



# Ballard Supplier Manual


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## **1.0 Introduction**

Ballard takes great pride in partnering with those suppliers who are aligned with our philosophy of delivering the highest performance products and best overall value propositions, while also sharing our vision to accelerate fuel cell adoption. Ballard's Supplier Development program will actively source and develop competitive suppliers that further enhance our leadership position.

Suppliers who partner with Ballard may expect to realize the fiscal and technology development benefits of a long-term relationship. We will remain at the forefront of technology by implementing joint development programs with suppliers who can contribute expertise and enthusiasm in bringing new ideas and methodologies to the design and manufacture of fuel cell products. An attractive supplier to Ballard will be a well-managed, financially sound and technically competent organization.

Consistent with our corporate values, Ballard will treat all its suppliers and their representatives fairly and objectively.

### **1.1 Summary**

This Supplier Manual is intended to be the primary document that communicates our Supplier Development, Supply Chain and Quality philosophy to our Suppliers and helps align their business objectives with ours. It describes Ballard's method of evaluating, approving, and monitoring suppliers.

The following key items are discussed in detail in this manual:

- Ballard's guiding philosophies for Supplier Engagement
- Process for becoming an Approved Ballard Supplier
- Performance expectations
- Supplier Non-Conformance issue resolution methodology
- Change management methodology
- First Article (FA) part submissions
- Part Approval Process.

### **1.2 Scope**

The primary focus of this document is for Suppliers who are providing materials, components or services that will be used in Ballard production parts or activities. It will be used as applicable to cover Suppliers who provide other non-production based materials, components or services.

It is not intended for the Supplier Manual to be applied in conflict with any other Ballard process, specification, engineering component definition, or Ballard Purchase order. In such cases, the latter shall take precedence.

## **2.0 Ballard's Philosophies**

### **2.1 Vision**

Be the leading global provider of innovative clean energy solutions.

### **2.2 Mission**

*"Use our extensive fuel cell and systems know-how to profitably deliver innovative clean energy solutions to our customers, create rewarding opportunities for our team, and provide extraordinary value to our shareholders."*

### **2.3 Cultural Values and Conduct Principles**

Our cultural values are:

#### Listen and Deliver

We will listen to our customers, understand their business, and deliver valuable solutions for lasting partnerships.

#### Quality. Always.

We will deliver Quality in everything we do, without exception.

#### Inspire Excellence

We inspire excellence through leadership, empowerment, and consistent demonstration of integrity, urgency, and passion.

#### Row Together

We achieve success through collaboration, respect, and trust.

#### Own It

We step up, take ownership for our results, and trust others to do the same.

Ballard wants to ensure that all of its suppliers also share this value set. Ballard has created a policy which sets out our requirements for supplier conduct: "POL5100158 Ballard Supplier Conduct Principles". This policy describes Ballard's expectations of its suppliers with respect to human rights, corporate and social responsibility, ethics, and compliance with applicable laws and regulations. Compliance with this policy is a condition of doing business with Ballard. Suppliers may be asked to submit a "Declaration of Compliance with Ballard Supplier Conduct Principles" (FRM5102095), as part of Ballard's monitoring of compliance to these principles.

When choosing a supplier among competitors for any goods or service, we will weigh the facts impartially and objectively and choose the supplier who can offer the best-valued product or service in accordance with Ballard's needs. Ballard employees will not do anything that suggests a purchase decision was influenced by irrelevant or improper considerations. In addition, we will not exert any influence to obtain "special treatment" from a particular supplier. We will strive to ensure that suppliers competing for Ballard's business have confidence that Ballard's selection process is ethical.

It is our policy that no Ballard employee accepts any gift (other than items with small intrinsic value) or other gratuity from any Supplier or bidder for Ballard's business. This policy applies to all employees whether or not they are directly involved in the purchasing activity.

## **2.4 Communication**

Suppliers are an integral part of the value chain. We therefore promote early engagement in development programs to accelerate insights into the best technologies and materials. We also work with suppliers to optimize manufacturing processes and minimize cost. In most cases Suppliers will be required to sign a confidentiality agreement with Ballard prior to full communications taking place.

Ballard clearly understands that our supply chain forms an extension of our own manufacturing capabilities, and that the expertise for managing that extension lies with the suppliers themselves. Early supplier engagement leads to more robust product design, optimized manufacturing techniques, lower cost of product, and reduced product development time. This multi-faceted Supplier Engagement approach requires communication at various levels within Ballard and also across Ballard and our Suppliers.

Ballard's Supplier Management is broken into 2 key groups:

- Supply Chain Management (Purchasing)
- Supplier Quality Engineering and Quality

All commercial communication (including purchase orders, volumes, cost, lead times etc.) should take place between the Supplier and the appropriate **Supply Chain Management contact**.

All information related to manufacturing, process and quality should be communicated directly to the appropriate **Supplier Quality Engineer**. Supply Chain (SC) will be able to provide the name of the Supplier Quality Engineer (SQE) representative responsible for a particular Supplier.

In cases where the Suppliers need to communicate directly with our engineering and design people, it is recommended that the relevant Supply Chain and SQE representative both be informed. The following general rules should be followed:

- a.) **Email communication** - Copy SCM and SQE on all communication-taking place between the Supplier and other Ballard employees.
- b.) **Teleconferences** - Invite SCM and SQE to the teleconferences
- c.) **Meetings** - Invite SCM and SQE to any meetings

## **2.5 Supplier Management**

Ballard's Supply Chain Management and Supplier Quality Engineer contacts will actively and continuously seek out competitive Suppliers to enhance Ballard's ability to manufacture more effectively in order to maintain its leadership in technology, quality and cost for the fuel cell market.

Ballard will remain at the forefront of technology by implementing new ideas, methodologies and joint development in the design and manufacturing of fuel cell products. An ideal Supplier to Ballard will be well managed, financially sound, and technically competent.

Ballard's Supply Chain is responsible for all aspects of commercial commitments, volumes, procurement, logistics, warehousing, and delivery. Ballard's Supplier Quality Engineer is responsible for the qualification of new Suppliers and re-qualification of existing ones and ensuring program deliverables are met for production part approvals. The choice of Suppliers in any of these areas may be the result of investigation and deliberation amongst various departments within Ballard, but the commitment to purchase rests solely with the appropriate procurement member of Supply Chain. **No other Ballard staff member can make such financial commitments.**

## **2.6 Standard Purchase Order Terms and Conditions**

All Ballard purchase orders shall be subject to Ballard's standard purchase order terms and conditions, as amended from time to time, as posted on Ballard's website at <http://www.ballard.com/docs/default-source/suppliers-documents/pol5100006-ballard-power-systems-standard-global-terms-of-purchase.pdf?sfvrsn=2> ("Ballard's Standard Global Terms of Purchase").

Unless otherwise agreed to by the parties, when a supplier provides goods or services pursuant to a Ballard purchase order, Ballard's Standard Global Terms of Purchase shall apply.

## **2.7 Shipping Documentation and Packaging**

All products shall be packaged, marked and otherwise prepared for shipment in a manner which is:

- a) to Ballard's packaging standards or in accordance with good commercial practice;
- b) acceptable to common carriers for shipment at the lowest rate for the particular Suppliers;
- c) assure that the product performance and characteristics will remain unchanged during packaging, transit and unpacking;
- d) In some cases, the packaging may need to be reviewed and agreed upon with Ballard Supplier Quality Engineer to ensure the packaging is adequate and compatible with all material handling and assembly equipment.

The Supplier shall clearly mark all containers with:

- necessary lifting, handling and shipping information
- Supplier name
- Ballard Purchase Order number
- complete Ballard Part Number and drawing/ specification revision level
- description and quantity of the material
- lot number (if applicable)
- date of manufacture
- date of manufacturer recommended expiry (if applicable)
- name of the manufacturer

An itemized packing list must accompany each shipment. In addition, Suppliers may be required to electronically send a Certificate of Conformance (COC) and/or Certificate of Analysis (COA) containing the information as agreed upon with Ballard for each shipment to [gcballard@ballard.com](mailto:gcballard@ballard.com). This requirement will be stated in either the purchase order or the engineering design documentation (drawing notes or specifications). As well, the supplier may be required to provide applicable material certifications, plating certifications, measurements, and any required critical specifications as agreed upon by the supplier and the Ballard Supplier

Quality Engineer, Product Development and Quality. Ballard Quality and/or Supplier Quality Engineer will review the COC to ensure it meets Ballard requirements.

## **2.8 Press Releases**

Except as required by applicable law, a governmental authority or regulatory requirements, Suppliers will not issue a press release, grant an interview to the press, or otherwise make a general public announcement, regarding the subject matter of any relationship, agreement, etc., with Ballard without the prior written consent of Ballard. Consent will be granted only under exceptional circumstances.

## **3.0 Ballard Supplier Management Program**

### **3.1 Ballard Supplier Management Program**

In pursuit of our mission to accelerate fuel cell product adoption, we seek to work with Suppliers who also share Ballard's passion and commitment to succeed in the fuel cell industry. The Supplier Management Program consists of two main components:

1. The Supplier Approval Process.
2. The Supplier Performance Management System

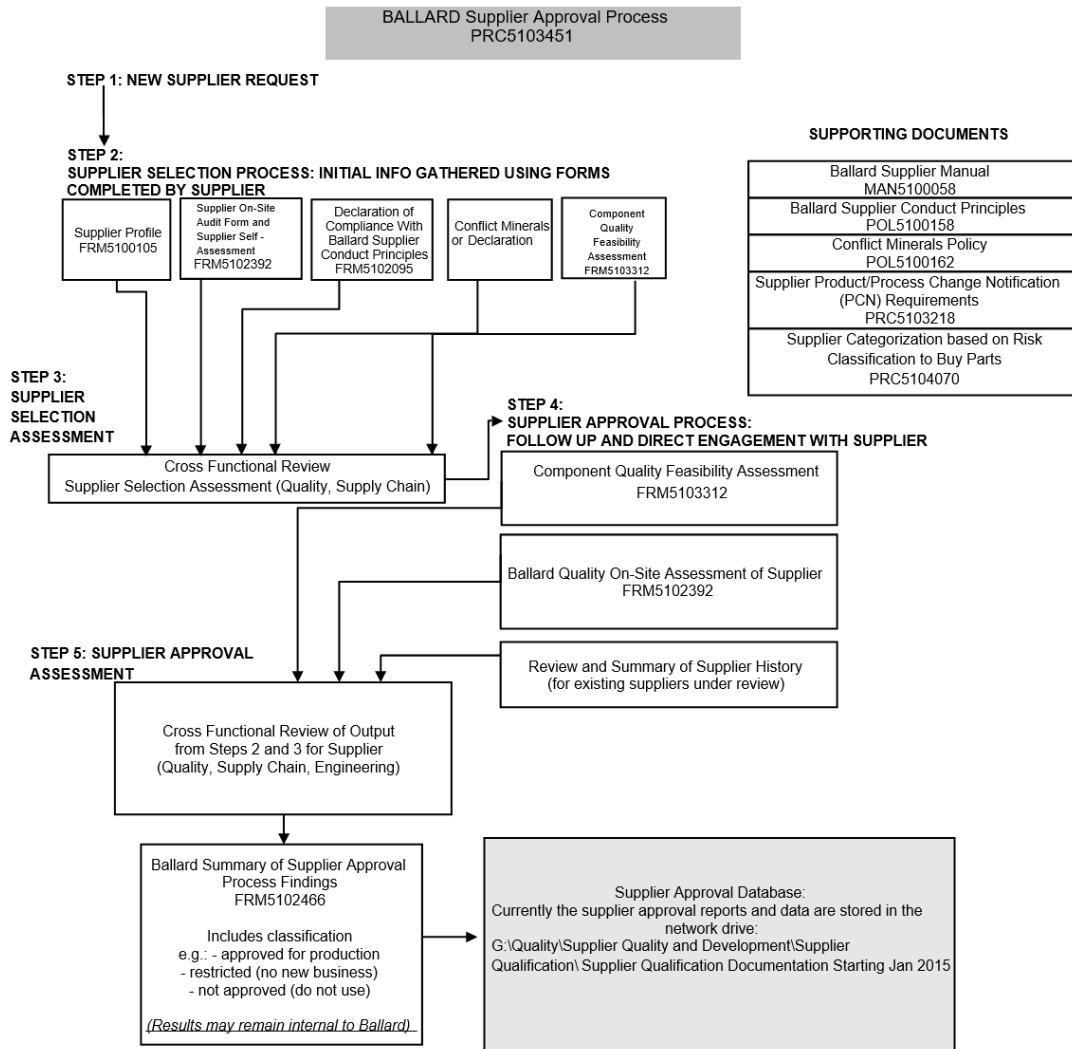
### **3.2 Supplier Approval Process**

The Supplier Approval Process (PRC5103451) is outlined in Figure 1 on the following page. The process starts with the supplier filling out forms to provide Ballard with basic business, commercial, quality and environmental management information. These forms are a fundamental first step in the supplier assessment and approval process.

#### **3.2.1 Forms to be completed by Supplier**

The Supplier Profile (FRM5100105), the Supplier Self-Assessment (FRM5102392), and the Declaration of Compliance with Ballard Supplier Conduct Principles (FRM5102095), Component Quality and Feasibility Assessment (FRM5103312) are the first forms that are filled out by the Supplier in order for Ballard to begin the assessment. These forms, as well as the supporting documents listed in Figure 1 can be obtained from Supply Chain or Supplier Quality.

It is Ballard's intention to work with Suppliers who excel in quality, competitive cost and on-time delivery to keep us competitive. We incorporate an open process that combines customer, partner, internal and supplier insights to identify innovations that address the product development, part production, manufacturing and customer needs.



**Figure 1: Ballard Supplier Approval Process**

The Supplier Profile will enable a commercial review to ensure that the potential Supplier is a viable company with strong quality and environmental management systems. It is Ballard’s expectation that Suppliers will provide full financial disclosure for the business assessment.

Ballard requires that all of its Suppliers and Service Providers comply with all applicable Governmental, Federal State/Provincial and local environmental regulations. Suppliers must also ensure compliance of their products and services to all applicable laws and regulations. This includes compliance to all environmental and health and safety requirements on restricted toxic and hazardous substances.



### **3.2.2 Supplier QMS Certification Requirements and Development**

Ballard prefers that all Ballard Suppliers be registered to ISO 9001 or IATF 16949, or have plans to register to ISO 9001 at a bare minimum. It is understood that there are some suppliers who serve the niche fuel cell space who are not ISO 9001 certified. Suppliers that do not have ISO 9001 certification are recommended to work towards registration. Ballard SQEs will help develop suppliers working towards certification, through second party audits and recommendations for improvement and risk mitigation.

If a supplier has no plans to be certified in the future, a full audit/review may be conducted by Ballard. Ballard may request that specific quality documents be forwarded or reviewed on the supplier's site during an audit (i.e. Quality Manual, environmental policy, FMEA's, control plans, and PPAP, etc.). If it is deemed necessary to use such a supplier (e.g.: single source supplier of critical material, component, or service), Ballard will manage the risk associated with this supplier by performing second party audits (at an interval of Ballard's choosing, depending on the perceived risk), along with co-operative implementation of focused risk mitigation actions based on the findings of those audits, when deemed necessary. In accordance with IATF requirements, Ballard will seek approval from customers for this practice.

### **3.2.3 REACH and ROHS Compliance**

Most of the products that Ballard sells need to be RoHS compliant. Suppliers of materials, parts and assemblies for such products will be required to provide statements of compliance. Full details of the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment can be obtained from the website:

<https://www.gov.uk/guidance/rohs-compliance-and-guidance>

Many of Ballard's products must be compliant with EU Regulation (EC) No 1907/2006, also known as REACH. This requirement cascades to purchased parts incorporated into Ballard products. Parts must not contain restricted substances or substances subject to authorization. Any Substances of Very High Concern (SVHCs) in any articles within the part must be declared if their weight percentage is greater than 0.1%

When applicable, Ballard suppliers must provide documentation certifying their products are compliant with REACH, with either a full material declaration or a declaration of conformity.

The requirement to comply with ROHS, REACH and other statutory, legal and regulatory requirements will be identified by the design documentation, purchase order, or component requirements documentation provided to the supplier by Ballard.

In addition, Ballard requires its Suppliers to be active in the implementation and management of environmental best practices. ISO 14001 registration is strongly recommended.

### **3.2.2 Qualification of Suppliers**

An important second stage of the supplier approval process includes a cross functional introductory meeting with the supplier, where both parties learn more about the products they produce, their capabilities, and the markets they serve. Ballard will also discuss the application(s) in which they might use the supplier's products, with the intent of determining whether it is a good fit between supplied product and intended use.

In many cases Ballard will visit the supplier to meet face to face, learn more about them, and to help develop a relationship. These visits may also include an on-site assessment by Ballard

Quality. Typically, Ballard will review the QMS, technical, commercial, management approach and environmental capabilities of new Suppliers before placing any orders for first article parts or services from new Suppliers. Ballard may also periodically re-evaluate the Supplier's capabilities.

Ballard may require additional actions to qualify a supplier, depending on the criticality and associated risk of the Supplier's part in our products. A cross-functional team may meet to assess the criticality of the component and Supplier. The main criteria that will be reviewed to determine criticality include, but are not limited to:

- component impact on product performance,
- component impact on product reliability,
- component cost,
- whether alternate sources are available for this component (i.e. not sole sourced),
- whether a new plant, new technology and/or new process is being used to produce the component.
- perception of supplier risk (including risk to product conformity and uninterrupted supply, financial risk, supplier's Quality Management System, manufacturing capability, adequacy of resources, change management process, logistics processes, customer service and business continuity planning)

The cross functional team will determine the appropriate actions that are required to qualify the Supplier. These may include:

- On-site Supplier Assessment (Second Party Audit)
- Process/documentation review
- Design and Specification Review
- ongoing supplier development to reduce risk

The output of the supplier approval process is a classification assigned to each supplier, which may be "approved" or "not approved". The results of these cross functional reviews are documented using FRM5102466: Ballard Summary of Supplier Approval Process Findings, Template, and they include the risk assessment based on all information and data collected to date by the cross functional team. These results are stored along with audit reports and forms collected from the supplier during the qualification process.

### **3.3 Supplier Performance Management System**

The Ballard Supplier Performance Management System (SPMS) is a business process that is used to measure, analyze, and manage a supplier's performance in an effort to reduce costs, alleviate risks, and drive continuous improvement. The ultimate intent is to identify potential issues and their root causes so that they can be resolved to everyone's benefit as early as possible.

SPMS focuses on reviewing and analyzing the Supplier's Quality Performance on a regular basis. The quality performance metrics are collected based on Ballard data collection systems, for example, the IQC Non-Conformance Reporting System. Other supplier metrics are derived from data stored in the ERP system which records all of Ballard's receipts, returns and rejects of "BUY" parts. These data are used for Quality performance and On-Time delivery performance metrics. Cross functional team review meetings are scheduled to review the results and decide on an action plan for the lowest performing suppliers. Action items from the review meetings are assigned to responsible attendees to work with suppliers in order to improve the supplier performance. Once the improvement actions have been implemented, the effectiveness of the actions is also tracked and reviewed. The SPMS report is generated on a regular basis for review

at cross functional levels and reported to the senior management team to indicate the current status of suppliers and the impact to Ballard's Cost of Quality.

## **4.0 Part Approval Process**

### **4.1 Product Development Cycle**

It is Ballard's intent to involve Suppliers in the product planning cycle as early as possible. There may, however, be unique requirements related to the confidential and competitive stage of our business, which will require a confidentiality agreement to be signed.

Ballard's Product Development Engineers and Supplier Quality Engineers work with Suppliers to create a specification and/or drawing which is mutually agreeable and mutually understood. This ensures that the supplier understands the design intent, the important aspects of the design, and that the acceptance criteria are understood and agreed upon. Ballard may require that the design documentation be approved by the Supplier using the Supplier Design and Specification Review form (FRM5100574). The Supplier is required to assess the parts and drawings for manufacturability, and signing off this form will signify acceptance, or will list required changes to make it acceptable. The completed form will be reviewed by Ballard's Supplier Quality Engineer to ensure that the issues can be resolved in a timely manner to meet program required dates.

Where possible, it is preferred that Suppliers have quality and rapid prototyping capabilities that are representative of the intended production processes. Ballard will choose to work with Suppliers who are capable of supporting a comprehensive prototype plan throughout the development cycle and to the ultimate supply of production volumes.

### **4.2 Production Part Approval / Qualification**

When a supplier is approved for production by the Ballard Supplier Approval Process, they will be required to become qualified on a part by part basis. To ensure quality launches of production products and to verify manufacturability of part designs prior to release into production, Ballard may require suppliers to provide first articles and/or production samples. Ballard will follow the internal FAI process PRC5103682. If successful, the supplier will be approved to supply the part in question, for the revision that was qualified. Depending on the criticality of the part or assembly, Ballard may determine that additional testing or qualification is required before the supplier is approved for supply of a given part for production. In some cases Ballard may require that a PPAP submission be provided. In such cases Ballard will follow the PPAP Process PRC5103775.

### **4.3 Supplier Product and Process Change Requests**

Ballard has a process for Suppliers to notify Ballard of changes or request permission for changes to product or process for Ballard parts or assemblies. This is detailed in the "Supplier Product/Process Notification (PCN) Requirements" (PRC5103218). This document describes what types of changes require notification and permission, and instructs suppliers on requesting changes with the use of the "Supplier Product/Process Change Request" form (FRM5100416).

#### **4.4 Supplier Selection Process**

Before awarding business to a supplier, a cross functional team will review drawings and specifications to identify the appropriate supplier(s) from the existing supplier base, or source a new supplier if required.

Ballard's selection process is based on a balanced evaluation of commercial and technical merits, an evaluation of the supplier's quality management system, strategic implications as well as risk to continuity and quality of supply, delivery performance, cost, and capacity. Other factors may be taken into account as required. The risk assessment for each supplier is part of FRM5102466: Ballard Summary of Supplier Approval Process Findings, Template, which is completed once the supplier approval process is complete. Ballard makes every attempt to be transparent in supplier selection.

Supply Chain will forward the appropriate Drawings, specifications, CAD files, volumes and cost targets (if available) to the Supplier(s) to review, comment and supply a quote. Quotes are reviewed to ensure that the requirements have been met. If any changes are needed, a re-quote will be required from the supplier. Preference for the award of business will be given to those suppliers who supply feedback on the design, tolerances, manufacturability, and cost savings suggestions.

#### **4.5 Product Verification (Supplier Quality Assurance)**

The Supplier should establish inspection plans to document product measurement requirements. The inspection plans may be part of the production documentation, but should include the following:

- Criteria for acceptance and/or rejection
- Where in the process measurement and testing operations are performed
- A record of the measurement (and approval of the record) as required
- Type of measurement instruments required and any specific work instructions for their use.
- For areas deemed critical or significant on the drawing or specification the actual measurement/inspection results should be recorded.

The supplier should monitor and measure the characteristics related to the manufactured products to verify that the component requirements have been met for all products supplied. The supplier should document the characteristics to check, as well as the method and the frequency of the sample measurements in the control plan.

#### **5.0 Supplier Corrective Action Requests**

If any parts supplied to Ballard do not conform to the drawings and specifications, the supplier must request a deviation prior to shipping the parts. If the deviation is approved, the parts can be shipped to Ballard. All parts shipped to Ballard under a deviation must be clearly identified with the deviation number in a manner agreed upon with Ballard.

A Supplier Corrective Action Request (SCAR - FRM5000017) may be issued to the Supplier should non-conforming parts be delivered to Ballard without prior notification of the issue and/or without a deviation request. SCAR related communication should take place between Ballard's Supplier Quality Engineer, Supply Chain and the Suppliers' quality representatives. Corrective actions may also be requested informally at the discretion of the SQE.

Upon receipt of a SCAR or request for corrective action for a non-conforming material/ service, the Supplier is required to react immediately with the following:

1. Verify concern on-site and initiate immediate containment/quarantine of all suspect material/ service.
2. Review all quality and/or manufacturing records related to the production of the suspect material/service.
3. Respond to Ballard's SQE within a reasonable time with appropriate supporting documentation attached.

Questions related to the SCAR requirements and structured problem solving process may be directed to Ballard's SQE as identified on the SCAR.

## **6.0 Design and Development**

The design and development process requirements apply to suppliers who are authorized by Ballard to create design definitions using:

- the Supplier's design rules and standards;
- the constraints defined in this document;
- Ballard's requirements;
- Government regulations and Ballard's customer requirements.

The requirements also apply to other product development activities such as design analysis and testing.

Design and development suppliers shall ensure that they and their supply chain comply with the technical requirements, and any additional contract specific process' and design requirements as outlined by Ballard.

The technical requirements are the product requirements produced by Ballard through engagement with Ballard customers and the Supplier. The technical requirements may be presented by a Technical requirements document (i.e. component requirements, envelope drawing, request for proposal, standards document etc.).

## **7.0 Geometric Dimensioning and Tolerance (GD&T)**

Ballard's drawing standard is ASME Y14.5M-2009 [Geometric Dimensioning and Tolerance (GD&T)].

In relation to this, Suppliers of Ballard Production parts and services (if applicable) are preferred to have the knowledge and understanding on how to use GD&T in the manufacture and inspection of parts/ service. Initiating early supplier involvement to develop the parts and drawings will ensure that the parts can be manufactured within the tolerances of the specified manufacturing process.

## 8.0 Special Characteristics

Ballard identifies potential special characteristics (significant or critical) on its documentation (e.g. on drawings, specifications, control plans, etc.). Significant characteristics are identified with a ■ symbol, while critical characteristics are identified with a □ symbol.

Table 1: Definition of Special Characteristics

	FMEA	Definition
Critical Characteristic	Severity >8 And Occurrence >1 And Detection >1	A product or process characteristic that can affect compliance with government regulation or safe product function, and require special actions or controls that must be listed on a Control Plan.
Significant Characteristic	Severity 5 to 8 and occurrence >=4	A product or process characteristic that is important for customer satisfaction and for which Quality Planning actions must be addressed on a Control Plan.

For Ballard documents (drawings, specifications, control plans, etc.) with potential significant/critical characteristics symbols, Suppliers should be able to demonstrate how these potentially special characteristics are affected by the Process FMEA (Failure Modes and Effects Analysis). Characteristics that are confirmed as special after PFMEA are required to be managed by reporting product/process capability, using appropriate control plans, and submitting dimensions/test results. A control plan should be in place to ensure that such special characteristics are met. This requirement does not affect a Supplier's responsibility to ensure that other product/ process characteristics are satisfied.

## 9.0 Forms and Related Documents

POL5100158: Ballard Supplier Conduct Principles  
 FRM5102095: Declaration of Compliance with Ballard Supplier Conduct Principles  
 PRC5103451: Supplier Approval Process  
 FRM5102466: Ballard Summary of Supplier Approval Process Findings, Template  
 FRM5100105: Supplier Profile  
 FRM5102392: Supplier On-Site Audit Form and Supplier Self Assessment  
 PRC5103809: Second Party Supplier Audit Process  
 FRM5100574: Supplier Design and Specification Review Form  
 PRC5100965: Supplier Design and Specification Review Procedure  
 FRM5100416: Supplier Product/Process Change Request (PCN)  
 PRC5103218: Supplier Product/Process Change Notification (PCN) Requirements  
 PRC5103775: Production Part Approval Process (PPAP) Ballard Burnaby  
 FRM5101624: Part Submission Warrant  
 FRM5101969: PPAP CHECK LIST  
 FRM5101622: Prototype and Interim Approval  
 FRM5000017: Supplier Corrective Action Request Form (SCAR)  
 PRC5103090: Supplier Corrective Action Request (SCAR) Process  
 POL5100162: Conflict Mineral Policy  
 PRC5103682: First Article Inspection Process  
 FRM5102839: First Article Inspection Sign-Off Sheet  
 FRM5103312: Component Quality and Feasibility Assessment