

8.6.6. **Acceptance Criteria**

No specific Plug requirements for this section.

[8.6] Ex Release of Products and Services:

With regard to Ex Products, Components and Materials:

Where routine tests are required by the certificate and technical documentation and performed at the supplier, these tests shall be performed as specified. Unless specifically permitted by the certificate and the technical documentation, statistical methods shall not be used.

Ex Products, Components and Materials shall only be released after final inspection and testing have been satisfactorily completed. When required, the supplier shall provide customers with instructions prepared in accordance with the relevant standards or statutory and regulatory requirements, including any Specific Conditions of Use or particulars of possible misuse.

8.7.Control of Nonconforming Outputs**8.7.1. Nonconforming Output Identification and Control**

Plug may issue Nonconforming notices (SCARs) upon discovery of defective product such as, but not limited to, line rejections, mislabeling, testing failures, failed inspection results, customer concerns, warranty and/or customer returns, receipt of obsolete material or material certifications or other failure modes. Issuance is commensurate with the risk imposed by the issue.

Plug may also issue Nonconformance notices for material/logistics noncompliance issues, such as over or under shipments, missed shipments, late deliveries, packaging issues, and/or required documentation noncompliance. Issuance is commensurate with the risk imposed by the issue.

8.7.1.1.Intentionally blank**8.7.1.2.Control of Nonconforming Product – customer specified process**

No specific Plug requirements for this section.

8.7.1.3.Control of Suspect Product

No specific Plug requirements for this section.

8.7.1.4.Intentionally blank**8.7.1.5.Intentionally blank****8.7.1.6.Customer Notification**

No specific Plug requirements for this section.

8.7.2. Nonconforming Output Documented Information

No specific Plug requirements for this section.

9. PERFORMANCE EVALUATION

9.1. Monitoring, Measurement, Analysis and Evaluation

9.1.1. General

Plug shall monitor, measure and report Supplier performance in the areas of quality, delivery, and cost such as, but not limited to:

- Quality Performance & timely problem resolution
- Delivery and schedule attainment
- Responsiveness / Innovation
- Cost

Plug shall take actions when performance levels are not met. Typical actions may include, but are not limited to, requests for documented corrective actions, cost recovery, on-site management reviews at the Supplier's or any Plug facility, onsite or remote product, process or system audits, probationary status precluding new business awards and in extreme circumstances, de-sourcing.

9.1.1.1. *Intentionally blank*

9.1.1.2. *Identification of Statistical Tools*

9.1.1.3. *Application of Statistical Concepts*

No specific Plug requirements for this section.

9.1.2. Customer Satisfaction

Plug shall monitor Supplier performance and provide periodic Score Cards to select suppliers. Suppliers shall review Plug supplied performance data, contact Plug Buyer with any questions or concerns regarding the data and respond accordingly to poor performance results.

When a Supplier's component or service is implicated in a nonconformance, in particular, warranty, campaign, or recall issue, with financial consequences to Plug or its customers, the Supplier shall be prepared to accept these costs. The cost shall be determined within the Purchasing Terms and Conditions, and as defined by any Statement of Work (SOW), Statement of Requirements (SOR) or contractual or warranty agreement.

9.1.3. Analysis and Evaluation

Plug monitors, measures, and reports Supplier performance in the areas of quality, cost and delivery (QCD) such as, but not limited to:

- Quality Performance & timely problem resolution
- Delivery and schedule attainment
- Responsiveness / Innovation

9.1.3.1.Prioritization

No specific Plug requirements for this section.

9.2.Internal Audit**9.2.1. Internal Audit Scope**

No specific Plug requirements for this section.

9.2.2. Internal Audit Planning, Implementation and Maintenance

No specific Plug requirements for this section.

9.3.Management Review**9.3.1. General**

No specific plug requirements for this section.

9.3.1.1.Management Review – supplemental

No specific plug requirements for this section.

9.3.2. Management Review Inputs

No specific plug requirements for this section.

9.3.3. Management Review Outputs

No specific plug requirements for this section.

9.3.3.1.Management Review Outputs – supplemental

No specific plug requirements for this section.

10. IMPROVEMENT**10.1.General**

No specific Plug requirements for this section.

10.2.Nonconformity and Corrective Action**10.2.1. Nonconformity Action**

No specific plug requirements for this section.

10.2.2. Nonconformity and Corrective Action Documented Information

Plug shall notify the Supplier of concerns via telephone and/or electronic means.

Supplier Corrective Action Requests (SCAR) may be issued for incidents of nonconforming product / services. SCARs are reflected in the Supplier's performance ratings.

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The Supplier shall submit a corrective action report addressing the reported concern in the agreed format (8-D, Plug format, 5 Why?, 3L5Why?, or other pre-approved format) within the following time frames:

- Initial response describing immediate containment activities up to and including sort, rework, breakpoint identification and shipment of certified material required within 24 hours.
- A completed corrective action plan including preventive action is required within 5 business days and final corrective action with 15 business days (after plan) for standard purchased components (unless otherwise specified).
- For more complex nonconformance issues, a corrective action report citing as a minimum, containment actions, the potential root cause(s) and the planned permanent and preventive actions and timing for such actions is to be submitted within the timeframes noted above.

Note: Should a response not be received from a Supplier, any stated charges associated with the notice will be considered accepted by the Supplier.

Root cause for escape (non-detection) and occurrence and actions addressing both shall be included on the corrective action report. Documented corrective actions shall address product, process, non-detection and system causes of the reported nonconformance.

Supplier will assess the risk of any reported nonconformances for potential impact internally and at any other sub-Supplier locations (such as feedback loop into FMEA's, lessons learned) and if such risk exists, Supplier will immediately contact any affected Plug locations to initiate containment activities.

Costs charged to the Supplier (time duration of applied charges, sort costs, methods of calculation, etc.) as a result of a quality concern are determined by the applicable Plug location. Charges that may be applied as applicable are as follows:

- Sort of Supplier product on or offline to support production schedules.
- Production line shutdown.
- Sort and/or scrap of finished product.
- Material transfer of nonconforming Supplier product.
- Costs associated with problem investigation.
- Testing costs.
- Costs associated with rework.
- Related transportation expenses.
- Any costs incurred by Plug for customer sort, rework, and/or line disruptions.
- Administrative costs.

The Supplier shall notify the appropriate Plug Buyer if a nonconforming condition is suspected to have been shipped. Notification shall be followed by documented corrective

action as previously described. Supplier notification to Plug of suspect shipments have less impact to Supplier's performance results than if Plug discovers the issue.

Plug reserves the right to perform onsite reviews and audits to establish 100% compliance and ensure that effective containment and corrective action has and is currently taking place. Plug's customer may also participate.

10.2.3. *Intentionally blank*

10.2.4. *Intentionally blank*

10.2.5. ***Warranty Management Systems***

No specific Plug requirement for this section.

10.3.Continual Improvement

No specific Plug requirements for this section.

11. ASSOCIATED DOCUMENTS:

- Statistical Process Control (SPC)
- Potential Failure Mode and Effects Analysis (FMEA)
- Advanced Product Quality Planning (APQP)
- Measurement System Analysis (MSA)
- IATF Guidance to IATF 16949:2016
- Automotive Certification Scheme
- Environmental Management Requirements ISO14001:2004 (region specific)
- European Regulation (EC) 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)- (region specific)
- Code of Federal Regulation (CFR) title 49

Note: Copies of PPAP, APQP, FMEA, MSA, SPS, IATF 16949 are available from AIAG. ISO documentation is available through the American National Standards Institute (ANSI).

12. NORMATIVE REFERENCES

When a specific revision is not indicated, the latest revision of the document applies throughout this manual.

- ISO 9001:2015
- EN ISO/IEC 80079-34:2020
- Plug Terms and Conditions
- IATF 16949:2016
- AIAG PPAP Manual