AXLES INDIA LIMITED

SUPPLIER QUALITY ASSURANCE MANUAL

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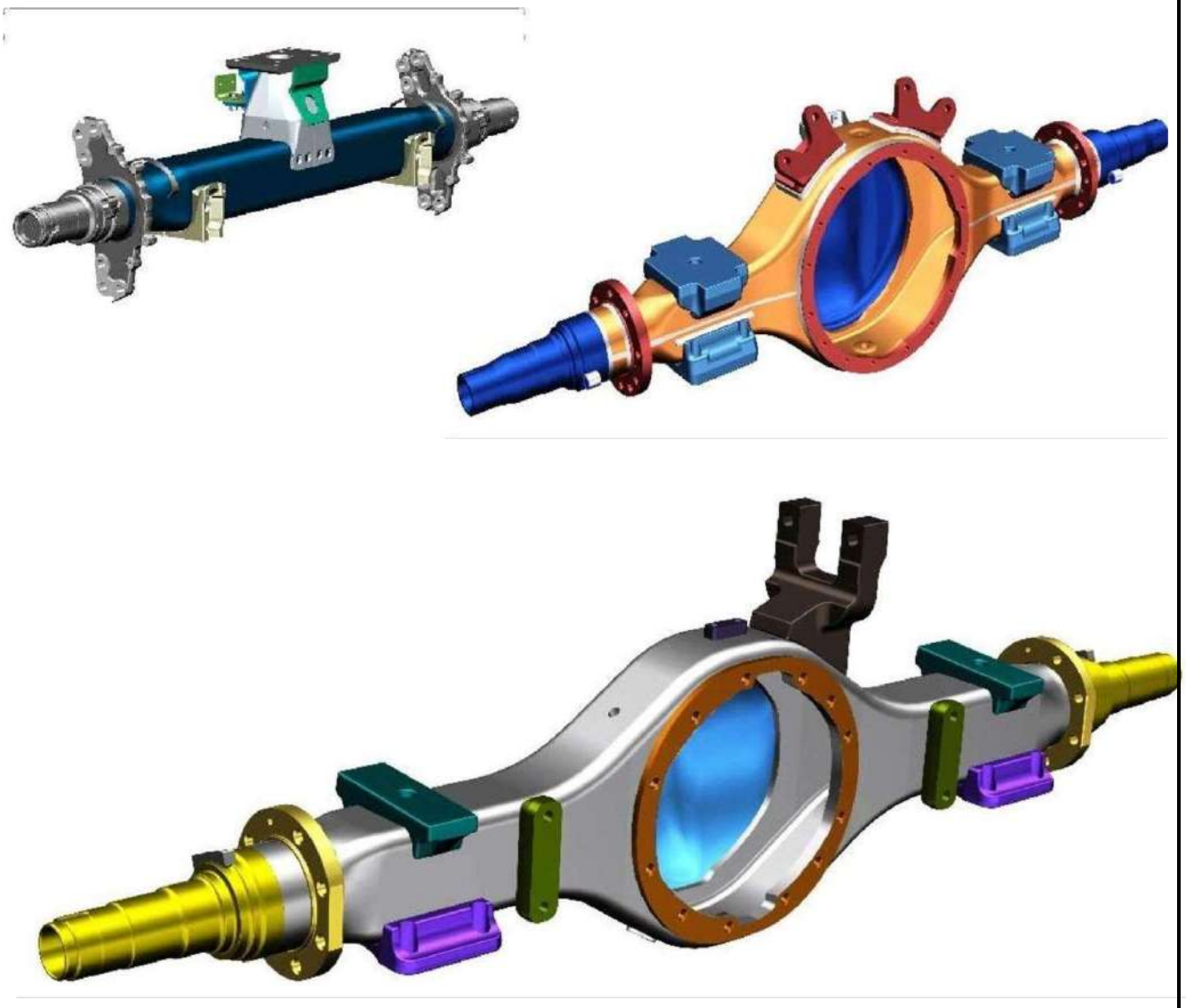

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Axles India Limited

SUPPLIER QUALITY ASSURANCE MANUAL

Issue No **21**

Date of issue **: 17.05.24**

This Manual is the property of Axles India limited. It has been Compiled to convey the Quality System Requirement and communicate the Information. These contents are meant for use by suppliers.

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Table Of Contents

SECTION – 01: Foreword

- This manual explains the activities which are to be carried out by Axles India Limited suppliers for meeting the ultimate goal of Quality, Consistency, and Continual Improvement &Cost reduction.
- These activities are part of our IATF 16949:2016 requirements, which all suppliers of AIL have to fulfill in a phased manner.
- This manual communicates AIL's Specific Requirements and Expectations to AIL's suppliers.

INTENT

- To meet the never-ending appetite on part of the customer and competition for survival & growth.
- We request our suppliers to use this manual as a tool to broaden their understanding of the quality assurance system of AIL.

SCOPE

- This manual contains and defines the QMS requirements for AIL suppliers.
- These customer requirements supplemental to ISO9001:2015 / IATF 16949:2016.

REFERENCES

The listed documents shall be used to expand and enhance the quality system

- Statistical Process Control (SPC) - 2nd edition.
- Measurement System Analysis (MSA) - 4th edition.
- Advanced Product Quality Planning and Control Plan - 2nd edition

Section – 02: Issue Amendment Procedure

- This manual shall carry an issue number & Released date on the cover page.
- When the entire manual is revised and issued, the Manual Issue no will be incremented. Only controlled copies are permitted for use.
- All the suppliers are requested to acknowledge in writing for the receipt and Possession of latest revision of this manual so that AXLES INDIA Ltd maintains the evidence of issue records.

Section- 03 Issue Amendment Record- SQAM

Manual Issue No	Page No	Effective Date	Nature of Change
14	20	03.04.2017	Escalation of low performing suppliers
15	ALL	02.01.2018	Revised in line with IATF requirements
16	11	03.04.2018	Quality Objective Revised
17	23	18.04.2018	Statutory & regulatory requirements added
18	9, 10, 29	14.07.2022	Supplier Code of conduct amended, Supplier PPM reduced, AOI format added, Volvo name changed to UD Trucks
19	9A	30.12.2023	Selection of Supplier Raw Material
20	7	22.04.2024	Supplier Business Code of Conduct
20	65	10.05.2024	Section 29 Corrective action procedure updated with affected documents details for NC management
21	Various Pages	17.05.2024	EnEHS requirements included.

Section – 04: Abbreviations used

AIL	:	**A**xles **I**ndia **L**td
DIST	:	**D**aimler **I**ndia **S**pecial **T**erms
EnEHS	:	**E**nergy**, E**nvironment**, H**ealth and **S**afety **(EnEHS)** Policy
EnMS	:	**E**nergy **M**anagement **S**ystem
EMS	:	**E**nvironmental **M**anagement **S**ystem
FMEA	:	**F**ailure **M**ode and **E**ffect **A**nalysis
IATF	:	**I**nternational **A**utomotive **T**ask **F**orce
IMTE	:	**I**nspection, **M**easuring and **T**est **E**quipment
ISO	:	**I**nternational **O**rganization for **S**tandardization
ISK	:	**I**ndian **S**ketches
MAQMSR	:	**M**inimum **A**utomotive **Q**uality **M**anagement **S**ystem **R**equirements

OH&S MS	:	**O**ccupational **H**ealth **&** **S**afety **M**anagement **S**ystem
OEM	:	**O**riginal **E**quipment **M**anufacturer
PPAP	:	**P**art **A**pproval **P**rocess
PPE	:	**P**ersonal **P**rotective **E**quipment
PPM	:	**P**arts **P**er **M**illion
SQAM	:	**S**upplier **Q**uality **A**ssurance **M**anual
SQMSM	:	**S**upplier **Q**uality **M**anagement **S**ystem **M**anual**DICV**
	:	**D**aimler **I**ndia **C**ommercial **V**ehicle
SEU	:	**S**ignificant **E**nergy **U**se

Section – 05: Quality Policy

Quality Policy of Axles India is:

- Maintain domestic market leadership and strong presence in export markets in the product range manufactured,
- Ensure customer satisfaction by meeting their expectations of safe product performance, on-time delivery at competitive prices,
- Promote continual improvements by motivating employees at all levels to build quality in processes.

Revised on
01.04.2017

V. Madhavan
Managing Director

Section – 06: Energy, Environment, Health and Safety (EnEHS) Policy

Axles India is committed to operate in a manner that minimizes environmental impact, optimizes Energy consumption and prioritizes safety and health of our stakeholders. We strive to

- Protect the Environment in all aspects of our business.
- Provide a safe and healthy working environment.
- Consume power responsibly using energy efficient & green technologies.
- Educate and encourage employee participation in our efforts.
- Comply with applicable legislations and regulations.
- Continual improvement in performance through
    - Conservation of natural resources and promoting biodiversity
    - Encouraging Reduce, Recycle and Reuse practices (RRR)
    - Eliminating & Minimizing Health & Safety Risks
- Communicate the policy to employees and other interested parties.

V. Madhavan
Managing Director

Date: 17-May-2024

Section – 07: Supplier Business Code of Conduct

Introduction:

Axles India Limited is committed to conducting business ethically, understanding that this commitment benefits our customers and stakeholders. It is crucial for our suppliers to comprehend and adhere to the standards of business conduct expected when collaborating with Axles India.

This code identifies our expectations concerning business conduct that are essential for companies that do business with Axles India. We also believe that these standards will serve to advance the performance of our companies to our mutual benefit. Therefore, compliance with Axles India's Supplier Business Code of Conduct is mandatory for all Purchase contracts.

Ethical Practices and Inclusive Workforce:

Suppliers are required to conduct ethical recruitment practices, providing fair treatment and equal opportunities to all individuals, regardless of gender, background, or ethnicity. Upholding the rights of minorities and indigenous peoples is fundamental, necessitating suppliers to promote transparency and respect for cultural traditions in their hiring processes. All suppliers must abide by applicable employment laws, ensuring fair treatment and equal opportunities.

Axles India prohibits the use of child labour and any form of forced or involuntary labour, including human trafficking. Suppliers must maintain a positive and diverse workforce, free from discrimination and abusive behavior. Additionally, suppliers should provide a safe and healthy work environment, complying with all applicable health and safety laws. Suppliers are expected to provide wage and benefit levels that meet basic needs and respect freedom of association. It's essential to reject the use of security forces violating human rights and engage in responsible conflict resolution to safeguard local communities.

Transparency, Accountability, and Fair Business Deals:

Transparency in operations and information disclosure is crucial. Suppliers must provide Axles India with comprehensive information (Declaration from supplier), adhering to fair competition and anti- trust practices to maintain integrity. Suppliers must also ensure fair business deals, providing accurate information during negotiations and avoiding deceptive practices. False statements or misleading information regarding products or their performance are prohibited.

Conflicts of Interest Mitigation and Product Integrity:

Suppliers must actively address conflicts of interest and counterfeit concerns within their supply chains. Upholding product authenticity and integrity is vital, with suppliers expected to implement robust measures to safeguard intellectual property and comply withexport controls and economic sanctions

Accountability Ethical Conduct and Anti-Corruption Policies:

Good ethics are fundamental to our business relationships. Suppliers must uphold high ethical standards in all their dealings, including honesty, integrity, and fairness. They should conduct business with respect, professionalism and in accordance with Axles India's values.

Suppliers must foster a culture of accountability and ethical behavior, establishing whistle blowing mechanisms and ensuring protections against retaliation.

Axles India adheres to stringent ethical conduct and anti-corruption policies to maintain integrity and fairness in all business dealings.

Suppliers should refrain from offering gifts, favours, or entertainment to Axles India employees that hold significant value or are inappropriate. Such gestures should not unfairly influence Axles India employees. Any solicitation for gifts or favours by an Axles India employee should be promptly reported.

Similarly, Axles India strictly prohibits bribes, kickbacks, or any form of improper payment, whether offered directly by an employee, on behalf of Axles India, or to third parties. This policy extends to interactions with customers, suppliers, competitors, and government officials. Suppliers acting on Axles India's behalf must adhere to these guidelines and may be required to certify their understanding and compliance with this policy.

Regulatory and Tax Laws Compliance:

Suppliers must comply with all applicable regulatory and tax laws in the regions where they operate. This includes but is not limited to, adhering to labour laws, environmental regulations, and tax obligations. Suppliers are expected to maintain accurate records and documentation to demonstrate compliance with these laws.

Confidentiality:

Suppliers must protect business and personal information of a confidential nature obtained as a result of business relationship for performing jobs assigned by Axles India and must not share such information with unauthorized persons in any manner.

Environmental and Community Rights Preservation

Suppliers must prioritize the protection of land, forest, and water rights, refraining from actions leading to forced evictions or unsustainable resource management. Additionally, suppliers should ensure water quality, consumption, and management, along with monitoring and reducing emissions to mitigate environmental pollution. Sustainable resource management practices and responsible chemical management are essential to minimize environmental harm and maintain product safety. Suppliers are also required to prioritize efforts to reduce greenhouse gas emissions, enhance energy efficiency, transition to renewable energy sources, and minimize noise emissions to reduce disturbances to local communities and ecosystems.

Decarburization

Suppliers are expected an unwavering commitment to Axles India's decarburization goals. This entails accurately measuring and reporting carbon emissions, setting ambitious reduction targets, enhancing EnMS-SEUs, energy efficiency, adopting renewable energy sources, minimizing transportation emissions, collaborating with your suppliers and continuously improving decarburization initiatives. Your dedication to these principles not only supports our sustainability objectives but also contributes to our collective efforts in combating climate

Circular Economy and Sustainable Practices

Suppliers are encouraged to champion sustainable procurement elements, waste reduction, reuse, and recycling initiatives to minimize environmental impact and promote resource efficiency. Additionally, suppliers should advocate for animal welfare, biodiversity conservation and responsible land use practices to mitigate deforestation and preserves soil quality.

Training and Communication

Supplier must implement training and communication programs to educate their employees regarding the requirements of this Code and Supplier's own related policies.

Supply Chain Standards Enforcement and Collaboration

Suppliers must enforce rigorous standards throughout their supply chains, expecting adherence to similar principles from tier-1 suppliers. Collaboration is essential to ensure consistency and accountability across the supply network, with tier-1 suppliers obligated to pass on these standards to maintain ethical and sustainable practices.

Continuous Improvement, Innovation and Auditing

Our Company is committed to ensuring suppliers fulfill CSR / sustainability requirements. To achieve this, we will conduct audits to assess supplier compliance

and identify improvement areas. Promoting continuous improvement and innovation in operations, suppliers can contribute to a more sustainable and responsible global supply chain.

Section – 08: Statement of Requirement

(Supplier Quality Management system – Requirements)

Requirements

- Supplier's minimum requirement of quality system is ISO 9001 with thelatest edition, also suppliers are advised to have road map for IATF 16949.
- Suppliers are expected to have a formal problem solving /corrective actions process in place and functioning that allows for effective response when problems occur.
- Containment action shall be submitted within two working days andthe permanent corrective action shall be submitted within 7 working days.
- PPM agreement should be less than 10 PPM from April 2023 onwards.
- Cost of scraping / rework parts due to manufacturing defect will be debited from the Supplier.
- The Expected Delivery Performance is 100%. however, the supplier if less than 90% shall submit the corrective action.

Warranty Charter

- Axles India will hold the Supplier responsible for Field failures related to the manufacture of their supplied products, costs & liabilities will be managed on "case by case.(Field failure means defect at customer end due to Suppliers defect.(OEM charged costwill be debited.)

Classification:

Category 1: Direct Input Material

Raw materials, Castings, Forgings, Fasteners, other Bought out parts, Sub-contracted parts, Conversion services like Heat treatment.

Category 2: Indirect Materials

Process consumables, Tools, Jigs & Fixtures and Packing Materials, welding wires and rods and paints

Category 3: IT / Projects / Services

Section – 09: Selection of Supplier for Direct Material

New suppliers are to be selected as per the steps below for domestic suppliers (For customer recommended sources, proceed to sampleevaluation stage after supplier registration stage). Ensure that at a minimum, the supplier third party registered to ISO 9001.

- Supplier registration details are to be obtained from supplier.
- HOD purchase/ Divisional manager to remark thisrecommendation as proceed to on site audit / clarification to be obtained / not considered for selection
- Coordinate with qualified internal auditor for onsite audit.
- Perform onsite audit as per checklist and record the non-conformities and the supplies target for corrective action.
- The overall scores will be segmented in to the following risk levels at the point of selection.
- Focus on **E**nergy**, E**nvironment**, H**ealth and **S**afety **(EnEHS)** Policy.

Assessment score %	Risk category	Judgment on selection
96-100	No risk	Can proceed to sample approval
90-95	Low risk	Can proceed to sample approval
81-89	Moderate risk	Corrective actions from supplier to be obtained. Sample approval can be processed simultaneously
75-80	High risk	Obtain corrective actions and evaluate the actions. Iffound acceptable, Proceed to sample Development
Less than 75 %	High risk	Reject

Section – 09A: Selection of Supplier for Raw Material

- We are committed to ensuring that we are sourcing responsibly.
- We expect our suppliers to have a policy in place and implement a system to trace the origin of their raw materials.

Section – 10: Second Party Audit Controls

Second party audits are conducted on suppliers based on Supplier's Risk level, QMS certification level and product safety. The Risk level to be determined based on the overall rating of 9 months performance out of 12 months of the previous year.

The frequency of audit / the need for second party audit will be as per the table below.

Supplier overall rating score %	Risk level	Product Safety	Third party certification	Second party Auditfrequency
100	No Risk	NA	ISO 9001 / IATF 16949	No second party Audit
90-99	Low Risk	NA	ISO 9001 / IATF 16949	Annual
81-89	Moderate Risk	NA	ISO 9001	Half yearly
			IATF16949	Annual
75-80	High Risk	NA	ISO 9001	Quarterly
			IATF16949	Half yearly

Process Audit will be Conducted as per the Above Table and audit NC will be closure within one month of lead time.

SUPPLIER ASSESMENT DATA SHEET

Axles India Ltd				Purchase
SUPPLIER ASSESMENT DATA SHEET				Page 1 of 15 **Date:**
	A. General Information			
1	Supplier Name :			Supplier Code
2	Address :			
3	Phone No(s):	Office	Works	
4	Fax No(s)			
5	E-Mail ID			
6	Employees Particulars		Total	For QAD
7	Contact Person.	Name	Designation	Mobile Number
	For Quality			
	For Delivery			
	For Commercial			

8	**Purpose and status of Assessment**		
	New Evaluation		Description of products / Process
	Re Evaluation		
	Annual Schedule		
	Previous evaluation score		If any Sub Supplier
	Present evaluation score		

9	**Preferred Over All Score - Risk Level**		
	96 - 100 %	No Risk	Can proceed to sample approval
	86 - 95 %	Low Risk	Can proceed to sample approval
	81 - 85 %	Moderate Risk	Corrective actions from Supplier to be obtained. Sampleapproval can be processed simultaneously
	75 - 80 %	High Risk	Obtain corrective actions and evaluate the actions, If foundacceptable, proceed to sample evaluations and re audit
	Less than 75 %	Reject	
10	**Minimum Applicable System Certification is : ISO 9001**		
11	**Over all Expansion plan for the next three years**		
AIL Recommendation:			

Manufacturing facilities

Sl No	Machine description	Make	Year	Condition	Remarks

Sl No	Instrument description	Make	Calibration Status	Condition	Remarks

Axles India Ltd	SUPPLIER ASSESMENT DATA SHEET	Purchase
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Technical capability Assessment Report		**Part - A**

		Score status					Track NC	Remarks
		0	1	2	3	N A		
1. Plant Facilities								
1 .1	Sufficient Lighting / Air ventilation arrangement							
1 .2	Covered shed availability							
1 .3	Alternate power source							
1 .4	Storage area							
1 .5	Material Handling equipment's							
2. Location								
2 .1	Ease of AIL Accessibility (Transportation / Inspection)							
2 .2	Compliance of Industrial Area							
2 .3	Employees Accessibility							
3.Skill Requirements								
3 .1	Whether the skilled machine operators available							
3 .2	Whether the skilled equipment operators available							
3 .3	Whether the skilled maintenance e personnel available							
3 .4	A re the necessary personnel are trained for GD&T and using the facilities							
3 .5	The skill m matrixare recorded							
4.Statistical control								
4 .1	Does the statistic al process control methods employed, wherever required							
4 .2	A re the personnel are trained in SPC techniques							
4 .3	Does the S PC record analyzed for data							
4 .4	Is there an effective m mistake proofing system available							
5.Quality Performance - Effectiveness(Last one Year)								
5 .1	A re the Supplier meeting adequate							
5 .2	Does the Quality rating monitored periodically							
5 .3	Does the CAPA implemented and followed when the rating i slow							
5 .4	Does the CAPA ineffectiveness is monitored and adhered							
	(Check the effectiveness s data for the past one year)							

Axles India Ltd	SUPPLIER ASSESMENT DATA SHEET	Purchase

TECHNICAL CAPABILITYASSESSMENT REPORT — Part - A

S.No	Elements	Evaluation Score					Track NC	Remarks
		0	1	2	3	NA		
6.DELIVERY PERFOAMANCE - EFFECTIVENESS (LAST ONE YEAR) **(check the adherence with the existing customer schedule)**								
6.1	Are they meeting adequate Delivery rating							
6.2	Does the Delivery rating Monitored periodically							
6.3	Does the CAPA implemented and followed when the rating islower							
6.4	Does the CAPA effectiveness is monitored and adhered (checkthe effectiveness data for the past one year)							
7.Cost reduction proposals / kaizens								
7.1	Does there of improvement in production, quality,efficiency and dispatch are identified?							
7.2	Are these activities effectively monitored by the management							
8.Product Requirement								
8.1	Are capable of performing special process required for theproduct							
9.Capacity								
9.1	Are the supplier having ability to supply product in accordance withthe organization's requirements							
9.2	Volume of automotive business (percentage / volume)							
	TOTAL MARKS							
0- No system available and not practiced		☐						
1- System procedure available but not practiced			☐					
2- System available but partially practiced.				☐				
3- System procedure available and practiced					☐			
NA- Not Applicable							☐	

Percentage scored : (Total points scored / Total Applicable Points) X 100 =

Expansion Facilities for the Next Three Years

Axles India Ltd	SUPPLIER ASSESMENT DATASHEET	Purchase

SUPPLIER PPAP REQUIREMENT

PART-B

S.No	Elements	Evaluation Score					Track NC	Remarks
		0	1	2	3	NA		
1.PART APPROVAL PROCESS:								
1.1	Are there complete organized and supporting data for all production part Submission and are the supporting data fields together for eachpart?							
1.2	Understanding of PPPAP requirements by all concerned							
1.3	Training need identification for PPPAP documentation							
1.4	Awareness of APQP,FMEA, Control plans							
2.FAILURE MODE EFFECT ANALYSIS(FMEA)								
2.1	Is there a mechanism available to study FMEA of the productSupplied							
2.2	Check the Assessment of risk ascertained on the product.							
2.3	Is all control elements covered in assessment							
2.4	Availability of FMEA records on new developments							
2.5	a) Availability of FMEA records on re-visit to existing products basedon customer complaints							
	b) Does the PFMEA reviewed based on the severity ranking of 9 or10 instead of RPN							
	c) Are threshold level for severity, occurrence& detection defined.Does any action proposed if it exceeds							
	d) Does any actions implemented to reduce the occurrence &detection.							
	e)Are the prevention control or mistake proofing system established to reduce occurrence & detection							
2.6	FMEA corrections based on the field feed back							
3.CONTROL PLAN:								
3.1	Is there Control plan available for production							
3.2	Is the Control plan effectively used							
3.3	Records of control plan documents.							
3.4	Are the special characteristics, if any, identified.							
3.5	Is there a reaction plan available, in case of not meeting therequirements							
3.6	Is there a clearly defined authority for reaction plan							
3.7	Is there a tracking mechanism for out of control situations							
	TOTAL MARKS							
0- No system available and not practiced								
1- System procedure available but not practiced								
2- System available but partially practiced.								
3- System procedure available and practiced								
NA- Not Applicable								
Percentage scored : (Total points scored / Total Applicable Points) X 100 =								

Axles India Ltd	SUPPLIER ASSESMENT DATA SHEET	Purchase

SUPPLIER EMS, OH&S MS, EnMS AUDIT CHECK LIST

PART-C

S.No	Elements	Evaluation Score					Track NC	Remarks
		0	1	2	3	NA		
ENVIRONMENTAL ISSUE COMPLIANCE								
1	Is the Supplier complying to the Legal requirements with respect to Environment							
2	Are the relevant Statutory approvals available from competent authorities.							
3	Is the supplier complying to the customer Specific legal requirements with respect to Environment							
4	Are the Customer specific relevant statutory approvals available from competent authorities							
5	Is the Effluents generated by process properly treated and disposed off							
6	Are the Records for effluent treatment maintained							
7	Is there method of waste minimization and evidenced							
8	Is there a method of continual improvement and evidenced							
9	a) Are the employees adequately trained in EMS, OH&S MS, EnMS							
	b) Are the personnel aware of Environmental Issues							
	c) Are the personnel aware of Hazardous and the method of disposal							
	d) Are the personnel aware of Significant Energy Use (SEUs- Energy saving)							
10	Is there a system for periodical audit for Environmental Aspects.							
11	Availability & Maintenance of PPE & Fire Extinguishers							
12	Past record on Environmental performance & corrective action effectiveness (Ex: Non - Conformities , etc)							
	TOTAL MARKS							
0- No system available and not practiced		☐						
1- System procedure available but not practiced			☐					
2- System available but partially practiced.				☐				
3- System procedure available and practiced					☐			
NA- Not Applicable							☐	

Percentage scored : (Total points scored / Total Applicable Points) X 100 =

SUPPLIER QUALITY MANAGEMENT SYSTEM AUDIT CHECK LIST

PART-D

S.No	Elements	Evaluation Score					Track NC	Remarks
		0	1	2	3	NA		
1.Management								
1.1	In the Company, Is there a defined quality policy with derived targets, e.g.continues Quality Improvements?							
1.2	Have the necessary financial and staff asset been provide?							
1.3	Is the company certified for QMS (ISO 9001/ IATF 16949) ?							
1.4	Is the company organization defined in writing witha definition of theresponsibility and the authorities							
1.5	arecompanyunitsmonitoredbyindependentbodiesintheformofregularquality audit							
1.6	Are contract / order documents such as specification, drawings, target specifications standard, quality agreements, logistics plants etc, checked for completeness and feasibility before a quotation is submitted?							
1.7	Arethe product specifications available to all department involved in thecompany?							
1.8	Arethe principles of product liability and product risk known?							
1.9	Arethe internal and external failure cost recorded and monitored?							
1.10	What form do professional further training, qualification and staff motivation take ? Are management personal also involved?							
1.11	Does the supplier have the system for internal Audit ?							
1.12	Are Audit finally are reviewed and actioninitiated?							
1.13	Is the company focused for EMS, OH&S MS, EnMS**?**							
2.External procurement								
2.1	How are subcontractors selected ? (Assessment of quality capability, certificates, initial sampleinspection agreements onquality inspections etc.)							
2.2	How is the quality of the delivered products guaranteed?(Inspection plan, agreements on quality inspection etc.)							

Axles India Ltd	SUPPLIER ASSESMENT DATASHEET	Purchase
	Part - D	Page 8 of 15

S.No	Element	Evaluation score					TRACK NC	Remarks
		0	1	2	3	NA		
3.Testing equipment								
3.1.	Is all testing equipment (Testing units and gauges) subject to testing equipment monitoring?							
3.2.	Are the specifications measured/checked using appropriatetesting equipment?							
4.Q Planning								
4.1.	Are control plans available?							
4.2.	Do capability inspections exist for the machines (systems) used?Are process FMEA carried out?							
4.3.	Are control plan / FMEA 's ? Related work instructions updatedwhen changes takes place in input drawings / specification ?							
4.4.	Are special characteristics identified and used?							
5.Equipment / Tooling maintenance								
5.1.	Is the maintenance of all production equipment carried outin accordance with a plan (Maintenance manual)?							
5.2.	Is the maintenance of all tooling carried out in accordance with the plan?							
5.3.	Are tools and test equipment's stored properly?							
5.4.	Are tools and test equipment's energy saving focused?							
6. Process Control & Quality Assurance								
6.1.	Are suitable processes(SPC)also used to control and monitorquality?							
6.2.	Do employees also have the qualifications for their work. Are theyinstructed when taken on /transferred?							
6.3.	Are the products clearly identified data all times (Serial number, work progress, Rework, scrap) and is traceability guaranteed?							
6.4.	Are PPPAP / Related documents followedby supplier?							
6.5.	Are required work instruction available at place / work?							
6.6.	Is the customer approval obtained before delivering products,which deviate from the specifications?							
6.7.	Are production parameters of the process recorded and are deviations logged with the measures introduced?							

Sl.No	Element	Evaluation score					TRACK NC	Remarks
		0	1	2	3	NA		
6.Process Control & Quality Assurance								
6.8.	Are special processes identified and process parameter defined?							
6.9	Are special processes monitored and reports maintained?							
6.10	Are the product /process validation process in place anddocumented?							
6.11	Is the customer approval obtained for new start- ups, productchanges and process changes?							
6.12	Are the production facilities and equipment clean and suitable?							
6.13	Is production planning and control being done?							
6.14	In the event of deadline delays and reduced quantities is the customer informed immediately and is there a process, whichillustrates delivery reliability?							
6.15	Can information be given at any time on the current productionstatus?							
6.16	Is there an organizational stipulation for emergencies, which candirectly cause delivery delays?							
6.17	Are quality inspections (Inward/In process and Final) doneappropriately as per procedures / Quality plans?							
6.18	Does the non- conformance products identified properly?							
6.19	Are the non-conforming products are isolated and kept in theseparate location?							
6.20	In the case of quality problems are the causes analyzed, remedial measures introduced and their effectiveness (avoiding repeat errors) monitored (Comprehensibility guaranteed)?							
6.21	Are process / products audited internally?							
6.22	Do supplier monitor his delivery performance, quality performanceand take appropriate corrective actions?							
6.23	Is continual improvement process evident?							
6.24	Handling / Storage / Packing / Preservation and Transport.							
7.Documentation								
7.1.	Are all relevant results of the quality inspections recorded andachieved?							
7.2.	Are quality relevant documents and records administered andachieved in an orderly way?							
7.3.	Are there methods and stipulations for products subject tocompulsory documentation (traceability)?							

Axles India Ltd	SUPPLIER ASSESSMENT DATA SHEET							Purchase
		Part- D						Page 10 of 15
S. No	Element	Evaluation score					TRACK NC	Remarks
		0	1	2	3	NA		
8.Risk Management								
8.1	Is any IR problems faced in last 10 Years							
8.2	Is any Geographical calamities problems faced in last 10 Years							
8.3	Is any Financial crisis faced in last 10 Years							
8.4	CAPA /8D reports are submitted to the Customer complaint within 7working days							
8.5	Contingency plan available for the Absenteeism ,Power failure, Breakdown, and Logistic failures							
9.Customer property								
9.1.	Arecustomer drawings specification maintained properly.							
9.2.	Arecustomer supplied product identified and maintained properly?							
10.Customer service / Customer satisfaction								
10.1	Arethe customer specific requirements fulfilled related to theproduct?							
10.2	Arethe customer requirement fulfilled atdelivery?							
10.3	Is the customer service guaranteed?							
10.4	Arethe complaints quickly reacted to thesupply of parts secured?							
10.5	Are fault analysis carried out when there are deviations from quality requirements and are improvement measures implemented?							
10.6	Is the personal qualified for each task?							
0-	**No system available and not practiced.**							
1-	**System procedure available and not practiced**							
2-	**No system procedure available, but practiced.**							
3-	**System procedure available and practiced.**							
NA-	**Not Applicable**							
Steps	**1 Take out NA and add total target marks. (Applicable No. of questions X3)** **2 Add actual marks obtained.** **3 Calculate the total for 100%.**							
Percentage scored : (Totalpoints scored / Total Applicable Points) X 100 =								
Notes :-- Min 10 Marks in Risk Management is mandatory								
F/COM/PUR/001								Dec'17

SUPPLIER- ADDITIONAL ENVIRONMENTAL REQUIREMENTS - CHECKLIST								PART-E	
S.No	Elements	Evaluation Score						Track NC	Remarks
		0	1	2	3	NA			
Additional Environmental requirements:									
1	Do they have a third party certified (ISO14001or EMS) management systemcovering all relevant activities? (e.g. Product planning & development, Production, purchase &Sales)								
2	Are there plans or activities to improve existing products of production process with regards to environment impacts?								
3	Are products delivered to customers are free from chemicals on theblacklist?								
4	Are the production processes free from chemicals notified on the customers blacklist?								
5	Are the products delivered to customers free from chemicals onthe grey list?								
6	Are production processes free from chemical notified on the customers grey list?								
7	Is the material content of the product viable to be reported in IMDS(according to IMDS reporting for customers Group institutions)								
8	Do they have a third party certified (ISO45001 or OH&S MS) management system covering all relevant activities? (e.g. Occupational Health and Safety)								
TOTAL MARKS									
0- No system available and not practiced									
1- System procedure available but not practiced									
2- System available but partially practiced.									
3- System procedureavailable and practiced									
NA- Not Applicable									

Percentage scored : (Total points scored / Total Applicable Points) X 100 =

SUPPLIER-CORPORATE SOCIAL RESPONSIBILITY (CSR)-CHECK LIST — **PART-F**

S.No	Elements	Evaluation Score					Track NC	Remarks
		0	1	2	3	NA		
1.CSR								
1.1	Have audits, with focus on human rights and work place practice, beenconducted in your company ?							
1.2	Does your company have a code of conduct or similar ?							
1.3	Does your company place a contractual requirement on its suppliers to becompliant with issues outlined in this assessment ?							
1.4	Are laws and other regulations regarding working conditions in your countryand/or region observed?							
1.5	Are the premises adequately designed for the operation that are conducted eg.Lighting, ventilation, safety equipment, restrooms etc ?							
1.6	Are necessary safety precautions in place to uphold a safe and healthy work environment? eg. Safe electrical installations, self machineries							
1.7	Is adequate personnel protective equipment such as goggles, gloves, earplugs, boots and protective clothing freely available at to the employees?							
1.8	Are all chemical substances labeled and safely stored?							
1.9	Is guaranteed that an employees are adequately informed about the danger andtrained in proper handling of hazardous and/or poisonous substances and chemicals and safety equipment?							
1.10	Is information, eg. Data sheets for chemicals, available in the area where thechemicals areused?							
1.11	Are inspection documents for lifts and machinery available?							
1.12	Do you keep records of accidents and injuries ?							
1.13	Do you follow up and take corrective actions due to the accidents and injuries ?							
1.14	Is fire fighting equipment installed, fire and evacuation drills carried out and is a sufficient number of employees trained in fighting practice?							
1.15	Are emergency exits properly marked ?							
1.16	Are working hours in your company in compliance with statutory requirementsin the country or region?							
1.17	Is everyemployee paid at least the statutory minimum wage ?							
1.18	Do all employees receive paid leave according to statutory regulations?							
1.19	Are required overtime supplements paid to all employees ?							
1.20	Are all employees employed by your company at least the minimum agerequired by country law or other regulations?							
1.21	Are employees allowed to leave the factory premises after work at any time asfar as in compliance with statutory regulations?							

Axles India Ltd	SUPPLIER ASSESMENT DATA SHEET	Purchase
	Part F	PAGE 13 OF 15

S. No	Element	Evaluation score					TRACK NC	Remarks
		0	1	2	3	NA		
1.22	Does your company uphold the employee's right to freely join and take actions in or form workers' organizations including union(s) of their own choosing without previous authorization of your company?							
1.23	Are all employees treated in a non-discriminatory manner regarding benefits, hiring procedure, job assignment, retirement provisions, andaccess to services etc.,(i.e.. Independent of gender, religion, age, union membership, race, caste, national origin, disability, sexual orientation or political affiliation)?							
1.24	Does your company regulate inappropriate sexual coercive behavior, including gestures, language and physical contact?							
1.25	Does your operation have policies and procedures in place to prevent and detect corruption by your employees, officers, managers, and any others working on behalf of your operation, including but not limited to bribery, excessive gift-giving, extortion, or embezzlement, on the partof suppliers, contractors or agents representing the facility? If yes, please describe those policies and procedures in a separate attachment.							
1.26	Does your operation have policies and procedures in place to preventand detect, and eliminate situations in which your employees, officers, managers, and any others working on behalf of your operation have potential conflict of interest in connection with your operation's activities or dealing with governmental or similar authorities? If yes, please describe those policies and procedures in a separate attachment.							
1.27	Has any gifts, payments, or anything else of value for your operation,or anyone working on behalf of your operation, has offered or given, in the last three years, to any government official or employee, political party, political candidate, or any person related by blood, marriage, or otherwise to such persons, in order to obtain some advantage favour, decision, or actions. If yes, please use separate sheet to describe.							
1.28	Does any governmental official or employee, political party, political candidate, or any person related by blood, marriage or otherwise such persons (i) own beneficially, directly or indirectly, the whole or a part ofyour operation; or (ii) in the last three years served as an officer, director or manager of your operation? if yes, please use separate sheet to describe.							
A	During the last three years has your operation been involved in any investigation, lawsuit, or other proceeding concerning the issues addressed in this assessment? If yes, please use separate sheet todescribe.							
	TOTAL MARKS							
	0- No system available and not practiced							
	1- System procedure available but not practiced							
	2- System available but partially practiced.							
	3- System procedure available and practiced							
	NA- Not Applicable							

Percentage scored : (Total points scored / Total Applicable Points) X 100 =

Axles India Ltd	NON - CONFORMANCE SHEET		
Of: M/S.		Date:	Page 14 of 15
NC Tracking No	AIL Remarks	Supplier Commitments	Target
Others, if any:			
Signature:	AIL's Rep		
	Supplier's Rep		

Axles India Ltd	SUPPLIER ASSESMENT DATA SHEET	Purchase
Of: M/S.	**Date:**	Page 15 of 15

SCORE SHEET

S.No	AUDIT ELEMENTS	% SCORED
1	PART A : **Technical capability**	
2	PART B : **PPAP Requirements**	
3	PART C : **Environmental Health& Safetycompliance**	
4	PART D : **Quality Management System**	
5	PART E : **Additional Environmental Requirements**	
6	PART F : **Corporate Social Responsibility(CSR)**	
	Total Score % **((Part A + Part B +Part C +Part D +Part E+Part F)/6**	

Name of the Auditors	Designation	Signature

CONCLUSION :

Approved By:	HEAD - QUALITY ASSURANCE	HEAD - PURCHASE SQA

Section – 11: Procedure for Initial Sample Inspection Report (ISIR)and Agreement of Inspection (AOI)

ISIR &PPAP approval from AIL is required for the supply of new partor changed part before volume production from all the suppliers.

ISIR &PPAP approval applicable to any one of the following situations:

- New Supplier.
- New Components or Product from existing Supplier.
- Engineering Changes with respect to tooling/dimensional/material /process (i.e., for every modification level of drawings)
- Resumption of Production after 2 years from previous supply.
- When previous submission is rejected.

Note: This procedure is not applicable for the new part number allotted as a regularization ofexisting ISK Part Numbers.

Requirement for **ISIR**: Dimensional Report & Metallurgical report if applicable Requirement for **PPAP**: AIL expects to level 4 submission (Refer PPAP requirements).

Initial samples are to be minimum 5 numbers made out of production tooling and process. In the case of PPAP submission,sample quantity should be high to meet PPAP requirements. Samples for PPAP submission are to be made out of production tooling, gauges,materials and operator.

ISIR submission can be replaced by PPAP submission. In this case PPAP submission will be taken as an evaluation and selectioncriteria.

Agreement of Inspection (AOI)

Once the ISIR samples are approved, PPAP to be submitted and Agreement ofInspection can be signed off between Axles India and the Supplier as per the below format

AXLES INDIALIMITED	**Agreement of Inspection(AOI)**	**DOC NO:AIL/SPR/QAD/AOI XXXX** **Rev:XX, Date:XX.XX.XXXX**
Supplier Name :	XXXX	Page: ----------
Part Name	XXXX	
Part Number	XXXX	
Drwg # XXXX	Rev: XX	Date:XX.XX.XXXX

S NO	**Parameters**	**Frequency**	**Applicable / Not Applicable**
1	Layout Inspection as per Drawing	Once in year	-
2	Corrective & Preventive Action for raised Flashes/deviations	Within7 working days	-
3	Raw material Mechanical & Chemical Test certificate as per drawing (standard)	For every consignment	-
4	Raw material Test Samples to be send to Axles India for Chemical & mechanical Testing	For every consignment	-
5	Inspection Reports as per AOI	For every consignment	-
6	Special characteristics class: Parameters affecting performance Cp, Cpk required	For every Heat code.	-

Table 1

A) Material Specification:

B) Dimension:

S No	**Inspection Item**	**Special characteristics class**	**Specification**	**Inspection/ Test method**	**Range / Least Count**	**Supplier Sampling plan**	**AIL Sampling plan**
1							
2							
3							
4							
5							
6							
7							
8							

9							
10							
11							
12							
13							
14							
15							

C) Mechanical properties:

D) Performance characteristics:

E) Visual (including appearance

item):1							
2							
3							

F) Packing Standard:

G) Cleaning Standard:

Note:

1.) All the Dimensions are in'MM'

2.) Samples for appearance items to bedecided jointly.

3.) Supplier is required to submit PPAP as per guideline given in SQAM PPAP manual for everynew development or process / material / design change

Othernon-definedrequirements will be in accordance withapplicable National/ International standard (to be specified).

Signed by (AIL QA) Signed by(AIL SQA) Signed by(SUPPLIER)

Section – 12: PPAP Requirement

The Production Part Approval Process ensures there is a documented verification that all customer engineering design requirement are met by the supplier and the process has potential to produce these requirements during an actual production run. Production parts are those manufactured at the production site using the production tooling, gauging, process, material, operators and environment and process settings.

The Supplier shall meet all specified requirements (e-g. Design record, Specifications). Inspection and testing for PPAP shall be performed by Supplier's testing facility or by an accredited laboratory approved by nationally recognized accreditation body.

The supplier shall submit PPAP for approval prior to the first production shipment. These records shall be maintained for the length of time that the part is active plus one calendar year.

The following documents and items in the check list must be completed by the supplier for each part.

For all customers Level 3 PPPAP should besubmitted.

12.1 Check list for "Part Approval Process"

PART NAME

PART NO

REVLEVEL DT:

SUBMISSION LEVEL

INDEX

S.No	CONTENTS	STATUS *
1	Part Submission Warrant	
2	DESIGN RECORDS (PART DRAWING)	
3	ENGINEERING CHANGE DOCUMENT	
4	CUSTOMER ENGINEERING APPROVAL	
5	DESIGN FMEA	
6	PROCESS FLOW DIAGRAM	
7	PROCESS FMEA	
8	DIMENSIONAL RESULTS	
9	MATERIAL PERFORMANCE TEST RESULTS	
10	PROCESS CAPABILITY STUDIES	
11	MEASUREMENT SYSTEM ANALYSIS STUDY	
12	QUALIFIED LAB DOCUMENTATION	
13	CONTROL PLAN	
14	APPEARANCE APPROVAL REPORT	
15	BULK MATERIAL REQUIREMENT CHECKLIST	
16	SAMPLE PRODUCT	
17	MASTER SAMPLE	
18	CHECKING AIDS	
19	RECORDS OF COMPLIANCE WITH CUSTOMER SPECIFIC REQUIREMENTS	

Note: Please indicate as "Submitted / Not submitted / Not applicable".

Retention /Submission Requirements table4.2 (Normative)

Requirement	***Level 1***	***Level 2***	***Level 3***	***Level 4***	***Level5***
1. Design Record	R	S	S	*	R
-forproprietary components/ details	R	R	R	*	R
-for all other components/ details	R	S	S	*	R
2. Engineering Change Documents, if any	R	S	S	*	R
Customer Engineering approval, if 3.required	R	R	S	*	R
4. Design FMEA	R	R	S	*	R
5. Process Flow Diagrams	R	R	S	*	R
6. Process FMEA	R	R	S	*	R
7. Control Plan	R	R	S	*	R
8. Measurement System Analysis Studies	R	R	S	*	R
9. Dimensional Results	R	S	S	*	R
10. Material, Performance Test Results	R	S	S	*	R
11. Initial Process Studies	R	R	S	*	R
12. Qualified Laboratory Documentation	R	S	S	*	R
13. Appearance Approval Report (AAR), If applicable	S	S	S	*	R
14. Sample Product	R	S	S	*	R
15. Master Sample	R	R	R	*	R
16. Checking Aids	R	R	R	*	R
17. Records of Compliance With Customer-Specific Requirements	R	R	S	*	R
18. Part Submission Warrant (PSW)	S	S	S	S	R
Bulk Material Checklist (see 4.1 above)	S	S	S	S	R

S= The organization shall submit to the customer and retain a copy ofrecords or documentation items at appropriate locations.

R= The organization shall retain at appropriate locations and make available to thecustomer upon request.

*= The organization shall retain at appropriate locations andsubmit to the customer upon request.

Level1	Warrant only (and for designated appearance items, an AppearanceApproval Report) submitted to the customer.
Level2	Warrantwith product samples and limited supporting data submitted to the customer.
Level3	Warrant with product samples and complete supportingdatasubmitted to the Customer.
Level4	Warrant and other requirements as defined by the customer.
Level 5	Warrant with product samples and complete supporting data reviewed at the organization's manufacturing location.

AIL expects its suppliers to level 4 submission, except for Customer Specificrequirements. Customer specific requirements will be informed by AIL separately

At the minimum, the following documents are to be furnished. However it is expected to submit all the appropriate documents as per the above "PPPAP check list" for system improvement.

- Part Submission Warrant – PSW
- Design Records (Component Drawing)O
  Dimensional Results
- Material test results O
  Control Plan OPFMEA
- Process Flow Diagram

Condition for Customer Notification required for PPAP submission during serial production.

1) A new product or part prior to volume production.
2) Production from new or modified tools (except perishable tools), dies, molds, patterns etc, including additional or replacement tooling.
3) Production following refurbishment or rearrangement of existing tooling or equipment.
4) Production from tooling and equipment transferred to a different plant location or from an additional plant location.
5) Change of sub supplier for parts, non-equivalent materials orservices (e-g. Heat treating, Plating) that affect customer fit, form, function, durability or performance requirement.
6) Product and process changes related to components of the production manufactured that impact fit, form, function, and durability or performance requirement.
7) Change in test/inspection method, new technique (no effect on acceptance criteria).
8) Production following any change in process or method of manufacturing.
9) Product or Part Re-released after the tooling has been inactive for volume production for 24 months or more.

Part Submission Warrant

Part Name _____ Cust. Part Number _____

Shown on Drawing No. _____ Org. Part Number

_____Engineering Change Level _____

Dated _____

Additional Engineering Changes_____ Dated _____

Safety and/or Government Regulation ☐ Yes ☐ No Purchase Order No.

Weight(Kg)

Checking Aid No. _____Engineering Change Level _____ Dated _____

ORGANIZATIONMANUFACTURINGINFORMATION

Organization name & Supplier / Vendor Code

Street Address

Chennai Pallavaram 600043 India

City Region Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

Customer Name/Division

Buyer/Buyer Code

Application

MATERIALS REPORTING

Has customer -required Substances of Concern information been reported? Yes ☐ No ☐ n/a ☐

Submitted by IMDS or other customer format:

_____

_____

Are polymeric parts identified with appropriate ISO marketing codes? Yes ☐ No ☐ n/a ☐

REASON FOR SUBMISSION(check at least one)

☐ Initial Submission
☐ Engineering Change(s)
☐ Tooling: Transfer, Replacement, Refurbishment ,or additional
☐ Correction of Discrepancy
☐ Tooling Inactive > than1Year
☐ Change to Optional Construction or Material
☐ Sub-Supplier or Material Source Change
☐ Change in Part Processing
☐ Parts Produced at Additional Location
☐ Other - please specify below

_____

REQUESTED SUBMISSION LEVEL (check one)

☐ Level 1 - Warrant only (and for designated appearance items ,an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples andlimited supporting data submitted to customer.
☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements asdefined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at organization's manufacturing location.

SUBMISSION RESULTS

☐

The result s for dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package ☐ These results meet all designer cord requirement: Yes ☐ NO ☐ (If "NO" - Explanation required)

Mold/Cavity/Production Process_____

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process manual 4th Edition Requirements' further affirm that

these samples were produced at the production rate of 400 / 8 hours.
I also certify that documented evidence of such compliance is on file and available for review .I have not noted any

deviations from this declaration below. EXPLANATION/COMMENTS:

Is each Customer Tool properly tagged and numbered? Yes No n/a

Organization Authorized Signature _____Date _____Print

Name_____ Phone No._____ FAXNO_____

Title_____E-Mail

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPPAP Warrant Dis position: Approved Rejected Other _____

_____Customer Signature _____

Date _____

Print Name:_____ Customer Tracking Number(optional):

Section – 13: Supplier Performing Special Processes

Suppliers performing conventional heat treatment and Induction hardening will be following the work instruction WI/COM/PUR/006; this work instruction describes the Hardness level to be maintained by heat treatment suppliers for spindle ends (pre machined). The indicatedranges are in accordance to the relevant to the engineering drawing

The suppliers are responsible to establish the process parameters to achieve the required Hardness in the Work Instruction.

The supplier is responsible for monitoring the process and maintainingthe necessary records, it should be evidenced during the Audits.

For Heat treatment : F/COM/PUR/006

For Induction Hardening : F/COM/PUR/007

Additionally AIAG CQI.9 will be used for both categories

Improvement actions are required with target dates for completion of gaps observed will be recorded in the above formats.

AXLES INDIA LTD	ONSITEAUDITCHECKLISTFORHEATTREATMENT PROCESSSPINDLE	F/COM/PUR/006 Page 1 of 3

COMPONENT : Part No:

SUPPLIERNAME :

CONTACTPERSON :

DATEOFVISIT :

LASTVISITDATE :

VERIFICATIONPOINTS :

1. Review of last visit report

2. Availability of component drg/WI with latest issue level

3. Availability of relevant engg specification of latest issue

4. Availability of relevant Work Instruction of latest issue

5. Whether the above documents are preserved propertyand old modification levels destroyed/returned

6. Whether suppliers find them understandable and any support needed

7. Whether the following process parameters are being recorded for each load

a) Hardening Temperature

b) Soaking Time

c) Quench Medium

d) Quench hardness

e) Tempering temperature

f) Time at tempering

8. Whether Inspection carried out and recorded as per Work

Instruction Whether performing heat treatment

9. a)Process For Export Hsg to Dana Corporation(FORD)Application Yes/No

b) If yes third party has been audit the in line heat treatment system Yes/No survey report as performed

c) Is yes status of pending corrective action if any Yes/No

10. Calibration Status

a) Hardness Testing machine

b) Crack Detection Unit(ammeter)

c) Temperature Indicators

11 Test Certificates

12 ControlofInspectionreports/complaintreports/correctiveactionreports(both AIL/Vendor)

13 Availability of fool proof system in processing

14 Whether separate are asare provided for keeping spindlesafter hardening & tempering

Represented by Supplier Represented by AIL

AXLES INDIA LTD	ONSITE AUDIT CHECK LIST FOR HEAT TREATMENT PROCESS SPINDLE	F/COM/PUR/006 Page 3 of 3	
Improvement Activities	**Subcontractors Target for Completion**	**Review**	
		Status	**Date**
Date:	Reviewed :	Approved :	

AXLES INDIA LTD	ONSITEAUDITCHECKLISTSPINDLEJOURNALS INDUCTIONHARDENING	F/COM/PUR/007 Page 1 of 3

COMPONENT PART No

SUPPLIER NAME

CONTACT PERSON

DATE OF VISIT

LAST VISIT DATE

VERIFICATION POINTS :

1. Review of last visit report

2. Availability of component drg/WI with latest issue level

3. Availability of relevant engg specification no

flattest issue

4.Availabilityofrelevantworkinstructionoflatestissue

5. Whether theabove documents are preserved properly and old modifications levels destroyed/returned

6. Whether Suppliers find the understandable and any support needed

7 Whether the following process parameters are being recorded for each load?

a)	Selection of coil configuration	
b)	Frequency	
c)	Cycle Time / Heating Time	
d)	Dwell	
e)	Coil Speed	
f)	Job Rotation	

8 Whether Inspection carried out and recorded as per Work Instruction (WI/COM/MET/030)

9 Whether performing Induction Hardening

a) Processfor Export Housing to Dana Corporation(FORD)application

b) IfyesThirdpartyhascarriedoutauditinlinewithheattreatmentsystemsurv ey report as per format

c) If yes statusof pending corrective action ,I fany

a) Hardness testing Machine

b) Crack Detection Unit(ammeter)

c) Temperature Indicators

10. Calibration Status

11. Test Certificates

12. Control of Inspection reports/ Complaint reports/ Corrective Action reports

13. Availability of fool proof system in processing

14. Whether separate areas are provided for Keeping spindles after hardening tempering

Section – 14 : Self Certification Procedure

A supplier for a particular item can be accorded the status of self certification by meeting the following conditions.

- Three consecutive lots satisfactory to inspection and testing.
- Third party certifications of Quality System for the scope of product supplied (or) qualified is developed by AIL through supplier Development.

A controlled copy of pertinent inspection plan / specifications will be provided by AIL. Suppliers to supply parts along with appropriate Test certificates

The lot can be accepted after review of the Test Certificate against the pertinent inspection plan / specification.

A cross check inspection shall be performed by AIL at least once in 6 months to continue self-certification status.

When deviation is more than 20% of tolerance, the self-certification statuswill be withdrawn and de-listed from the "Master list of self-certified suppliers"

Section – 15 : Calibration of Gauges

Only calibrated Gauges and Instruments are to be used. All gauges and instruments are to be identified, their frequency, method and acceptance criteria are to be established and the calibration is to be traceable to National / International standards. If traceability could not be established, check method is documented and complied with.

A master list of all Gauges and measuring instruments is to be maintained by the suppliers . Instruments are to be calibrated at the defined intervals for their full operating range before use.

All the Gauges are to be calibrated on or before the due dates eitherat AIL or at any other external calibration center. The calibration records are to be maintained and to be made available to AIL when required. Any default will result in the supplies be quarantined.

Out of calibration situation – Refer the exhibit "Out of calibration Report"

Whenever the results of calibrations are found to be unsatisfactory, out of calibration report is to be raised. If the IMTE is beyond calibration condition, it should be defaced, scrapped and removed from the master list.

When not in use, IMTEs are to be kept in trays, stands, Hangers,Racks, cup boards, pallets or in boxes supplied by the manufacturer.

Gauges that are prone to rust shall be smeared with a film of oil orwhite petroleum jelly or anti-corrosive chemical while in storage.

Section – 16: Guidelines for On-going performance monitoring

On-going Performance monitoring for suppliers providingDirect input Raw materials, Castings, Forgings, Fasteners, other Bought out parts, Sub-contracted parts, Conversion services like Heat treatment & Acid pickling will be based on Quality and Delivery performance as given below on a monthly basis.

Overall Rating (OR) = Quality Rating (QR) + Delivery Rating (DR) + Service factor.

$$\textbf{Quality Rating (in \%) (Part No /Itemwise)} = \frac{\text{(DA x1)+((CA+SA) x 0.8) + (RAx 0.7)+(R x 0)}}{\text{Total quantity supplied}} \times 100$$

Where,

DA is Directly Accepted Quantity CA is Concessionally Accepted Quantity SA is Segregated and Accepted Quantity RA is Reworkedand Accepted Quantity R is Rejected Quantity.

$$\textbf{Delivery Rating (in \%)} = \frac{\text{QuantitySupplied}}{\text{Schedule Quantity}} \times 100$$

Service factorof +5% to be applied when there is no premium freight on accountof respective supplier else 0%.

Overall rating calculation is done as per the following formula for each supplier.

OR % = [(QR%) x 0.70] + [(DR%) x 0.25] +5% (or 0).

- For Overall Rating the following grading will beapplied:

  100% : Excellent
  90 to99% : Good
  80 to89% : Satisfactory75
  to79% : Marginal
  Below75% : Unsatisfactory

- If Overall Rating score is less than 90% for a supplier, a correctiveaction plan with target date must be obtained from supplier.

- Supplier will be advised to show improvement trend based on the corrective action and its effectiveness as part of continual improvement to achieve a higher rating.

Re-Evaluation will be done for following Criteria:

- Incoming parts overall performance less than 75% for 3 consecutive months.
- Merger, Acquisitions which can have impact on Quality/ Delivery
- Any other specific reason as decided by Purchase / Quality head.
- Delisting (if, overall score less than 75 % for six consecutive months)

Section – 17: Escalation in case of low performing Suppliers

Axles India Ltd Purchase	WORK INSTRUCTION FOR ESCALATION OF LOW PERFORMING SUPPLIERS	Doc No:WI/COM/PUR/014 Page 1 of 1 Revision No.: 1

ESCALATION IN CASE OF LOW PERFORMING SUPPLIERS

1. If the Over all rating is less than 80% for consecutive two months the Supplier will be considered as Low performing Supplier
2. The Supplier will be Improved either by Supplier performance review at AIL or Process Audit at Supplier end

1) Supplier performance review at AIL
Attendees: GM(Commercial)/Quality Mgr/Supplier Rep
Review Current Over all rating of Supplier
CAPA & Progress plan and NEXT STEP Decision
2) Process Audit at Supplier End
Review CAPA effectiveness
Perform Process Audit
If result is not acceptable,repeat process next month

Monitoring Over all rating performance
Alert quality and establish Firewall Station
Repeat Supplier Process Audit

If not improve (< 80%)

Monitoring Over all rating performance
Review CAPA effectiveness
Supplier Process Audit

If not improve (< 80%)

Detection of Non conformity
Feedback on Non detection at Supplier end
Organising of Containment actions

Date:02.01.18	Reviewed by :M.Sundar	Approved by:V.Shankar

Section – 18: Special Characteristics

All product and process characteristics are important and need to be controlled. However, some characteristics referred to as "**Safety**" or "**Critical**" need extra attention because excessive variation in them might affect product safety, compliance with Government regulations, fitfunctions, appearance or quality of subsequent manufacturing operations.

1. ★ - A product characteristics or process parameter that can potentially affect compliance with government regulations, safe vehicle operation or safe equipment functions.

2. ● - A product characteristics or manufacturing process parameter which can affect fit, function, performance or impact subsequent processing ofproduct

S.No.	Symbol	Explanatory note
1		Safety/ critical characteristicsCp/Cpk : min 1.67
2		Significant characteristics Cp/Cpk : min 1.33

If the above Symbols are addressed in the AHS 068 or in therespective drawings, to be addressed and monitored in the control plan, FMEA and FIR.

If the required capability Index is not achieved, 100% inspection is allowed on a short term period with full traceability. Action for inspecting the process to be jointly arrived.

Section – 19 : Information For the External Providers –Supplemental

All our Suppliers of products and services shall have to adhere to relevant legal requirements while supplying materials and services. Following are the minimum requirements.

Suppliers of Hazardous Chemicals / Collection parties of Hazardous waste

Any material which is hazardous in nature as per Environmental Rules, shallaccompany with

- Material Safety Data Sheet(MSDS)
- Transport Emergency Card(TREM)
- Certificate of analysis
- "Hazardous" label on the container Training to Driver
- Driver's instruction card (Do's& Don'ts) Pollution under Control Certificate

Suppliers of the Gas Cylinders shall ensure /Provide

- Color coding of the cylinder Proper valve protection cap
- No physical damage on the cylinder
- Last test certificate / Inspection details of thecylinder Material Safety Data Sheet (MSDS)
- Transport Emergency Card (TREM) Driver's instruction card(Do's & Don'ts) Pollution under Control Certificate

All other service providers / Manpower suppliers

- Provision of adequate PPE to all thepersonnel Your adherence to our system requirements
- Adherence to our Safety & Environmental procedures andsystems Following our Waste Management systems
- Adherence to our Environmental Policy requirements.

Statutory & Regulatory requirements

The suppliers shall follow all the applicablestatutory & regulatory requirements will be communicated through purchase order, drawings, work instructions and Engineering specifications (AHS) etc.

This will be evidenced through Second party Audits

Section – 20 : Procedure for Supplier Development

AIL will determine the priority, type, extent and timing of required supplier development actions for its active suppliers. Determination inputs will include but arenot limited to the following:

- performance issues identified through suppliermonitoring.
- second-party auditfindings
- third-party audit quality management system certificationstatus
- risk level

The risk level of the supplier is based on the previous year overall rating of the Supplier.

Supplier overall rating score %	Risk level
100	No Risk
90-99	Low Risk
81-89	Moderate Risk
75-80	High Risk

- Suppliers who have scored 100% are considered as “No Risk” Suppliers**.** 90-99% Low Risk Suppliers should have Development program to achieve 100% under continual improvement.

- Suppliers who are under moderate risk and High risk being considered for technical assistance by AILs technical team coordinated by SQA and continual improvement actions or initiatives. The possible actions can be one or more of the following

  - Inviting supplier representative to participate in AILs in housetraining
  - Technical assistance that can include
    1. Providing gauge design for AILs partinspection
    2. Calibration assistance
    3. Corrective action input for product quality problems
  - Assistance where required to resolve second party audit issues identified byAIL

Section – 21 : Customer Specific Requirements

Special Characteristics for customers, especially for UD TRUCKS

Individual components or systems that are directly connected to legal requirements or regulations or features of a part that have the potentialto impact compliance, are defined using the symbols [CC] or [SC]. These symbols appear on UD TRUCKS drawings or are stated within the related UD TRUCKS technical specifications controlling the part. UD TRUCKS standard STD_105-0007 defines the guidelines for grading the characteristics. The designation of [CC] or [SC] differentiates the degree of significance of the characteristic in question.

[CC]: Critical Characteristics refer to special characteristics which affects safety.[SC]: Significant Characteristics refer to special characteristics which can affect compliance with regulations, form, fit, function and performance, or subsequent manufacturing-process steps.

It is mandatory for [1],[2],[3],**[CC] & [SC]** features to be inspected or tested and the necessary documentation (inspection results, test reports, certificates) to be kept at the supplier for a period of time consistent with the document retention policy. For all features identified as a special characteristic, the following requirement applies:

	Characteristics level [CC],[1]	**Characteristicslevel [SC], [2],[3]**
Process **under statistical control** Normally distributed	**C**pk **≥ 1.67** ☐ On-going Statistical Process Control ☐ Process appropriate checking frequency ☐ Ppk Analysis every6 months (control charts or electronic data stored and available upon request) ☐ Electronic or AutomatedPoka-Yoke ☐ Effectiveness verified once per shift ☐ UD Trucks approved action plan for achieving	**C**pk **≥ 1.33** Checking frequency adequate to demonstrate ☐ On-going Statistical Process Control ☐ Compliance to capability requirement (Inspection results recorded maintained and stored, available upon request). ☐ 100% Inspection till agreed period for achieving process control ☐ Plan for achieving control and capability
Process **not under statistical control** or **Capability not achieved**		
	Process Control and Capability	

Safety Management -UD TRUCKS

Safety requirements are determined based on the potential of a feature, product or system to create a personal hazard to any person incontact with the products or effects caused by the product. A safety Customer effect is considered when a danger can lead to injuries to vehicle operator, passengers, other travellers, passers-by or maintenance personnel.

The production of safe, fully conforming products to the UD TRUCKSgroup companies is the supplier's responsibility and is part of the supplier's contractual commitment. Suppliers are responsible to ensure that all sub-suppliers and contractors are aware of and comply with the requirements related to safety requirements.

Suppliers of safety critical components must have safety system requirements embedded in their quality management system. Suppliersmust be able to demonstrate they have the organization, systems, processes, and competencies to manage the UD TRUCKS requirements related safety critical features.

UD TRUCKS has developed and uses a technical audit to evaluate the safety management systems of suppliers of safety related parts. A safety management audit will be conducted during the sourcing process and potential suppliers are required to achieve a passing score prior to supply. Suppliers those achieve a passing score but do not achieve 90% are required to develop a detailed action plan with a time line for achieving 90% score. This plan must address all audit findings.

A copy of the Safety Management Audit template is available for reviewon the UD TRUCKS supplier portal.

Quality System Requirements -UD TRUCKS

UD TRUCKS requires all suppliers and sub-tier suppliers are 3rd party certified ISO 9001 with a plan for achieving IATF 16949. Suppliers have full responsibility for the quality assurance and corrective action of products delivered from sub-tier suppliers for use in UD TRUCKSproducts.

UD TRUCKS purchasing reserves the right to have direct access to sub-tier suppliers and processes that could have significant impact on final product quality. This will generally concern technical processes like surface treatment, Heat treating, Forging, Casting etc.

QMS Assessment Audit for Critical processes

Purpose:

The purpose of QMS assessment audit is to evaluate the supplier performance in terms of quality systems, in-process controls and adherence to agreed practices along with conformance of part to drawing requirements. The result of a process audit will indicate the performance of supplier and identifies potential areas for continualimprovement. Process audit must be done for the actual process chain at the supplier's / sub-supplier's manufacturing end.

Scope:

QMS audit of critical processes applies to Casting, Metallurgy (Forging, Heat treatment) and Surface treatment part suppliers of specific customer application based on AIL's discretion.

Supplier Responsibility:

The Supplier is responsible to develop and maintain their process quality in a way that audit score of 60% or above is guaranteed and no stopping parameters exists. Regardless of the score suppliers are expected to work aggressively to address any concerns or action itemsidentified during audit.

Procedure:

1. Supplier will be identified for the audit based on the following criteria prior to commencement of supplies tospecific application.
   - Parts proposed to be used for UD TRUCKS export application.
   - Any other parts intended by specific customer requirements.

2. AIL Purchase will issue a written notification along with required formats about the audit to the supplier prior to the scheduled time of audit. Audit will be done along with customer for certain customer specific requirements as per their procedure.

3. Upon completion of audit, AIL auditor and OE customer will jointly prepare a summary report and then meet with the supplier to discuss the results and countermeasure plan activities.

4. A detailed report on audit findings with actual scores will be sent to the supplier by AIL within a week. For the audit findings, the supplier has to give the countermeasure plan for all the observations within 10 days.Countermeasure plan must be signed by the supplier's top management.

5. After the issue of countermeasure plan, the supplier is required to present the plan and actions implemented to AIL. This has to be mutually followed by supplier and AIL within 60 days from the date of audit report.

6. After the review, based on the status, a suitable datewill be fixed for conducting the verification audit.

Environmental Requirements –UD TRUCKS

- Suppliers must comply with all applicable environmental legal requirements
- Suppliers must have knowledge of the UD TRUCKS group EnvironmentalPolicy
- Suppliers of Production materials and services must bethird party certified to ISO14001
- Suppliers must be able to report on their environmental work, including organization, fulfillment of legal demands and environmental results.
- Chemicals or materials involved in products meant for UD TRUCKS group must fulfill the requirements stated in the UD TRUCKS standards 100-0002, 100-0003 and100-0005.
- When required by UD TRUCKS Group, suppliers shall report specified chemical and material content of component parts in the International Material Data Systems (IMDS STD100-0006)

Latest version of UD TRUCKS Supplier Quality Manual is available in the Quality Section within the E-Library of UD TRUCKS Supplier portal. Suppliers are advised to refer the following website for downloading the complete manual.

http://www.UD Trucksgroup.com/suppliers/global/en-gb/supplierselection/ourrequirements/keyelements/Pages/KeyElementProcedu res.a spx

Customer Specific Requirements -Daimler

Daimler India Special Terms –(DIST)

Those who supply parts to Daimler application should comply with the requirements of Daimler India Special Terms. AIL Purchase will send the DIST before commencing the supply or parts.

Supplier must clearly and permanently identify those tools which are

DICV-owned tools as the property of DICV. During stock taking at theend of the year, the supplier shall transfer the necessary information.

Suppliers should ensure the marking as per the Exclusive standards mentioned in the drawings to maintain lot traceability.

DICV is entitled to participate in inspections, appraisals, reviews or tests carried by the supplier and sub-supplier or to have these observed by third parties authorized by DICV. Suppliers can be audited by DICV with prior notice.

Suppliers have to document the quality assurance methods with proof of quality assurance.

Supplier shall provide AIL with information on relevant products, materials and processes for DICV's internal life cycle assessment audit.

Section – 22: Process Flow Diagram

Process Flow Diagram is a schematic visual representation of the current or proposed process flow. It also captures, in a standardized format, additional information associated with various steps of the process.

Its benefits are

- Shows the entire process at once
- Allows each operation to bequestioned
- Exposure source of variation
- Highlighted non-value addedsteps

The standardized symbols and format is given below forreference and understanding.

Symbol	Activity	Definition
O	Operation	When something is done to or by the subject being followedat a given work area. Something is being changed, added to or created.
→	Transportation	When something is moving or being moved from one workspace or location to another.
□	Inspection	When something is checked or verified for quality or examined for information, or the act of doing so.
D	Delay	When something or someone waits or is delayed or whenflow is interrupted
▼	Storage	When something is kept and protected against unauthorizedremoval

Section – 23: Control Plan

Control Plan is a written description of the system for controlling the parts & processes. It is a comprehensive documentation of product / process characteristics, process controls, tests and measured systems that will occur during production.

It is a living document and should be updated to reflect the addition/deletion of controls based on experience gained by producing parts.

Mass production will provide the producer the opportunity to evaluate output, review control plan and make appropriate changes.

The benefits of a control plan are,

- Communication will be improved within the organization.
- Communication between Supplier & Customer will be improved.
- Provides an emphasis on prevention.
- Provides a focus on process control
- Provides a pro-active planning
- Promote Continual Improvements
- Provides entire picture of control
- Helps to standardize documentation

AXLES INDIA LTD	CONTROL PLAN						CONTROL PLAN No:					
	☐ PROTOTYPE	☐ PRELAUNCH	☐ PRODUCTION	KEY CONTACT / PHONE			CUSTOMER ENGG.APPROVAL / DATE (IF REQD)					-
				FUNCTIONAL GROUP / AREA RESPONSIBLE			CUSTOMER QUALITY APPROVAL /DATE(IF REQD)					-
	ORGANISATION'S NAME/PLANT:						OTHER APPROVAL / DATE (IF REQD)					-
	ORGANISATION'S CODE :		ENGG CHANGE LEVEL:		CUSTOMER INFORMATION:		ORGANISATION NAME / PLANT/ APPROVAL DATE(IFREQD) -					
PART No PART NAME							Issue Dt:	Rev.No:	Rev.Dt:		Sheet: 1 of 1	
							OPN NAME					OPN NO

MACHINE TOOLS,JIG & FIXTURES FOR MFG.	CHARACTERISTICS			SPL CHAR CLASS	METHODS									PLAN ACTIO	REMARKS
					PRODUCTPROCESS SPECIFICATION TOLERANCE	EVALUATION MEASUREMENT TECHNIQUE	SAMPLESIZE FREQUENCY		RECORDING FREQUENCY		CONTRL METHOD ERROR PROOF	ERROR PROOF DEVICE DESRIPTION			
	NO	PRODUCT	PROCESS				QAD PNL	OPERATOR	QAD PNL	OPERATOR					

RECORDING FORMATS	KEY WORDS:			NOTE:
	FIR: FIRST OFF INSPECTION	CT: CORE TEAM		**1.** ALLDIMENSIONSAREIN**mm**
	PI: PATROL INSPECTION	REF: **REFER**		2. OPERATORRECORDINGFREQUENCYREF
	WI: WORK INSTRUCTION	R: **RANGE**		3. FIRSTOFFINSPECTIONALLCHARACTERISTICSMIN1NoBYQAD.PNL.
	EP: ERROR PROOFING	Y: **YES**		
	LC: LEAST COUNT	N: **NO**		

Section – 24 : Work Instruction

There should be a documented process monitoring & Operator instructions for all employees having responsibilities for operation of processes. These instructions are to be accessible at work stations.

A good work instruction must

- Be linked to the control plan
- Be manageable
- Be available at each operation
- Show step by step detail
- Be easy to understand
- Reaction to non-conformance
- Options
- Be easy to maintain
- Be controlled
- Be understood by all involved

Section – 25 : Inspection Instruction & Visual aids

There should be a documented inspection/testing instructions for all employees having responsibilities for inspection and testing. These instructions are to be accessible at work stations.

A good inspection instruction must

- be available at each inspection stations
- be understood by inspection personnel
- shoe details of checking frequency

Visual aids are those which are used during judgment of product characteristics with only visual aspects. It can be in the form of well identified limit master samples (for both acceptable & non-acceptable categories) or photographs of sample showing the same. This is applicable for all stages which has been identified as “Visual inspection” in the control plan. A list of Visual aids used in production run is to be prepared and submitted.

Section – 26 : Dimensional Inspection Report

Dimensional inspection must be performed on all parts and product materials with dimensional requirements to determine conformance with all relevant design record specification. All dimensional (except reference dimensional), characteristics and specifications as noted on the design record and control plan are to be listed in the enclosed format with actual results recorded. Blanket statements as OK or NOT OK willnot be accepted. Indicate the data of design record, change level and any authorized engineering change document not yet incorporated in design record to which the part was made.

It is the supplier's responsibility to meet all applicable specifications. Any results that are outside specifications are cause for the supplier notto submit the parts and /or documentation. Every effort has to be madeto correct the process so that all design record requirements are met. If the supplier is unable to meet any of the requirements, AIL is to be contacted for further instructions.

The product which was measured has to be identified properly and sent to AIL for verification and approval.

Section –27:Identification and Traceability

Material tests must be performed for all parts and product material when Chemical, Physical & Metallurgical requirements are specified.

If the supplier cannot perform the required tests, external servicescan be procured from a qualified source or upon special request from AIL facilities. When external lab services are used, the results must be submitted on their letter heads.

All tests required by the design record and related specifications are to be listed in the format. Also indicate any authorized engineering change documents that have not yet been incorporated in the design record. Blanket statements as OK or NOT OK will not be accepted

- Indicate the design record change level of the parts tested and the number, date and change level of the specifications to which the part was tested
- Indicate testing date
- Indicate material supplier's name

It is the supplier's responsibility to meet all applicable specifications. Every effort must be made to correct the process so that all designrecord requirements are met.

Date code, Heat code and Heat No to be marked in product (Whereever Applicable) and the same to be addressed in the Material Test Report.

If the suppliers is unable to meet any of these requirements, AIL is tobe contacted for determination of corrective action.

Section – 28 : Checking Aids

Checking aids are nothing but gauges, inspection fixtures, master reference samples, templates etc which is being used for inspectionand testing.

A list of the same is to be maintained pertaining to each product along with calibration details and submitted to AIL.

Section – 29 : Corrective Action

This report should be initiated by the supplier in case of repeated non-conformances is observed in the product i.e. repetitive. Concession/deviation requests and in the case of quality complaints received from AIL and also depending upon the magnitude of problem.

The supplier should immediately generate the referred document describing the details about the problem, interim corrective action planned and initiated, identified root cause and implementation of permanent corrective actions in order to prevent recurrence of such defects.

Implementation and effectiveness of the corrective and preventive action will be verified by AIL as appropriate through evaluation visit to the source or through evaluation of future lots after the date of correctiveaction.

In case corrective action requires any change in process/part/material it shall be done in consultation with AIL.

Countermeasures should be implemented carefully and keeping the following points in mind.

- It should not simply end with verbal instructions, guidance, education to workers etc., but should result in up gradation of control system and review/revision of standards and procedures.
- Consider if it is possible to install error-proofing devices inthe process to prevent errors.
- Investigate if there is a danger of occurrence of a similar parts or similar processes. If such possibilities are there, then implement counter-measures against each of them.

Along with the corrective action plan, the following support documents are to be updated and submitted appropriately.

Process Flow, Control Plan, PFMEA, Poka Yoke, Q Alert, One Point Lesson

When there is a rejection in supplied components, rejection note is raised in the format “F/COM/QAD/003”..

F/COM/QAD/003 Feb '25'	**Axles India limited**						
Ref: QAD/CR/S.	Quality Report for Bought out components				Report based on sample inspection / on 100% inspection		
Date:							
Vendor as per GIN:							
Part No –					Summary of rejections for debit purpose		
Part Name :	Split up details for stock purpose				Party	Qty rework / rejected / Scraped	
DC No. *Dt as per GIN.:*							
GIN No.	Qty accepted:						
Batch Qty :	Qty rejected:						
Sl.No.	Nature of defect	Qty	Rework/Deviation/Reject/Scrap	Attributed to	Rework done by AIL/ Party	Cost of rework to be debited	Remarks
Prepared by :	Verified by :			Approved by			
				Quality Head:		Commercial Head:	
Note: Approval is required only in case of suppliers debits							

In case of rejection which is significant in terms of quality / application requirements, an additional note will be raised requiring "Corrective Action Report" in the format "F/COM/QAD/032" attached.

Purchase department will send the original rejection note along with corrective action format to the supplier. Purchase department will ensure that corrective action report is completed and received within 7 days.

The completed reports will be scrutinized by QAD and subsequent three batches will be monitored for the absence of such defects. The corrective action will be considered as cleared after that.

If the corrective action report is not received within 7 days, further lots from the concerned supplier will not be accepted

PART I - RESP. - AIL QAD	AXLES INDIALTD	VENDOR/SUPPLIERCORRECTIVEACTIONREPORT			REF.No.: Date :	
	GIN No.:	REPORTED AREA			PARTNo	
	DC No.:	AIL'SORIGIN		CUSTOMER ORIGIN	PART NAME :	
	GIN QTY.:	BASED ON MAGNITUDE ANDRISK INVOLVED	BASED ON REPETITIVE IN NATURE		SUPPLIER :	
	REF.CR No.:					
	NATURE OF COMPLAINT (S) :					
					QAD SIGN.	

PART II - RESP. - VENDOR	TO BE FILLED BY THE SUPPLIER					
	DISPOSITION ACTION / CONTAINMENT ACTION				RESP.	TARGET DATE
	ROOT CAUSE(S) : (ATTACH ADDITIONAL SHEET IF NECESSARY)					
	ESCAPE ROOT CAUSE(S) :					
	CORRECTIVE ACTION :				RESP.	TARGET DATE
	FOR ESCAPE:					
	Note:Incaseofcorrectiveactioninvolvingchangeintooling,material,processorprocesssequenceorlocation,PSWtobesubmittedwithnecessa ry supporting documents					
	PREVENT RECURRENCE :					
	Horizontal deployment of Corrective Action				Resp.	Target Date
	Sl No	Related Document Updation	Applicable	Change details	Resp.	Target Date
	1	Process Flow				
	2	PFMEA				
	3	Control Plan				
	4	Poke-Yoke				
	5	Drawing				
	6	PPPAP				
	7	Horizontal Deployment				
	8	Others - OPL & Red alert				
	VENDOR SIGN:					

PARTIII - AIL PURCHAS	Verified by :	Onsite	Offsite
Date:	Purchase Officer:		Purchase Head:
PART IV - AIL QAD			
Date:	QA Incharge:		QA Head:

VENDOR COLUMN PART II - TO BE FILLED AND SEND BACK TO AIL WITHIN 10 DAYS FROM THE DATE OF COMPLAINT

F/COM/QAD/032 Apr'18

SECTION -30: CAPACITY VERIFICATION:

The purpose of capacity verification is to

- Determine if there are capacity constraints
- Identify process bottlenecks
- Be capable to meet full production volume during PPAP

Purpose:

- Capacity verification is used to verify & assure that the Suppliers Production System will be able to produce required customer declared volume stated in the RFQ.
- Capacity is to be demonstrated in all Production steps.
- One ICAS is used for every part no.
- ICAS is a self-assessment used by the supplier and then submitted & approved by Axles India.

Scope:

- Capacity verification shall be performed on all the appropriate supplied components and must be completed as part of all new or major modifications PPPAP submission

Procedure

- The supplier shall fill the form as given in the annexurepage no. 65 for each individual part no.
- Filling up instruction (step by step) procedure is given in the annexure page no 69.
- Capacity planning data covers machine available time, quality rate & cycle time, totally OEE has been derived.
- Planned production capacity / week will be generated.

automatically which has relevance to Customer demand / week

A minimum 20% free capacity is preferable for each process. It helps in meeting sudden increase in requirement.

I. Key Information

A) Product

	Supplier
	Site Location
	Parma Code
	Date of Study
	Part#/ Name

B) Customer Production

		Method
Annual quoted volume (RFQ volume)		
Production weeks/year (at customer) X Customer Demand / Week	-	

II. Capacity Planning

	Process 1	Process 2	Process 3	Process 4	Process 5
Operating pattern for the specific part Process description **Dedicated** or **Shared** process (for shared process, show only the operating pattern for the specific part)	SHARED	SHARED	SHARED	SHARED	SHARED
A Shifts/day					
B Total hours/shift B1 Hours/shift used for this part number (shared prod) C1 Personal breaks: lunch, breaks (minutes/shift) C2 Planned Maintenance (minutes/shift) D Days/week					
E **Net available time** (production hours/week) [A*(B1-(B1/B)*((C1+C2)/60))*D]	-	-	-	-	-
Projected Downtime for this part number					
F Tool/Variant Changeover (minutes)					
G Changeovers/shift					
H Inspections off facilities/shift (minutes)					
I Breakdowns/shift (unscheduled downtime) (minutes) J **Total projected downtime/week** (hours) [((FxG+H+I)/60xAxD)*B1/B]	-	-	-	-	-
K **Equipment Availability** [(E-J)/E]	-	-	-	-	-
Projected Quality Rate (%) Projected percent of parts scrapped and/or reworked For linked processes, see notes.					
L **Projected Quality Rate (%)**	-	-	-	-	-
Planned Cycle time / Capacity **Required Cycle time needed to cover exact customer demand** (sec/part) [E*3600*K*L/X]	-	-	-	-	-
M Net Planned Ideal Cycle Time (sec/part) For multiple cavities in one tool, see notes. Planned production capacity/ week [(E-J)*3600*L/M]	-	-	-	-	-

User Instruction - Capacity Assessment Sheet

Objective: The Capacity Assessment Sheet is used to verify the supplier's production system can support customer declared production volume stated in the RFQ. .
Capacity is to be demonstrated on all production processes, including internal sub-assembly and sub-tier components.

Capacity Verification
The Initial Capacity Assessment Sheet consists of one main element: Capacity Planning (verification of production readiness).

The Initial Capacity Assessment Sheet is divided into 2 areas for ease of use. Each area has a heading at the top of the box. The headings are:

1. **Key Information - Product / Customer Production / Capacity Revision Record**
2. **Capacity Planning**

Data input
The Initial Capacity Assessment Sheet has been divided into a number of easy to identify information boxes. Each box has a main heading to allow easy recognition. Within each box the user is required to input a variety of data. This manual will explain how to complete each section in turn.
Input & Calculation Cells: Data can only be input into the workbook in the cells on each sheet that require data. This ensures that the headings or other information cannot be accidentally erased or modified. These cells (***input cells***) are clearly identified as white in colour and with a solid outline around the box.
Cells that are grey in colour are ***calculation cells***. The user cannot enter data into these cells. They calculate values according to specific formulae using data entered into the input cells.

KEY INFORMATION - Product & Production Information / Capacity Revision Record

I. Key Information — **A) Product**

Asterix & Obelix Ltd	**Supplier**
Gaul	**Site Location**
12345	**Parma Code**
15-Jan-11	**Date of Study**
20304050 / Tie rod	**Part # / Name**

B) Customer Production

Annual quoted volume (RFQ volume)	46000
Production weeks/year (at supplier)	46
X Customer Demand / Week	1000

C) Capacity Revision Record (e.g. Significant Prod Run)

Method	Date	Description
ICAS self assessment	15-Jan-11	Self ass sent by supl

A. Product
The first Step in completing the Initial Capacity Assessment Sheet is to enter details of the part being analyzed. These Cells hold the basic information on the supplier and the part analyzed within the worksheet.

B. Customer Production
Before the Initial Capacity Assessment can take place, the Annual quoted volume must be added. This information will be available through the buyer and may also be available in the Purchase Order.
Fill in volume quoted in RFQ in cell "Annual quoted volume (RFQ)" in section "1. Key Information." Volume value that should be used is volume in peak production year multiplied with 10% for fluctuations during the year.

C. Capacity Revision Record.
Any revisions to the capacity Assessment of the process must be tracked using this section.

CAPACITY PLANNING

The Capacity Planning element will assess if suppliers have a "true production environment" in place and have adequately prepared their organization and their suppliers for the start of production and ramp-up.

II. Capacity Planning

Operating pattern for the specific part

		Process 1	Process 2	Process 3	Process 4	Process 5	Process 6	Process 7
	Process description	Turning	Drill	Bore	Washing	Assembly	Assembly II	Assembly III
	Dedicated or **Shared** process (for shared process, show only the operating pattern for the specific part)							
A	Shifts/day	1.00	2.00	1.00	1.00	1.00	1.00	2.00
B	Total hours/shift	8.00	8.00	8.00	3.00	8.00	8.00	8.00
B1	Hours/shift used for this part number (shared prod)	5.00	4.00	4.00	4.00	4.00	4.00	8.00
C1	Personal breaks: lunch, breaks (minutes/shift)	30.00	30.00	30.00	0.00	30.00	30.00	25.00
C2	Planned Maintenance (minutes/shift)	30.00	30.00	30.00	30.00	30.00	30.00	0.00
D	Days/week	1.00	5.00	4.00	5.00	5.00	5.00	5.00
E	**Net available time** (production hours/week) [A*(B1-(B1/B)*((C1+C2)/60))*D]	4.38	35.00	14.00	16.67	17.50	17.50	75.83

A cut of the Operating pattern is shown above with an example of data input for a process with seven operations. The Operating pattern gives the opportunity to give each operation a different operating pattern. The operating pattern input should mirror the true dedicated manufacturing time for each operation, e.g. by shared machines.

Input Cells: *Process Description*: Enter a brief Description of a process (e.g. final assembly, or inspection)
Input Cells: *Dedicated or Shared Process*: Identify from a drop-down box, the process type – dedicated / shared.

Dedicated Processes
A "**dedicated**" process is one, which is solely used for the part being analysed in this worksheet. For example, a test station may be a dedicated process.

A "**shared**" process is one which has many different parts manufactured on the process, and a more significant tool changeover time. It would be usual for such a process to manufacture parts in a batch production mode.

Examples of a shared process are:
- stamping press
- injection moulding machine
- heat treatment facility

- **Input Cells**: *Shifts per day*: - indicate the number of shifts in which each process operates per day.
- **Input Cells**: *Total hours per shift* – total number of hours for each shift.
- **Input Cells**: *Hours/shift used for this part number* (shared prod) - indicate the average number of hours per shift intended to be used for this partnumber.
- **Input Cells**: *Personal Breaks* – If the machine stops during personal breaks enter the length of time over one shift that the machine will not be operating. If the machine operates during personal breaks and is guaranteed to never run out of parts, then enter "0".
- **Input Cells**: *Planned Maintenance* – this is the length of time that is planned for the machine to be down during a shift for maintenance.
- **Input Cells**: *Days per Week* – indicate the number of days in which each process operates per week. Example: Supplier works 4 days 3 shifts each and on Friday only 1 shift should just enter. 4 working days plus 1/3 working day = 4.333 days / week [4,333 in European notation]

Projected Downtime for this part number

F	Tool / Variant Changeover (minutes)	2	1.00	0.00	20.00	15.00	0.00	20.00
G	Changeovers / Shift	10	20.00	0.00	0.33	0.33	0.00	1.00
H	Inspections of facilities / shift (minutes)	20	20.00	0.00	0.00	0.00	0.00	0.00
I	Breakdowns / shift (unscheduled downtime) (minutes)	10	20.00	10.00	0.00	10.00	10.00	50.00
J	**Total projected downtime/week** (hours) [((FxG+H+I)/60xAxD)*B1/B]	0.83	10.00	0.67	0.55	1.25	0.83	11.67
K	**Equipment Availability** [(E-J)/E]	81.0%	71.4%	95.2%	96.7%	92.9%	95.2%	84.6%

· **Input Cells**: *Tool / Variant Changeover* – Enter the changeover time for tool changes or module changes for the part in question. Changeover time is defined as the total time from last off previous part to checked first off new part.
· **Input Cells:** *Changeovers / shift* – Enter the frequency of tool / module change per shift.
· **Input Cells:** *Inspections of facilities / shift* - Enter the downtime required for unplanned equipment inspections or unplanned adjustments during a shift
· **Input Cells:** *Breakdowns / shift* – Enter all other projected downtime during a shift.

· **Calculation Cell**: The *Equipment Availability* is calculated automatically by using previous data.
Equipment Availability = (Total Planned Production Time – Downtime) / Total Planned Production Time

Projected Quality Rate (%)							
Projected percent of parts scrapped and/or reworked	1.00%	1.00%	1.00%	0.00%	2.00%	0.00%	1.00%
L **Projected Quality Rate (%)**	99.00%	99.00%	99.00%	100.00%	98.00%	100.00%	99.00%

· **Input Cells**: *Projected percent of parts scrapped and/or reworked* – Enter the combined percentage of parts that are scrapped and/or reworked on-line. If zero losses are expected, enter a zero. Note: This sheet does not address the scrap rate loss of linked processes. To evaluate output of linked processes. Scrap/rework that is related to a certain process step but found later up-streams must be added to the actual process step.

Planned Cycle time / Capacity							
Required Cycle time needed to cover exact customer demand (sec/part) [E*3600 * K / X * L]	274.40	1936.96	1033.04	1261.30	1246.62	1304.35	4971.52
M Net Planned Ideal Cycle Time (sec/part) For multiple cavities in one tool, see notes.	8.00	70.00	40.00	45.00	30.00	73.00	140.00
Planned production capacity / week [(E-J)*3600/M*L]	1578	1273	1188	1289	1911	822	1634

· **Input Cell**: Net *Planned Ideal Cycle Time* – Please provide the best estimate of the cycle time of the part on each process. The worksheet will use this data to calculate the Planned Production Capacity. This could also be a time taken with a stopwatch at the bottleneck operation. The measurement taken should always include the time for loading / unloading and inspection (Part-to-Part). Part-to-Part cycle time measurement requires that the operation being measured is not blocked or starved for at least two consecutive part cycles. Pick a point in the operation's cycle to begin timing and when the next part reaches that same point in the cycle, stop timing and record the elapsed time as the operation's cycle time. It is best to repeat this measurement at least 10 times (making sure that the blocked and starved condition is absent in each measurement) and take the average. Note: For multiple cavities in one tool the actual cycle time of the tool must be divided by the number of cavities in the tool (to provide a net cycle time per part).

· **Calculation Cell**: *Required Cycle time needed to cover exact customer demand* - "For Information Only" - the worksheet displays the Cycle time needed to cover exact customer demand, calculated
· **Calculation Cells:** *Planned production capacity per week*. This is to be compared with the *Customer Demand per Week*.

Section – 31 : SPC related Terms

Definition of Quality:

Totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs of customers.

Definition of Quality Control:

Quality control is "the process through which we measure actual quality performance, compare it with a standard, and act on the difference"

SPC

Statistical Process Control is a tool for controlling the manufacturing process to prevent defects rather than detect them.

STATISTICAL

Taking of measurements and arrangement of those measurements in clear pattern to allow predictions to be made on performance.

PROCESS

Any activity that involves a combination of **Man, Machine, Material, Method, Environment** working together to produce a final product.

CONTROL

Comparing **actual performance with target** and decide when and what corrective action is necessary to achieve the target. A processis said to be in statistical control when the only source of variation are from common causes. Process capability is determined by the variation that comes from common causes.

VARIATION

No two products or characteristics are exactly alike, because any process contains many source of variability. The differences among products may be large or they may be immeasurably small, but they arealways present. In practice, variation is inevitable in any process or product. The variation is of two types.

Inherent variation due to Common causes (or) Chance causes
Identifiable variation due to Special causes (or) Assignable causes

Inherent Variation due to Common causes / Chance causes /Random causes:

Sources of variation which are built into the process and will be caused by such problems as vibration, speed, power etc., These are the sources of random variation, the extent of which can be measured andmonitored. This level of variation will continue unless a fundamental change occurs in the process.

- A large number are in effect at anytime
- Each has an individual effect that is too small to mention
- Only a change in the system will reduce that part of the variability
- Remain constant overtime

Identifiable Variation due to Special causes / Assignable causes:

Sources of variation which will be due to specific identifiable causes such as variation in raw material, operator, tool wear, wrong setting, state of maintenance, etc., these removal are usually the responsibility of someone who is connected directly with the operation.

Ideally, only inherent variation in the process is preferred. If only the inherent variation is present, the output of the process will form a pattern which is stable over time and predictable. The occurrences of special causes will produce additional variation on irregular basis which will

remove the predictability of the process.

- Very few in effect at anytime
- The effect ismeasurable
- They can be found and eliminated
- The machine operator is best able to discover and make changes
- They occur infrequently in an unpredictable manner.

Process Capability:

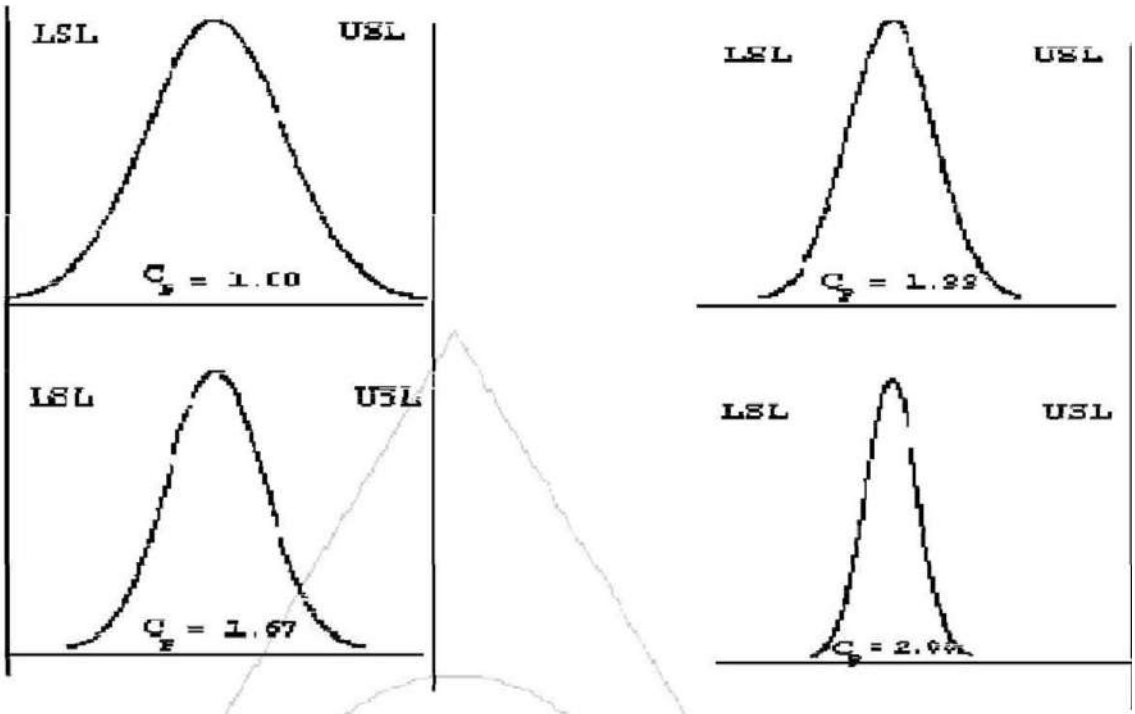
To understand the extent to which a quality characteristic of a process meets the specified requirements, "Process capability" analysis done. It is a comparison between the spread of the quality characteristic to the specification limits.

- Process Capability concerns with the Variation caused by all sources of variations : The Machine, The Material used, The Methods employed, The people involved and The environment as it affects the product
- To make a process capability study, Data must be collectedover a fairly long period of time the machine.

Process Capability &Performance:

Definition of Cp:

Cp is an index comparing the variation within the process to the spec limits. The higherthe number, the less variation in the process.



31.4.1.2 Definition of Cpk:

Cpk is an index (a simple number) which measures how close a process is running to its specification limits, relative to the target of the process. The larger the index, the less likely it is that any item will be outside the specifications.

Cpk	Confirming Output (%)	PPM
0.5	93.3	67,000 ppm
1.0	99.86	1,400 ppm
1.33	99.997	30 ppm

Cp & Cpk -Calculation:

$$Cpk = \text{Min}\left(\frac{USL - Xm}{3\sigma}, \frac{Xm - LSL}{3\sigma}\right)$$

$$Cp = \frac{USL - LSL}{6\sigma} = \frac{\text{Tolerance}}{6\sigma}$$

σ= Standard Deviation

$$= \frac{\sqrt{(X-X)^2}}{} \quad \text{or} \quad \frac{R}{d2} \quad \text{when } n = 5, d2 = 2.33 \; n-1$$

Comparison Of Cp& Cpk:

		Cpk	
		Low	High
Cp	Low	Reduce Process Variability	Impossible
	High	Move process mean	Seek a Target Dimension

Cpk will always be less than or at the most equal toCp.

If the process is Preferably Centered, Cpk and Cp shall beequal

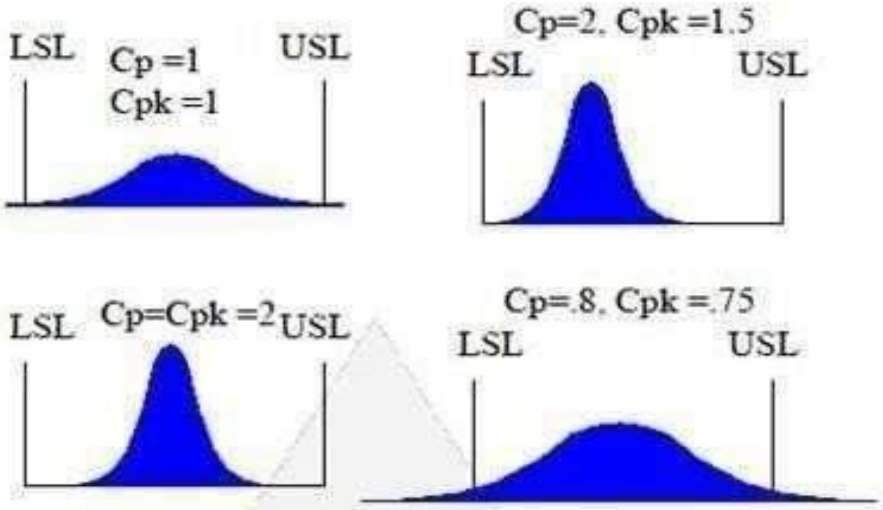
- **1.33 <Cpk : The process capability is ample, review the specification or process if excessive**

Cpk = 1.33 : Ideal status. "The goal" for all processes

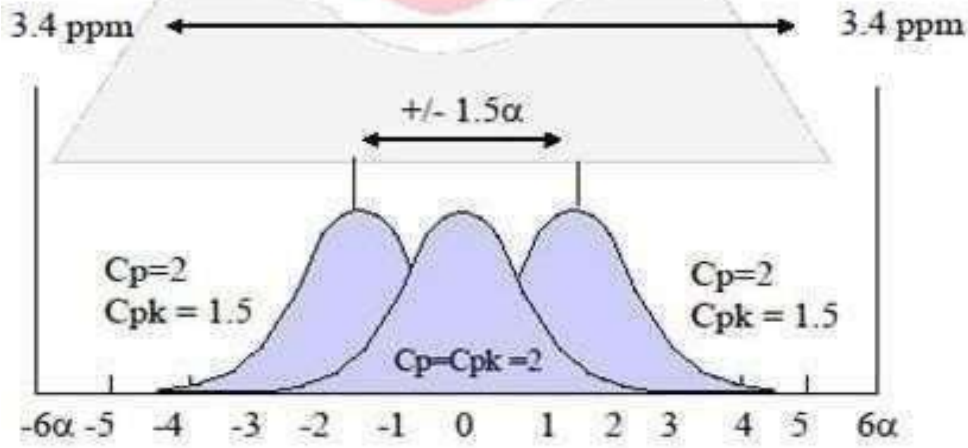
1 < Cpk <1.33 : This status is desirable, but careful control is necessary because defective units may be generated when Cp approaches 1

Cpk <1 : Since defective units exist, it is necessary to takeaction, such as change operation methods or total screening

Examples of Cp, Cpk



6 Sigma And Cp & Cpk



Process Capability Study

Preliminary and periodic process capability studies are to be conducted for the characteristics specifically intimated by AIL as safety/Significant/Critical characteristics.

This is represented in the drawings. An acceptable level of process capability must be determined by evaluation using variables data.

The purposes of this study if to find out whether the production process is likely to produce product that will meet AIL requirements.

Preliminary process capability study using X bar & R chart is the starting activity.

These are short term and will not predict the effects of time and variation in people materials, methods, equipment, measurement systems and environment whereas periodic process capability capturesall the above variations.

For short term studies the sample size should be at least 25 sub-groups of data containing at least a total of 125 individual readings.

The control chart should be examined for signs of instability. If there are signs if there are signs of instability, corrective actions shouldbe taken.

If stability cannot be achieved, contacts AIL and determine appropriate action.

Section – 32 : Failure Modes and Effect Analysis

FMEA (System, Design, Process, Service), as applicable, shall be carried out by the supplier. He shall share with AIL about the details pertaining to potential failure.

Process FMEA

Process Failure Modes and Effect Analysis (Process FMEA) is a method for identifying potential or known processing failure modes and providing problem follow-up and corrective actions. PFMEA is an analytical technique used to identify potential problem areas associated with all stages of manufacturing i.e. right from receipt to dispatch. Efforts shall be taken to improve the process to achieve defect prevention rather than defect detection.

Objective:

The Process FMEA is a disciplined analysis of the part process with the intent to identify and correct any known or potential failure modes before the first production run occurs. Once these failure mode is systematically ranked so that the most severe failure modes receive priority attention. The completion of Process FMEA is the responsibility of individual product / process engineer. This individual process engineers is the most knowledgeable about the process structure and can best anticipate the failure modes and their effects and address corrective actions.

Timing:

The Process FMEA is initiated during the early planning stages of the process before the machines; tooling, facilities, etc are purchased. The Process FMEA is continually updated as the process becomes more prior to the first production run.

Requirements:

Completing the Process FMEA form FMEA risk ranking Guidelines

Ranking of failure modes and causes:

It will be most desirable to eliminate all Failure modes and causes. However practical considerations based on cost and time, dictate the need to tackle only those critical modes and causes based on a priority ranking system. The ranking system in FMEA is based on the probabilityof

1) **Occurrence**
2) **Severity**
3) **Detection**

Occurrence:

Estimate the probability of occurrence of the potential failure on a 1 to 10 points scale. Only controls intended to prevent the cause of failure from occurring should be considered in thisestimate.

Severity Ranking:

Severity is an estimate of the effect on the user. Severity is the factor that represents the seriousness of the failure to the customer after it has occurred. Estimate the severity of "Effects of failure" to the customer on a 1 to 10 points scale.

Detection:

Apply a scale of 1 to 10 which will enable probability of detection to be rated. Each assignable cause must be addressed and theprobability of detection rated.

Risk Priority Number(RPN)

It is a measure of design risk. It is the product ofthe

Severity (S) x Occurrence (O) x Detection (D)

Higher the RPN the team must undertake efforts to reduce the risk

through corrective actions. However the action plan should be planned for failure modes having higher severity and occurrence rating also, irrespective of the RPN.

PFMEA – TeamEffort:

During the initial process potential FMEA preparation, ***the responsible engineer is expected to directly and actively involve representatives from all affected areas.*** These areas should include. But not limited to design, assembly, manufacturing, materials, quality, service and suppliers as well as the area responsible for the subsequent assembly. The FMEA should be a catalyst to stimulate theinterchange of ideas between the functions affected and thus promote a team approach.

The process FMEA is a living document and should be initiated before or at the feasibility stage, prior to tooling for production, and take into account all manufacturing operations from individual components to assemblies. Early review and analysis of new or revised processes is promoted to anticipate, resolve or monitor potential process concernsduring the manufacturing planning stages of a new method or component program.

The process FMEA assumes the product as designed will meet the design intent. Potential failures which can occur because of a designweakness need not, but may be included in a Process FMEA. Their effect and avoidance is covered by the Design FMEA. The Process FMEA does not rely on product design changes to overcome weakness in the process, but does take into consideration a product's design characteristic relative to the planned manufacturing or assembly process to assure that, to the extent possible, the resultant product meets customer needs andexpectations.

Process function /requirements

Enter a simple description of the process or operation being analyzed (e-g., turning, drilling, tapping, welding, assembly). Indicate as concisely as possible the purpose of the process of operations with different potential failure, it may be desirable to list the operations as separate processes.

Potential Failure Mode

Potential Failure Mode is defined as the manner in which the process could potentially fail to meet the process requirements and /ordesign intent. It is a description of the non- conformance at that specificoperation. It can be a cause associated with a potential failure mode in a subsequent (down stream) operation or an effect associated with a potential failure in a previous (upstream) operation. However, in preparation of the FMEA, assumption should be made that the incomingpart(s) are correct.

List each potential failure mode for the particular operation in terms of a component, subsystem, system or process characteristics. The assumption is made that the failure could occur, but may not necessarily occur. The process engineer/team should be able to pose and answer the following questions:

1) How can the process / part fail to meet specifications?
2) Regardless of Engineering Specifications, what would a customer (end user, subsequent operations or service) consider objectionable?

A comparison of similar processes and a review of customer (enduser, subsequent operations or service) claims relating to similar components is a recommended starting point. In addition, knowledge of the design is necessary. Typical failure modes could be, but are not limited to bend, cracked, grounded, binding, deformed, open circuited, burred, dirty, short circuited, handling damage, tool worn, etc.,

Potential Effect(s) of Failure

Potential effects of failure are defined as the effects of the failure mode on the function, as perceived by the customer. Describe the effects of failure in terms of what the customer notice or experience, remembering that the customer may be an internal customer as well as the ultimate end user. State clearly if the function could impact safety or noncompliance to regulations. The effects should always be stated in terms of the specific system, subsystem or component being analyzed. Remember that a hierarchical relationship exists between the component, subsystem and system levels. For example, a part could fracture, which may cause the assembly to vibrate, resulting in an intermittent system operation. The intermittent system operation could cause performance to degrade, and ultimately lead to customer dissatisfaction. This intent is to forecast the failure effects to the team's level of knowledge. Typical failure could be noise, poor appearance, erratic operation, unpleasant odour, in operative, etc.,

Severity(S)

Severity is an assessment of the seriousness of the effect (listedin the column "potential failure mode" to the customer). Severity applies to the effect only. If the customer affected by a failure mode in the assembly plant or the product user, assessing the severity may lie outside the immediate process engineer's / team's field of experience of knowledge. In these cases, the Design FMEA, Design engineer, and/or subsequent manufacturing or assembly plant process engineer should be constituted. Severity should be estimated on a "1" to "10" scale.

Suggested Evaluation Criteria:

(The team should agree on an evaluation criteria and ranking system, which is consistent, even if modified for individual process analysis.

Severity Rankings				
Effect	**Criteria : Severity of Effect on product (Customer Effect)**	**Rank**	**Effect**	**Criteria : Severity of effect on product (Manufacturing / Assembly Effect)**
Failure to meet safety and/or Regulatory Requirements	Potential failure mode affects safe vehicle operationand/or involves noncompliance with government regulation without warning	10	Failure to meet safety and/or Regulatory requirements.	May Endanger operator (machine or assembly) without warning.
	potential failure mode affects safe vehicle operationand/or involves noncompliance with government regulation with warning	9		May Endanger operator (machine or assembly) with warning
Loss or Degradation of primary function	loss of primary function (vehicle inoperabledoes not affect safe vehicle operation)	8	Major Disruption	100% of product may have to be scrapped line shutdown or stop ship.
	Degradation of primary function (vehicle operable, but atreduced level of performance)	7	Significant Disruption	A portion of the production run may have to be scrapped .deviation from primary process including decreased line speed to added manpower.
Loss or Degradation of Secondary function	Loss of secondary function (vehicle operable,but comfort / convenience functions inoperable)	6	Moderate	100 % of production run may have tobe reworked off line and accepted.
	Degradation of secondary function (vehicle operable but comfort/ convenience functions atreduces level of performance)	5	Moderate Disruption	Aportion of the production run may have to be reworked off line and accepted
	Appearance or Audible noise, vehicle operable ,item does not conform and noticed by most customers(>75%).	4		100% of production run may haveto be reworked in station before it is processed.
	Appearance or Audible noise, vehicle operable ,item does not conform and noticed by most customers(50%).	3		A portion of the production run my have e to be reworked in-station before it is processed.
	Appearance or Audible Noise .Vehicle operable .item does not conform and noticedby discriminating customers(<25%)	2	Minor Disruption	Slight inconvenience to process. Operation. or operator.
No effect	No discernible effect	1	No effect	No discernible effect

Classification:

This column may be used to classify any special characteristics for components, subsystems or systems that may require additional process controls. If a classification is identified in the Process FMEA, notify the design responsible engineer since this may affect the engineering documents concerning control item identification.

Note: An item identified in the Design FMEA should have the special process controlsidentified in the process FMEA.

Potential cause (s) / Mechanism(s) of Failure:

Potential cause of failure is defined as how the failure could occur, described in terms of something that can be controlled. List to the extent possible, every conceivable failure causes assignable to each potentialfailure mode. If a cause is exclusive to the failure mode, then this portionof the FMEA thought process is completed. Many causes however are not mutually exclusive, for example, may be considered to determine which root cause are the major contributions and which can be most easily controlled.

The causes should be described so that remedial efforts can be aimed at those causes, which are pertinent. Typical failure causes mayinclude, but are not limited to

- Improper torque – excess /less
- Improperweld - current, time, pressure
- Inaccurate gauging
- Improper heat treatment – time ,temperature
- Inadequate gating –venting
- Inadequate / no lubrication
- Part Missing or miss-located

Only specific errors or malfunctions (e-g, Operator fails tofit a seal) should be listed, ambiguous phrases (e-g, operator error, machine malfunction) should not be used.

Occurrence(O):

Occurrence is how frequently the specific failure cause / mechanism are projected to occur. The occurrence ranking number hasa meaning rather than a value.

Estimate the likelihood of the occurrence on a "1" to "10" point scale. Only occurrences resulting in the failure mode should be considered for this ranking. Failure detecting measures are not considered here.

The following occurring ranking system should be used to ensure consistency. The "Possible Failure Rate" is based on the number of failures which are anticipated during the process execution. If availablefrom a similar process, statistical data should be used to determine theoccurrence ranking. In all other cases, a subjective assessment can bemade by utilizing the word descriptions in the left column of the table, along with any historical data available for similar processes.

32.2.2.1 Suggested Occurrence Evaluation criteria

The team should agree on an evaluation criteria and ranking system, which is consistent, even if modified for individual process analysis.

Occurrence Ranking		
Likelihood of Failure	**Criteria : Occurrence of cause - PFMEA (Incidents per item/Vehicle)**	**Rank**
Very High	≥100 per Thousand > 1 in 10	10
	50 per Thousand 1 in 20	9
High	20 per Thousand 1 in 50	8
	10 per Thousand 1 in 100	7
	2 per Thousand 1 in 500	6
Moderate	5 per Thousand 1 in 2000	5
	.1 per Thousand 1 in 10000	4
	.01 per Thousand 1 in 100000	3
Low	≤.001 per Thousand 1 in 1000000	2
Very Low	Failure is eliminated through preventive control	1

Current Process Control

"Current process controls" are descriptions of the controls that either prevent to the extent possible the failure mode from occurring or detectthe failure mode should occur. These controls can be process controls such as fixtures or

Statistical process controls (SPC), or can be post process evaluation. The evaluation may occur at the subject operation or at asubsequent operation.

There are three types of process controls / features to consider those that:

1) Prevent the cause / mechanism or failure mode / effect from occurring, or reduce their rate of occurrence.
2) Detect the cause / mechanism and lead to corrective actions ,and
3) Detect the failure mode.

The preferred approach is to first use the type1 controls to the maximum possible extent and then other two types in the order.

The initial occurrence rankings will be affected by the type 1 controls provided they are integrated as part of the design intent.

The initial detection rankings will be based on the type 2 or type 3 current process controls, provided the process being used is representative of process intent.

Detection (D)

Detection is an assessment of the probability that the proposed type2 current process controls, listed in column 16, will detect potential cause/mechanism (process weakness), or the probability that the proposed type3 process controls will detect the subsequent failure mode, before the part or component leaves the manufacturing operationor assembly location. Estimate the detection controls in a "1" to "10" point scale. Assume the failure has occurred and then assess the capabilities of all "current process controls" to prevent to prevent shipment of the part having this failure mode or defect. Do not automatically presume that the detection ranking is low because the occurrence is low (e- g, when the control charts are used), but do assess

the ability of the process controls to detect low frequency failure modesor prevent them from going further in the process.

Random quality checks are unlikely to detect the existence of an isolateddefect and should not influence the detention ranking. Sampling done on a statistical basis is a valid detection control.

Suggested PFMEA Detection Evaluation Criteria			
Opportunity for Detection	**Criteria: Likelihood ofDetectionBy process Control**	**Rank**	**Likelihood of Detection**
No detection opportunity	No current process control: cannot detect or is not analyzed.	10	Almost impossible
Notlikely todetect at any stage	Failure mode and/or Error (cause) is not easily detected(e.g. random audits)	9	Very Remote
Problem Detection Post Processing	Failure mode detection post-processing by operator through visual/tactile/audible means.	8	Remote
Problem Detection at source	Failure Mode detection in-stations by operator through visual/tactile/audible means or post-processing through useof attribute gauging (go/nogo ,manual torque check/check wrench ,etc.	7	Very low
Problem Detection post Processing	Failure mode detection poet-processing by operator through variable gauging or in-station by operator through use of attribute gauging (go/nogo ,manual torque check/clicker wrench ,etc.	6	Low
Problem Detection at source	Failure Mode or Error (Cause) detection in-station by operator through use of variable gauging or by automated controls in-stations thatwill detectdiscrepant part and notifyoperator (light, buzzer, etc). Gauging performed on setup and first-piece check (for set-up causes only)	5	Moderate
Problem Detection post processing	Failure Mode detection post-processing by automatedcontrols that will detect discrepant part and lock part to prevent further processing	4	Moderately High
Problem Detection at source	Failure mode detection in-stations by automated controls that will detectdiscrepant partand automatically lock part instation to prevent further processing	3	High
Error Detection and/or problem Prevention	Error (cause) detection in-station by automated controls thatwill detect error and prevent discrepant part from being made.	2	Very High
Detectionnotapplicable :Error prevention	Error (cause) prevention s a result of fixture design. Machinedesign or part design. Discrepant parts cannot be made because item has been error-proofed by process / product design.	1	Almost certain

Axles India Limited	PROCESS FAILURE MODE AND EFFECTS ANALYSIS	DOC No:	
		PFMEA DATE(Orig) :	
Part Name :	PROCESS RESPONSIBILITY	Rev no / date :	
Part Number :	HEAD-Cross Functional team :		
		Prepared by :	
	CORE TEAM :		
Customer :		Approved by	

Process Step	Process Function/ Requirements	Potential failure mode	Potential Effects of Failure	SEV	CLASS	Potential causes / mechanisms of failure	Current process Controls Prevention	OCC	Current process Controls Detection	DET	RPN	Recommended Actions	Responsibility and Target Completion date	Action Results						
														Action Taken	SEV	OCC	OCC	DET	DET	RPN