WHEELS INDIA LIMITED

SUPPLIER QUALITY ASSURANCE MANUAL



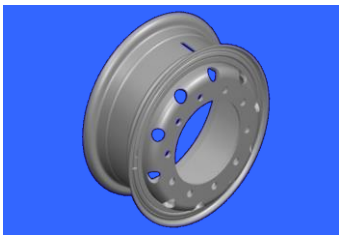
PASSENGER CAR WHEEL



CAW WHEEL



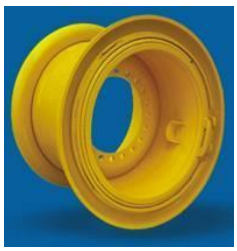
WIRE WHEEL



TUBED WHEEL

CONSTRUCTION WHEEL

WB DUAL WHEEL







TRACTOR WHEEL



WHEEL For Run Flat Assy



FORGED ALUMINUM



DROP CENTER WHEEL

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FOREWORD

1.0 - PURPOSE :-

- This manual explains the activities which are to be carried out by Wheels India Limited suppliers for meeting the ultimate goal of Quality, Consistency, Continual Improvement & Cost reduction.
- These activities are part of our ISO 9001:2015 / IATF 16949:2016 requirements, which all suppliers of WIL have to fulfill in a phased manner.
- This manual communicates WIL's Specific Requirements and Expectations to WIL's suppliers.
- Applicable to WIL & WCWL BU's and Plants.

2.0 - 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 WIL.
- This manual is to be used as a reference for establishing Quality Systems, promoting continual improvement and cost reduction activities in your organization.
- This would certainly result in parts being supplied to WIL are of the highest quality, delivered at the right time and which finally leads to Customer Satisfaction.

3.0 - SCOPE :-

- This manual contains and defines the QMS requirements for WIL suppliers.
- These customer requirements supplemental to ISO 9001:2015 / IATF 16949:2016.
- The requirements of this manual shall be documented in the organizations quality systems.
- Circulation limited to the approved suppliers of all WIL plants (Including Air Suspension Division) and to internal departments of WIL.

4.0 - REFERENCES :-

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

- Advanced Product Quality Planning and Control Plan – 3rd edition.
- Potential Failure Mode and Effects Analysis (FMEA) – AIAG 4th edition or AIAG_VDA Version 1 Guidelines.
- Control plan – 1st edition.

- Measurement System Analysis (MSA) - 4th edition.
- Statistical Process Control (SPC) - 2nd edition.
- Production Part Approval Process - - 4th edition

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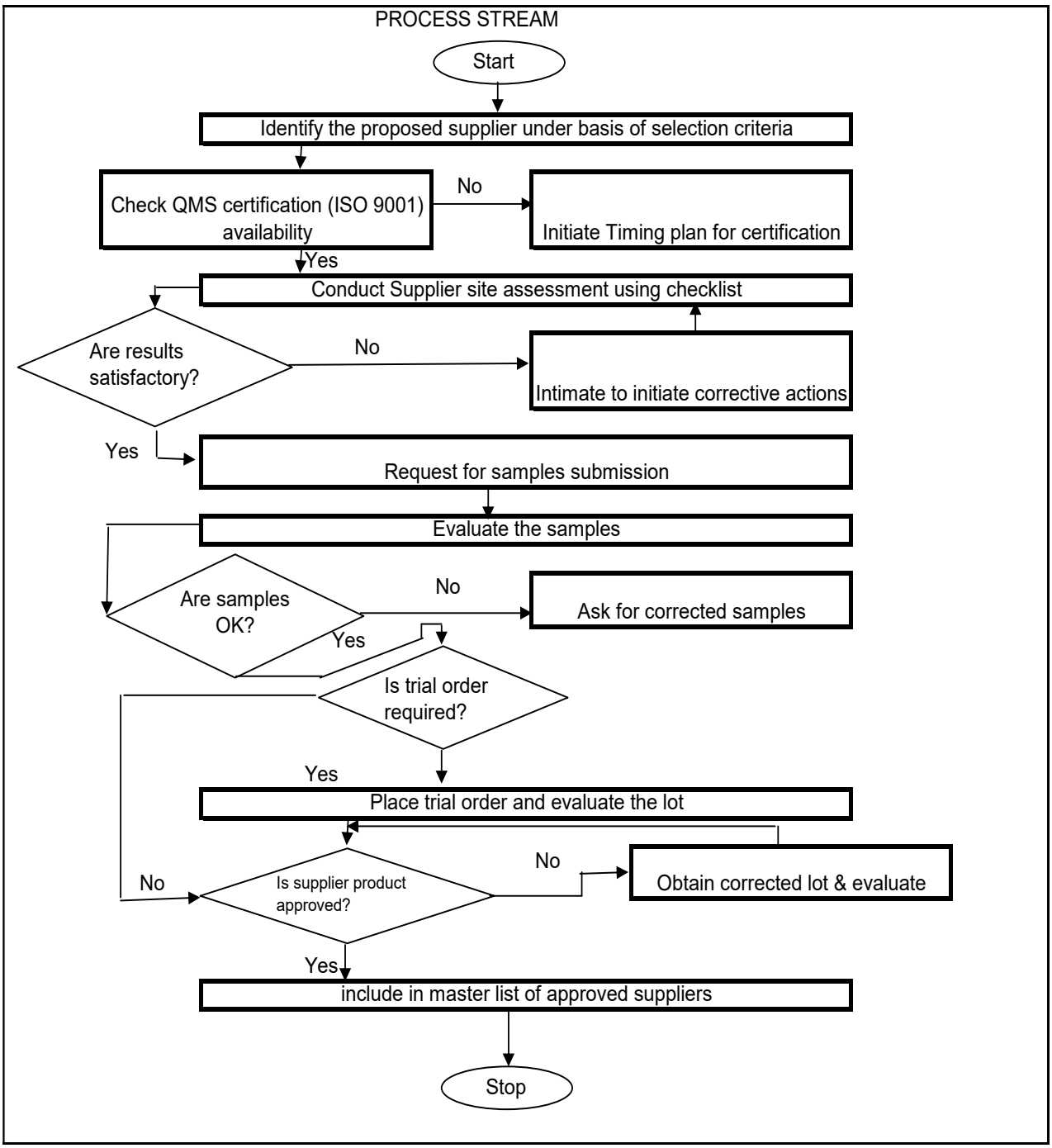
5.0 NEW SUPPLIER SELECTION FLOW CHART

PURPOSE :-

- To out line supplier identification and selection procedure.

SCOPE :-

- Applicable to incoming products of WIL.



6.0 QUALITY ASSURANCE SYSTEM AT SUPPLIER SITE

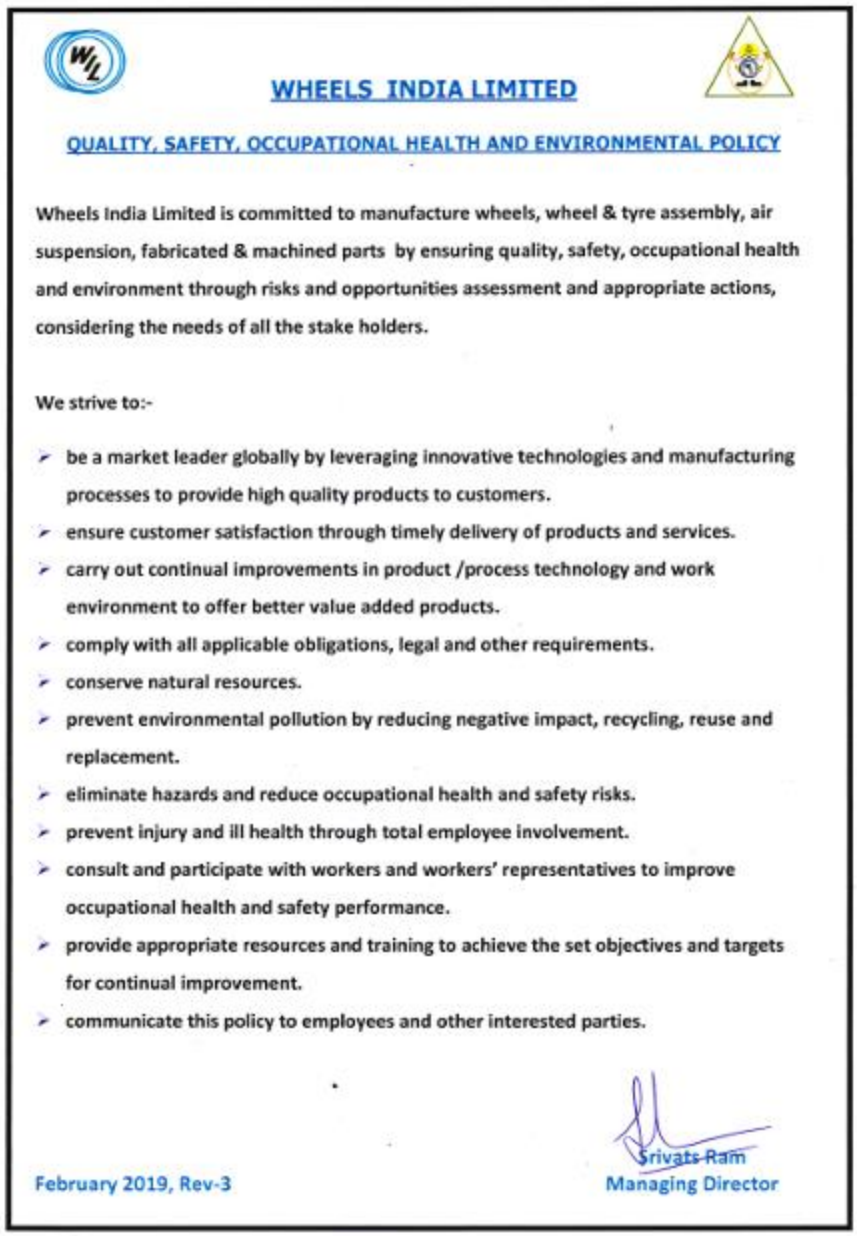
In order to ensure smooth functioning of quality assurance system and its continuing suitability and effectiveness, the following shall be ensured by your organisation.

6.1 MANAGEMENT RESPONSIBILITY :-

QUALITY POLICY :-

6.1.1

Formulate a quality policy for the organisation defining objectives for quality and its commitment to quality.



WHEELS INDIA LIMITED

QUALITY, SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENTAL POLICY

Wheels India Limited is committed to manufacture wheels, wheel & tyre assembly, air suspension, fabricated & machined parts by ensuring quality, safety, occupational health and environment through risks and opportunities assessment and appropriate actions, considering the needs of all the stake holders.

We strive to:-

- be a market leader globally by leveraging innovative technologies and manufacturing processes to provide high quality products to customers.
- ensure customer satisfaction through timely delivery of products and services.
- carry out continual improvements in product /process technology and work environment to offer better value added products.
- comply with all applicable obligations, legal and other requirements.
- conserve natural resources.
- prevent environmental pollution by reducing negative impact, recycling, reuse and replacement.
- eliminate hazards and reduce occupational health and safety risks.
- prevent injury and ill health through total employee involvement.
- consult and participate with workers and workers' representatives to improve occupational health and safety performance.
- provide appropriate resources and training to achieve the set objectives and targets for continual improvement.
- communicate this policy to employees and other interested parties.

Srivats Ram

February 2019, Rev-3 Managing Director

6.1.2

It should be understood, implemented and maintained at all level of your organisation

ORGANISATION :-

6.1.3

Nominate a person who would be totally responsible for Quality Assurance Activities in your organisation for liaise with us.

6.1.4

Maintain an organisation chart which defines the responsibilities and authorities of different personnel who are involved in assuring quality.

6.1.5

Management: Periodically review and document Quality System requirements, Quality deficiencies if any and implement corrective actions.

6.2 QUALITY SYSTEM :-

6.2.1

Prepare a Quality Manual which explains all the quality assurance activities and specifies the company quality procedures.

6.2.2

Effectively implement the quality system and its documented procedures with proper recording system.

6.2.3

Plan for quality in a systematic way document it in the form of Process Flow Chart, Process FMEA, Control Plan, Work Instructions, Inspection Instructions and Visual Aids.

6.2.4

Identification and control of Special characteristics as per below matrix

IDENTIFICATION AND CONTROL OF SPECIAL CHARACTERISTICS						
		Process capability study				100% Inspection
S.no	Description	Cp	Cpk	Pp	Ppk	If no SPC Available
1	WIL Requirement	>1.67	>1.67	>=1.33	>=1.33	Yes
2	Stellantis (PSA)	>1.67	>1.67	>=1.33	>=1.33	Yes
3	Volvo group (VECV)	>1.67 for CC / >1.33 for SC	>1.67 for CC / >1.33 for SC	>1.67	>1.67	Yes
4	Skoda VW	>1.67	>1.67	>=1.33	>=1.33	Yes
5	Daimler (DICV)	>1.33	>1.33	>1.33	>1.33	Yes
6	Renault group	>1.33	>1.33	>1.67 Initial	>1.67 Initial	Yes
7	Ashok Leyland	>1.33	>1.33	>1.67	>1.67	Yes
8	TML	>1.33	>1.33	>1.67	>1.67	Yes
9	Force motors Limited	>1.33	>1.33	>1.67	>1.67	Yes
10	SML-Isuzu	>1.67	>1.33	Nil	Nil	Yes
11	MTBD	>1.67	>1.67	>1.33	>1.33	Yes
12	Polaris	>1.33	>1.33	>1.67	>1.67	Yes
13	GM India limited	>1.33	>1.33	>1.67	>1.67	Yes

Note :1) CSR Superseeds all the other requirements.
2) WIL Requirements applicable by default when no CSR Given.

Stastical Studies

Supplier Shall conduct Statistical approach to study measurement process and manufacturing process to optimize variation like MSA,SPC Studies based on AIAG Guidelines.

6.2.5

Evolve error proofing methodologies during planning of processes, facilities, equipment and tooling.

6.3 DOCUMENT CONTROL :-

6.3.1

There should be a control system to incorporate customer changes on purchase orders, Component drawings, specifications and Quality plans to work accordingly to the latest issue and obsolete documents promptly removed and returned to WIL.

6.3.2

Quality records, including inspection, testing, audits, review results should be maintained as important evidence to demonstrate conformance to specified requirements for effective operation of the quality system.

6.3.3

The documents and formats shown in this manual are for reference purpose only. The suppliers are requested to refer the same for preparing the documents.

6.3.4

Record Retention Period: The retention period of all documents and records shall be maintained as per the below matrix with respect to customers.

Record Retention Period for All Customer Matrix		
S.no	**Customer**	**Record retention period**
1	WIL Requirement	3 Years
2	Stellantis (PSA)	NIL
3	Volvo group (VECV)	10 Years
4	Skoda VW	Length of time product active + 1 Year
5	Daimler (DICV)	Length of time product active + 1 Year
6	Renault group	Length of time product active + 1 Year
7	Ashok leyland	Length of time product active + 1 Year
8	TML	Length of time product active + 1 Year
9	Force motors Limited	Length of time product active + 1 Year
10	SML-Isuzu	3 Years
11	MTBD	Length of time product active + 1 Year
12	Polaris	Length of time product active + 1 Year
13	GM India limited	Length of time product active + 1 Year

6.4 PURCHASING :-

6.4.1

a) All purchasing activities should be planned and executed as per purchasing procedure.

b) To avoid dispute and improve in quality level a good association to be maintained.

6.4.2

For Tier –II supplier all the requirements to be clearly defined and should be communicated properly for better understanding.

6.4.3

The supplier should develop a clear agreement with their sub-contractors for the assurance of product supplied if required.

6.4.4

There should be a procedure to inspect the incoming materials like Raw-material, sub-contract items, chemicals and consumables that were used to manufacture the product.

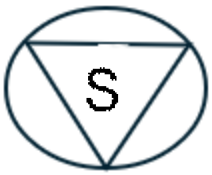
6.4.5

a) WIL supplied products should be verified stored and maintained when ever required and has to be clearly identified for traceability purposes.
b) Any such product received in damaged condition, with quality problem and shortages if any should be recorded and promptly intimated to WIL for implementing corrective actions.

6.5 PRODUCT IDENTIFICATION & TRACEABILITY :-

6.5.1

a) From the initial receipt of product, it should be identified from raw material to dispatch.
b) Product safety special characteristics shall be Identified as per special characteristics matrix.

SPECIAL CHARACTERISTICS MATRIX			
S.NO	**TYPE**	**MEANING**	**SYMBOL**
1	Product safety	Characteristics which affect Product safety requirements	
2	Statutory & Regulatory	Characteristics which affect Product statutory & Regulatory requirements	
3	Product Function	Characteristics which affect Product fit,form & Function	@

6.5.2

At an appropriate intervals re-validation to be carry out for shelf life products which are in stock.

6.6 PROCESS CONTROL :-

6.6.1

a) Accuracy to be maintained in Jigs, fixtures, toolings, Templates and Gauges prior to use.
b) Stranger component jigs, fixtures, toolings, Templates and gauges to be properly stored and protected and it has to be calibrated before use.
c) All the above should meet the drawing requirements.

6.6.2

A program of preventive maintenance should be established and implemented to ensure continuous capability of the process.

6.6.3

Work instruction should be made describing the criteria for determining the satisfactory work completion and conformity to specifications and standards.

6.6.4

Quality status of processed material should be verified for all characters in production sequence right from start to end in order to minimise effects of errors and to maximize yields and values to be recorded.

6.6.5

Operations associated with product or process characteristics which are having a significant effect on product quality should be identified. Appropriate controls should be established to ensure these characteristics remain with in the specifications.

6.6.6

The supplier is required to notify the buying company of Wheels India Limited for all changes to the process chain (site, product, process) prior to implementation and to obtain the approval of the relevant quality personnel. If a new model is required, this must be agreed with the relevant quality personnel from the buying company of Wheels India Limited. This is to ensure the customer requirements of Wheels India.

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6.6.7

The product should be evaluated in case of any change instituted so as to verify whether the desired effect is achieved in product quality.

6.6.8

The supplier should maintain his premises in state of order and to be clean.

6.6.9

The supplier should have contingency plan in order to protect the customer supply product in case of emergency.

6.6.10

There should be proper facility for maintenance, repairing of tools and their storage.

6.7 INSPECTION AND TESTING :-

6.7.1 INCOMING INSPECTION :-

6.7.1.1

a) There should be a method to ensure quality of all purchased materials before starting production.
b) Any deviations observed should be documented.

6.7.2 IN PROCESS INSPECTION :-

6.7.2.1

a) Inspection / testing should be carried out at appropriate points in the process to verify conformity.
b) Processing stage and frequency of inspection depends on the importance of the characteristics and ease of verification.
c) During processing, verification may include the following.
    1. Set-up and first off –inspection
    2. Inspection by operator
    3. patrol inspection
    4. last off inspection

6.7.2.2

a) It has to be strictly ensured that the product is not released for further use until it has been inspected.
b) Appropriate records should be maintained at all stages.

6.7.3 FINAL INSPECTION AND TESTING :-

6.7.3.1

Finished product should conform the specified requirements at final inspection or during testing. Eg: Appropriate records should be maintained for the characters which are inspected 100% for visual defects, lot sampling and continuous sampling.

6.7.3.2

These inspections provide rapid feed back for corrective actions to be implemented in the product, process or the quality system. Any deviations observed should be documented and appropriate records shall be maintained.

6.8 CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT :-

6.8.1

Control should be exercised overall measuring systems such as gauges, instruments, sensors, special test equipment etc. Before first use, the measuring system has to be calibrated and checked whether it is suitable. Then it should be periodically calibrated at specified intervals depending upon frequency of usage.

6.8.2

Documentary evidence should be made available showing that the above activities have been carried out as planned.

6.9 INSPECTION AND TEST STATUS :-

6.9.1

Once inspection and tests are performed the product shall be identified suitably indicating either of the following categories-Accepted, Rework, Scrap or Review.

6.9.2

It has to be ensured the product that has passed the required inspection and tests to be dispatched or passed to next operation.

6.10 CONTROL OF NON CONFORMING PRODUCT:-

6.10.1

WIL should be prevented from unintentionally receiving non conforming product the unnecessary costs of further processing.

6.10.2

a) Suspected non-conforming items or lots should be immediately identified and the occurrence to be recorded.
b) In such situations there should be a system to examine or re-examine previous lots also.

6.10.3

Non-conforming items should be segregated from the conforming items and adequately identified.

6.10.4

Non-conforming items should be subjected to review by WIL to determine whether it can be accepted by concession, rework or scrap.

6.10.5

Repaired / Re-worked product should be re-inspected or re-tested to verify conformance with specified requirements.

6.11 CORRECTIVE / PREVENTIVE ACTION :-

6.11.1

Appropriate corrective & preventive action should be initiated through 8D formats & implemented to eliminate / minimize the recurrence of non-conformances in product. WIL urges suppliers to initiate containment actions within 48 hours and submit analysis along with corrective action within 10 working days and except steel suppliers. Steel supplier's feedback on non-conformances to be provided with in a period of 60 days.

6.11.2

The details of the actions should be documented and effectively monitored at defined intervals over a period of time.

6.11.3

WIL to verify the corrective action after implementation and ensure the sustenance during the next assessment.

	8D - PROBLEM SOLVING REPORT					F/QAD/374 Rev-2 17.09.2025
WHO IS AFFECTED BY THE PROBLEM?						
Customer:		**Part Number**			**Open Date :**	
Plant:		**Part Name:**			**Close Date :**	
BU:		**INTERNAL** ☐	**EXTERNAL** ☐		**8D Number:**	
D'0' SYMPTOMS (Use 5W 2H)			**EMERGENCY RESPONSE ACTION (ERA)**			
D1 TEAM MEMBER NAMES/TITLES:		**D2 PROBLEM STATEMENT/DESCRIPTION (Use 5W 2H)**				
Champion / Facilitator:					No. of parts supplied:	
Team Lead:					No. of parts affected:	
Team Members:					PPM affected:	
		Is Product safety / special characteristics involved? Yes ☐ No ☐				

D3 CHOOSE AND VERIFY INTERIM CONTAINMENT ACTION(S) (ICA):					
Stock Management	Total verified (Qty)	NG Qty	Stock Management	Total verified (Qty)	NG Qty
Supplier end			Warehouse/Stores		
Receipt stage			Customer end		
WIP			In-transit		
FG/PDI					

	% Effective:	**Target Date:**	**Actual Date:**

D4 DEFINE AND VERIFY ROOT CAUSE(S):	**% Contribution:**

D5 CHOOSE AND VERIFY PERMANENT CORRECTIVE ACTION(S) (PCA):	**% Effective:**

D6 IMPLEMENT AND VALIDATE PERMANENT CORRECTIVE ACTION(S) (PCA):	**Target Date:**	**Actual Date:**

D7 SYSTEM PREVENTION ACTIONS TO PREVENT RECURRENCE: **Mistake Proofing:** How are you going to ensure it can't happen again?	**Target Date:**	**Actual Date:**

HAS CORRECTIVE ACTION/IMPLEMENTATION BEEN REVIEWED AGAINST DOCUMENTS?:						
Check boxes that apply:	Process flow ☐	FMEA ☐	Control plan ☐	Work instruction ☐	Audits ☐	
	Insp. Instruction ☐	Training ☐	Limit sample ☐	Risk assessment ☐	Others ☐	

D8 TEAM AND INDIVIDUAL RECOGNITION: Recognize the collective efforts of the team.

Criteria:	Comment:
Root causes identified	
Corrective actions completed	
Corrective actions effectiveness verified	
Documentation updated	

EFFECTIVENESS VERIFICATION:						
Month	**Invoice Ref.**	**Part Number**	**Qty**	**Feedback**		

SIGN-OFF						
Signature						
Function						

6.12 HANDLING :-:-

6.12.1

The product should be properly handled so as to prevent any damages or deterioration.

6.13 STORAGE AND PRESERVATION :-

6.13.1

The product should be properly stored so as to ensure shelf life and to avoid deterioration. FIFO (First in First Out) / stock rotation to be monitored.

6.14 DELIVERY :-

6.14.1

a) The supplier shall monitor their delivery performance as against the schedule given by WIL.

b) 100% on-time delivery should be achieved and if not, analyze the cases of delays and take suitable countermeasures.

6.15 QUALITY RECORDS :-

6.15.1

The record retention period is to be decided and implemented depending upon the importance of individual records.
The following are examples of records to be maintained.

1) WIL drawings / Specifications.
2) Incoming material inspection report.
3) In process inspection reports (First off, Patrol & Last off).
4) Final inspection & testing reports.
5) Work instructions.
6) Inspection instructions.
7) Process Flow Chat.
8) Process FMEA.
9) Production control plan.
10) Visual aids.

All the improvements done may be converted in to worth of rupees saved e.g Man hour saved, material saved etc.

6.16 INTERNAL AUDIT :-

6.16.1

The supplier should establish a system for periodical internal audit with planned intervals for the following area's of audit and to be performed as per the plan and actions to be taken against to the audit observations.

1) Quality Management System Audit.

The supplier has to move towards the following internal audits:

2) Manufacturing Process Audit.
3) Product Audit.

6.17 TRAINING :-

6.17.1

The supplier should establish and maintain documented procedure for identifying training needs and achieving competence of all personnel performing activities affecting conformity to product requirements.

6.17.2

If any specific task should be qualified for specific requirements, it has to be met the WIL guidelines.

6.17.3

Determine the necessary competence & evaluate the effectiveness.

6.18 CONTINUAL IMPROVEMENT :-

6.18.1

The supplier shall continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, quality status, analysis of data, corrective and preventive action and management reviews

6.18.2

a) The supplier shall work to improve the quality and productivity continually.

b) Performance indicators shall be identified to improve quality and productivity and the progress shall be identified to improve quality and productivity and the progress shall be monitored at regular intervals in the following areas.

Following are some of the typical examples of performance indicators.

1) Machine down time.
2) Machine / Tool setting time.
3) Production cycle time.
4) Machine break down time.
5) Percentage Rework.
6) Percentage scrap.
7) Customer rejections.
8) Customer complaints.
9) Product produced per employee.
10) Quality system / Process audit rating.
11) Quality performance rating.

12)Delivery performance rating.

6.19 DEVIATION APPROVAL :-

6.19.1

A characteristic which does not conform to standards as per drawing which cannot be rectified should be informed to WIL through written document.

6.19.2

The document should describe the quality problem, quantity, the reason for occurrence, corrective and preventive action plan to avoid such deviations in future & about special identification on such deviated components.

6.19.3

It has to be ensured that dispatch of such lot is not affected till clearance for dispatch is obtained from WIL.

6.20 CHANGE APPROVAL :-

6.20.1

In case the supplier needs to make any change either in design part, material and manufacturing process standard as a continual improvement, the same should be promptly intimated to WIL for approval.

6.20.2

It is very important to keep WIL informed about the changes prior to implementation.

	CHANGE REQUEST & SIGN-OFF FORM	F/CFT/CM/001 Rev-2 05.11.2025

Change initiator :

R&D ☐ **Manufacturing** ☐ **Quality** ☐ **Tool Engineering** ☐ **Sales** ☐ **Packaging & Dispatch** ☐ **Methods** ☐

BU:		**Facility /Line :**		**Date :**	
Part Number:		**Drawing No. / Operation No.:**		**PCR / ECN Request No (If any)**	
Plant:					

PART-A: Change Initiation:

1. Change Type:

☐	Product (Drawing change)	☐ Is product safety / special characteristics involved?	☐	Source / supplier	
☐	Process (4M)		☐	Location	
☐	Equipment / Machine		☐	Logistics	
☐	Tool / Jigs / Fixtures / Mold		☐	Continual improvement	

2. Reason for change:

3. Proposed change :

PART-B: Change Disposition:

4. Team feasibility & Risk assessment: (F/CFT/CM/002)	Feasible	☐	Not Feasible	☐	
5. PPAP Requirement:	Internal	☐	Customer	☐	
6. Conclusion:	Accepted	☐	**Remarks (If any):**		
	Rejected	☐			
7. CFT Approval (Before the change)			**Date:**		

R&D	**Methods**	**Manufacturing**	**Tool Engineering**	**Quality**	**Purchase**	**Sales**

8. Production implemented on:		**9. PCR Closed on:**		**10. ECN Closed on:**	
11. Change Sign-off (After the change)		**Date:**			

R&D	**Methods**	**Manufacturing**	**Tool Engineering**	**Quality**	**Purchase**	**Sales**

6.21 SAFETY :-

6.21.1

Suppliers are requested to ensure proper lighting ,ventilation, noise level under control, use of safety guards for equipments at factory premises and PPE for workmen (Mainly shoes, gloves, respirators, goggles, helmets, earplug etc, wherever applicable)

6.22 LEGAL REQUIREMENTS :-

6.22.1

Suppliers are requested to ensure compliance of all mandatory requirements of statutory and regulatory, legal to their product supplies to WIL.

6.22.1

Customers are requested to ensure specific statutory and regulatory approval from competent authorities and legal requirements with respect to environment to be met.

6.22.3

In case of any deviation in compliance should be notified to WIL immediately in writing.

7.0 SUBMISSION OF DOCUMENTS :-

Document Requirement for Suppliers		
S.no	Nature of Process	Technical Documents
1	Steel Mill (Hot Rolling)	Technical delivery condition / Mill TC
2	Sub-contractors	Inspection report
3	Bought-out Parts	Inspection Report / Material test report / PPAP Level - 3

For Production Part Approval Process (PPAP) requirements,

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 the potential to produce as per the requirements during actual production run.

Production parts are those manufactured at the production site using the production tooling, gauging, process, material, operators, and environment during process settings.

Parts for production part approval must be taken from a significant production run. This ppap run would typically be from one hour production run to one shift production run.

It should be minimum 125 parts unless otherwise agreed by WIL. Production part approval is always required prior to the first production dispatch of product in the following situations,

1. **A new part or product.**
2. **Correction of discrepancy on a previously submitted part.**
3. **Product modified by an Engineering change to design records, specification or materials.**
4. **Use of another optional construction or any new material in approved part.**
5. **Production from new or modified tools, dies, patterns etc.,**
6. **Production following refurbishment or re-arrangement of existing tooling or equipment.**
7. **Production following any change in process or method of manufacturing.**
8. **Production from tooling and equipment. Transfer to a different plant location.**
9. **Change of source for sub-contracted parts, materials or services (e.g. Heat treating and Plating process).**
10. **Product re-released after the tooling has been in-active for volume production for 12 months or more.**
11. **WIL has the right to suspend delivery due to quality problems.**

The following documents and items must be completed by the supplier for every part when any or the situation referred above occurs:

1. **Design records of saleable product.**
2. **Engineering change document if any.**
3. **Customer engineering approval if required.**
4. **Design FMEA.**
5. **PFD.**
6. **PFMEA.**
7. **Dimensional results.**
8. **Material performance test results.**
9. **Initial process capability study.**
10. **Measurement System Analysis studies.**
11. **Qualified laboratory documentation.**

12. **Control Plan.**
13. **Part Submission Warrant.**
14. **Appearance approval report, If applicable.**
15. **Bulk material requirements check list.**
16. **Sample product.**
17. **Master sample.**
18. **Checking Aids.**
19. **Records of complaints with customer specific requirements.**

\

Suppliers will be notified by WIL regarding the submission guidelines. After sample approval, suppliers are responsible for assuring future production continues to meet all customer requirements.

The supplier shall not dispatch production quantities of their products before receiving the customer approval.

The standardized format to be used is shown in the page number 43 of this manual.

Explanation about the above documents to be submitted is explained in detail in the subsequent pages.

Compliance to these documents in a systematic way will lead the supplier's organization towards adherence to ISO IATF 16949:2016

In addition to the above, supplier has to submit customer specific PPAP documents to WIL requirement.

7.1 PROCESS FLOW DIAGRAM :-

7.1.1 The process flow diagram is a schematic visual representation of the current or proposed process flow.

7.1.2 It also captures in a standardized format, additional information like special process characteristics / product characteristics associated with various steps of the process. Its benefits are

a) Shows the entire process at once.

b) Allows each operation to be questioned.

c) Exposes source of variation.

d) Highlighted non-value added steps.

7.1.3 Blank and filled format of Process flow diagram was shown in page no 17 and 18 for reference.

7.1.4 PROCESS FLOW DIAGRAM :-

PROCESS FLOW-ASSY

DRG.No./REV :		PROCESS FLOW NO :	
PART NAME :		PROCESS FLOW REV :	
PART No. :		FIRST ISSUE DATE :	
PLANT :		REVISION DATE :	
CUSTOMER :		WHEEL CODE :	

OPN NO	DESC. OF OPERATION	DESC. OF MACHINE	PROCESS FLOW DIAGRAM	SPECIAL CHARACTER CLASS	OUTGOING DIMENSIONS
10	Assemble disc & rim	PRESS	10	⊕	OFFSET MARKING WOBBLE & LIFT TYRE SEAT CIRCUMFERENCE
20	INSPECT	MANUAL	20		SAME AS ABOVE
30	SUB ARC WELD	WELDING M/C	30		DISC TO RIM WELD AROUND WELD BEAD GEOMETRY
40	PLANISH NAVE	600 T PRESS	40	⊕	FLATNESS MIN FLAT
50	MULTI CHAMFER BOLT HOLE INSIDE	WMW MULTI DRILL	50		BOLT HOLE CHAMFER
60	BORE MACHINING & CHAMFER INSIDE	WOLFEL	60	⊕	BORE DIA BORE CHAMFER CONCENTRICITY BETWEEN BORE AND BOLT HOLE
70	BOLT HOLES CHAMFER OUTSIDE	NATCO MULTI DRILL	70		BOLT HOLE CHAMFER
80	FINAL INSPECTION		80		RUNOUT & VISUAL DEFECTS
90	WHEEL MOPPING		90		NO SCALE ON HEAT AFFECTED ZONE
95	TRANSPORT WHEEL FOR PAINTING		95		
100	PAINT PRIMER (CED)	PAINT PLANT	100		PAINTING FINISH.
110	FINISH PAINT (SPRAY)	SPRAY PAINT PLANT	110		PAINTING FINISH.
120	TRANSPORT TO DC WARE HOUSE		120		

Operation Inspection Decision Transport Storage Delay

MODIFICATION ' B' - PROCESS FLOW REVIEWED FOR THE PART FAMILY.

REVIEWED AND APPROVED BY:

RIM PROCESS FLOW

OPN NO	DESC. OF OPERATION	DESC. OF MACHINE	PROCESS FLOW DIAGRAM	SPL. CHAR. CLASS	OUTGOING DIMENSIONS	POKE YOKE
10	Transport To Rim Line				No damage	
20	Receiving Inspection.				Metalurgical Properties, Strip size,Thickness.	
30	Marking.	30T EP Press			Marking.	Poka Yoke List 001, 002, 003
40	Circle.	EP Coiler			No under over coiling ,No Excess Heeling in coiling	
45	Tack weld	Manual			Overlap of edges&Heeling	
50	Butt weld.	SCH Butt Welder			Butt Joint Weld finish checked as rim	
60	Flash cut .	Weld Dresser			Butt Joint thickness	
70	Clip Joint Ends	Manual Grinder			Clipped edges on Butt Welding	
80	Coning.	300T HMT			No scoring mark	
90	FirstRoll forming.	EP Roll Former			Rim profile, Rim Wdith, Bead angle.	
100	Final Roll forming	EP Roll Former			Thining	Poka Yoke List 004, 011
110	Expand	400T EP Press		@	Tyre Seat Circ.	Poka Yoke List 005, 007, 006
120	Depress & pierce valve hole .	120T EP Press			Valve hole diameter.	
130	Deburr value hole				Free from Burr.	
140	Butt joint polishing					
150	Inspect.				Tyre Seat Circ,Well circ,Rim profile,Bead angle,Valve hole,Rim width.	
160	Storage					
	Scrap Bin					

7.1.5 FORMAT OF PROCESS FLOW DIAGRAM :-

PROCESS FLOW	
PROCESS FLOW NO :-	PROCESS RESPONSIBILITY :-
PART NO :-	PART REV :-
WHEEL CODE :-	DATE (ORIGINAL) :-
PRODUCTION LINE :-	REV DATE : -
CORE TEAM :-	REV :-

REVISION DETAILS		
REV	DATE	REVISION HISTORY

REVIEWED & APPROVED BY-----				
	R & D	TDN	MFG	QAD

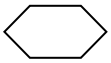
WHEELS INDIA LTD PAGE1 OF 1

Process Flow Diagram

OPN NO	DESC. OF OPERATION	DESC. OF MACHINE	TOOLING DETAILS	PROCESS FLOW DIAGRAM	SPL. CHAR. CLASS	OUTGOING DIMENSIONS

Operation | Inspection | Transport | Storage | Delay | Operation/ Inspection

7.1.6 **These are the standardized symbols to be used whenever a flow-diagram is made.**

Operation / Machine	
Inspection / Testing	
Storage	
Transportation	
Dispatch	
Decision	
Delay	

7.2 PROCESS FMEA :-

7.2.1

PFMEA is conducted during product quality planning and before beginning of production.

7.2.2

It is a disciplined review and analysis of a new / revised process and it is conducted to anticipate, resolve or monitor potential process problems for a new / revised product drawing.

7.2.3

The benefits of PFMEA are,

a) **Aid in analysis of new manufacturing processes.**

b) **Assure that potential manufacturing process failure modes and effects are considered.**

c) **To resolve the problem, to develop the existing controls and to identify the process deficiencies.**

e.g.,

1) **Eliminate non conforming product (or) reduce the frequency of manufacturing non conforming product.**
2) **Increase the frequency of detecting non conforming products.**
3) **Identify the critical characteristics and significant characteristics contributing to the development of a complete manufacturing control plan.**

4) Establish priorities for process improvement activities.

7.2.4

The process FMEA examines each operation

1) **Identifying potential, product related process failure modes.**
2) **Assessing potential effects of failure.**
3) **Identifying process control variables for prevention and / or detection of failure condition.**
4) **Suggesting the recommended action for improving controls or eliminating causes.**

7.2.5

Filled format with example for PFMEA shown in page no 22 for reference

7.2.6

With the help of cross functional team pfmea to be brain stormed and capture the causes.

Conducting a process FMEA is a "Creative" process involving a team creativity & investigation are required when

1) **Identifying the potential failure modes, their effects and causes.**
2) **Developing recommended actions to reduce the risk of failure modes.**
3) **Quantifying severity, occurrence & Detection.**

7.2.7 Typical failure modes are

Bent,blistered,burred,brittle,broken,corroded,cracked,deformed,dirty,discolored, distorted, eccentric, hole missing, loose, melted, Misaligned, omitted, oversize, pores, rough, short, tight, undersize, wrapped, Non-conforming material, Out of tolerance etc.,

7.2.8 Typical potential Effects are

1) **Poor appearance.**
2) **Customer dissatisfaction.**
3) **Cannot fasten.**

4) Discoloration.

5) Part jams next operation

6) Difficulty in assembly.

7) Excessive wobble.

8) Excessive Lift.

9) Weld failure.

10) Uneven fit

7.2.9 Typical Causes are

1) Lacking of controls.

2) Lack of Training

3) Cannot fasten

4) M/c Breakdown

5) No preventive maintenance

6) Wrong tooling

7) Wrong material

8) Fatigue

9) Poor lighting

7.2.10 Process Failure Mode Effects Analysis :-

FAMILY PROCESS FMEA	
PFMEA NO: -	PROCESS RESPONSIBILITY: -
PART NO:-	
WHEEL CODE:-	MODEL: -
CORE TEAM : - QPT	REV : - REV DATE : -

REVISION DETAILS		
Rev:	DATE	REVISION HISTORY

REVIEWED AND APPROVED BY--				
	R & D	TDN	MFG	QAD

PROCESS FMEA

PFMEA Number : Process Responsibility : PFMEA Date (orig.) :

Part No : Production line : PFMEA Date (Rev.) :

Part desc : Key Date : Prepared By :

Model Year/Vehicle(s): --- Customer\Cust part no\Wheel code: Plant : WIL - PADI

Process Function	Requirements	Potential Failure Mode	Potential Effects of Failure	Severity	Class	Pot. Cause(s) / Mechanism(s) of Failure	Current Process Controls			Det	RPN	Rec.Actions	Resp. and Target / Comp. Date	Actions taken	Actions Results			
							Prevention	occ	Detection						Sev	Occ	Det	RPN
10 Transport to rim line	Free from damage	Strip Damages		5				3	100 % Visual inspection by operatbr	6	90							
			Next process: No effect	1		Incorrect handling using fork lift	Operator Instruction	2	Firstoff inspection	5	50							
			Assembly : Dissatisfaction	5		New Operator handling usage condition	Operator Instruction	3	Skill Matrix	5	75							
			Customer: Dis satisfaction	5														
			Field: No effect	1														
			Environment and operator safety: No effect	1														

7.2.11 GUIDELINES ON SEVERITY,OCCURRENCE & DETECTION RATINGS :-

(a) Severity:-

It is an assessment of the seriousness of the effect of the potential failure mode on the customer. It is estimated on a scale of 1 to 10.

Suggested Process FMEA Severity Evaluation Criteria				
EFFECT	**Criteria: Severity of Efferct on Product (Customer Effect)**	**Rank**	**Effect**	**Criteria:Severity of Efferct on Product (Manufacturing / Assembly Effect)**
Failure to meet safety and / or Regulatory Requirements	Potential failure node affects safe vehicle operation and / or involves non compliance 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 operation and / or involves non compliance with government regulation with warning	9		May endanger operator (machine or assembly) With warning.
Loss of Degradation of Primary Function	Loss of Primary Function (Vehicle inoperable,does not affect safe vehicle operation)	8	Major Distruption	100% product may have to be scrapped.Line shutdown or stop shipment.
	Degradation of Primary function (Vehicle operable,but at reduced level of perfomance)	7	Significant Distruption	A portion of the production run may have to be scrapped.Deviation from primary process including decreased line speed or added manpower.
Loss of Degradation of Secondary function	Loss of Secondary function (Vehicle operable,but at comfort/ convenience functions in operable)	6	Moderate Distruption	100% of the production run may have to be reworked off line and accepted.
	Degradation of secondary function (Vehicle operable,but comfort / convenience functions at reduce level of performance)	5		A portion of the production run may have to be reworked off line and accepted.
Annoyance	Appearance or Audible noice , vehicle operable , item doesn't conform and noticed by most customers (>75%)	4	Moderate distruption	100% of production run may have to reworked in station before it is processed.
	Appearance or Audible noice , vehicle operable , item doesn't conform and noticed by many customers (50%)	3		A portion of the production run may have to be reworked in station before it is processed.
	Appearance or Audible noice , vehicle operable , item doesn't conform and noticed by many customers (<25%)	2	Minor distruption	Slight inconvenience to process,Operation or Operator.
No Effect	No discernible effect	1	No Effect	No discernible effect.

(b) Occurrence:-

Frequency that the cause mechanism is projected to occur.It is rate on a scale from 1 to 10.Prevention controls will reduce the occurrence number.

Failure probability ratings			
Failure probability	**Failure Rate**	**Rating**	**Cpk**
Remote	<1/1,500,000	1	>=1.67
Very low	<1/1,500,000	2	>=1.50
Low	1/15,000	3	>=1.33
Moderate	1/2,000	4	>=1.17
Moderate	1/400	5	>=1.00
Moderate	1 / 80	6	>=0.83
High	1 / 20	7	>=0.67
High	1/8	8	>=0.51
Very High	1/3	9	>=0.33
Very High	1/2	10	< 0.33

Likelihood of Failure	Criteria: Occurrence of Cause-PFMEA (Incidents per items / vehicles)		Rank	
Very High	≥100 per thousand ≥ 1 in 10		10	
	50 per thousand 1 in 20		9	
	20 per thousand 1 in 50		8	
High	10 per thousand 1 in 100		7	
	2 per thousand 1 in 500		6	
	0.5 per thousand 1 in 2,000		5	
Moderate	0.1 per thousand 1 in 10,000		4	
	0.01 per thousand 1 in 100,000		3	
Low	≤.001 per thousand 1 in 1,000,000		2	
Very Low	Failure is eliminated through preventive control		1	

(c) Detection:-

Assessment of the probability that the current process will detect the failure mode before it leaves the location. It is rated on a scale from 1 to 10.

Detection Probability Ratings	
Probability of Detection	**Rating**
Very High : Controls almost certain to defect	1 to 2
High : Controls have good change to defect	3 to 4
Moderate : Controls may detect	5 to 6
Low : Controls have poor change of detection	7 to 8
Very Low : Controls will probably not detected	9
Absolute certainty of non detection	10

Suggested Process FMEA Detection Evaluation Criteria

Oppurtunity for Detection	Criteria: Likelihood of Detection by Process Control	Rank	Likelihood of Detection
No Detection Opportunity	No current Process Control: Can't detect or is not analyzed	10	Almost Impossible
Not likely to detect 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 station by operator through visual /tactile/audible means of post-processing through use of attribute gauging (go / no-go,manual torque check/clicker wrench,etc)	7	Very Low
Problem detection post processing	Failure mode detection post-processing by operator through variable gauging or in station by operator through use of attribute gauging (go/no-go,manual torque check/clicker wrench,etc)	6	Low
Problem detection at source	Failure mode detection in station by operator through use of vaiable gauging or by automated controls in station that will detect discrepant part and notify operator (light,buzzer,etc) Gauging performed on set up and First piece check (For set up cause only)	5	Moderate
Problem detection post processing	Failure mode detection post-processing by autimated controls in station that will detect discrepant part and lock part to prevent further processing	4	Moderately High
Problem detection at source	Failure mode detection in station by automated controls that will detect discrepant part and automatically lock part in station to prevent further processing	3	High
Error detection and/or Problem prevention	Error (Cause) detection in station by sutomated controls that will detect error and prevent discrepant part from being made	2	Very High
Detection not applicable:Error Prevention	Error (Cause) prevention as a result of fixture design,machine design or part design.Discrepant parts cannot be made because item has been error-proofed by Process/Product design.	1	Almost certain

(d) Risk Priority Number :- (RPN)

- RPN is calculated s RPM = (SXOXD)
  - S-Severity
  - Occurrence
  - D-Detection
- RPN is used to rank failure modes.
- Corrective action is taken thereafter to reduce RPN
- Regardless of RPN number, Special attention should be paid to failure modes with a high severity number.

7.3 CONTROL PLAN :-

7.3.1

Control plans are written descriptions of the systems for controlling parts & Processes. It is a comprehensive documentation or product/process characteristics, process controls, tests and measured systems that will occur during production.

7.3.2

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

7.3.3

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

7.3.4

The benefits of a control plan are;

a) Communication will be improved within the organization.
b) Communication between supplier & customer will be improved.
c) Provide an emphasis on prevention.
d) Provides a focus on process control.
e) Provides a pro-active planning.
f) Promote continual improvements.
g) Provides entire picture of control.

7.3.5

Helps to standardize documentation and standardized format to be followed as per the example given in page **number 26 of** this manual for your reference and easy understanding.

7.3.5 SAMPLE OF CONTROL PLAN :-

7.4 WORK INSTRUCTIONS :-

7.4.1

There should be documented process monitoring & Operator instructions for all employees having responsibilities for operation of processes.

7.4.2

These instructions are to be accessible at work stations.

A good work instruction must

a) be linked to the control plan.

b) be manageable.

c) be available at each operation.

d) show step by step detail.

e) be easy to understand.

f) Reaction to non-conformance

g) Options

h) be easy to maintain

i) be controlled

j) be understood by all involved.

7.4.3

Helps to standardize documentation the standardized format to be followed as per the example given in page number **28** of this manual for your reference and easy understanding.

7.4.4 SAMPLE OF WORK INSTRUCTION: -

ORGANIZATION DETAILS:	WORK INSTRUCTION	Format Number:

Part Family :	Engg Level : Ref Drawing	Machine/Operation description:	Operation Number:40

STEP - 1	STEP - 2	STEP - 3	STEP - 4
How to locate component? Photo expression	How to clamp component? Photo expression	How to ensure the component located properly? Photo expression	How to operate ? Photo expression

INPUT MATERIAL
PHOTO

INPUT MATERIAL PHOTO

PPE to be used



OUTPUT MATERIAL PHOTO

OUTPUT MATERIAL
PHOTO

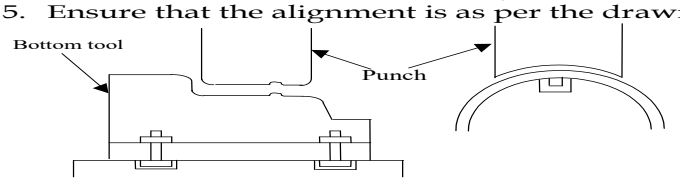
Setup Instruction Ref:	Poka-Yoke Ref:

Tools and Gauges details:	Tool life monitoring Ref:	Process Monitoring Ref:	SPC Ref:

Corrective Action Ref:	Relevant Engg & Mfg Standards ref:	Month &Year of Release:	Reviewed By:	Approved By:		Revision No:

SET-UP INSTRUCTION	Format number:
OPERATION :	PAGE : --- OF --- REVISION :
LINE : MACHINE :	

1. Clean the machine bed.
2. Locate the bottom tool on the machine bottom base.
3. Fix the bottom tool with the T Bolts.
4. Fix the top tool / Punch in the cylinder arm.
5. Ensure that the alignment is as per the drawing given below.



6. Connect the inlet and outlet water line hoses and ensure water flow.
7. Set the parameters as per the work instruction WI/MFG/LPA/020.

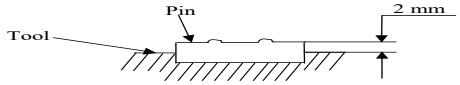
Setup Verification

After setting offer one component to QAD for FIRST OFF INSPECTION and start the production only after getting approval from QAD.cn Plan

In case of any problem attend the problem as per the guidelines given below.

Reaction Plan

1. Sparking :
   If sparking is noticed on the rim, clean that area in the tool by applying emery.
2. Pin welding failure :
   a) Check the pin seating slot for any worn out. Pin should be atleast 2 mm above the tool.



b) Check the welding parameters as per the work instruction

MONTH & YEAR OF RELEASE	JAN ' 02		REVIEWED :	APPROVED :

7.4.5 INSPECTION INSTRUCTIONS: -

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

a) **be available at each inspection stations**
b) **be understood by inspection personnel**
c) **show details of checking frequency**

Helps to standardize documentation, the standardized format to be followed as per the example given in page number 29 of this manual for your reference and easy understanding.

7.4.6 VISUAL AIDS: -

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 samples 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 are to be prepared and submitted.

7.5 INSPECTION INSTRUCTIONS :-

ORGANIZATION DETAILS	INSPECTION INSTRUCTIONS	Format number: Rev : Page -- of ------

OPERATION NAME :

Checking parameter - 1	Checking parameter - 2	Checking parameter - 3
PHOTO EVIDENCE FOR CHECKING METHOD	PHOTO EVIDENCE FOR CHECKING METHOD	PHOTO EVIDENCE FOR CHECKING METHOD
DETAILS OF INSPECTION PARAMETER	DETAILS OF INSPECTION PARAMETER	DETAILS OF INSPECTION PARAMETER
		
Drawing Number / Issue : Drawing specification : Instrument / gauge to be used : Frequency of check : Document reference :	Drawing Number / Issue : Drawing specification : Instrument / gauge to be used : Frequency of check : Document reference :	Drawing Number / Issue : Drawing specification : Instrument / gauge to be used : Frequency of check : Document reference :

Revision : Month / Year	REVIEWED BY :	APPROVED BY :

7.6 DIMENSIONAL INSPECTION REPORT :-

7.6.1

Dimensional inspection must be performed on all parts and product materials with dimensional requirements to determine conformance with all relevant design record specifications.

7.6.2

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 will not be accepted.

7.6.3

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.

7.6.4

It is the suppliers responsibility to meet all applicable specifications. Any results that are outside specifications are cause for the supplier not to submit the parts and / or documentation.

7.6.5

Every effort has to be made to correct the process so that all design record requirements are met. If the supplier is unable to meet any of the requirements, WIL is to be contacted for further instructions.

7.6.6

The product which was measured has to be identified properly and send to WIL for verification and approval.

7.6.7

Helps to standardize documentation, the standardized format to be followed as per the example given in page number 31 of this manual for your reference and easy understanding.

7.6.8 DIMENSIONAL INSPECTION REPORT

ORGANIZATION DETAILS	**INSPECTION REPORT**	

CUSTOMER : M/s ----------	DATE : ----/-------/--------
DRAWING NO : ISSUE : ' ---------- '	QUANTITY CHECKED : --------- No's
WHEEL CODE/ SIZE : ----------	CUSTOMER PART NO : ----------

SL.NO	CHEKING PARAMETERS	DRG.DIM (IN MM)	CHECK METHOD	1	2	3	4	5	RESULT
1	LENGTH								
2	WIDTH								
3	HEIGHT								
4	RADIUS								
5	CRS								
6	PCD								
7	FLATNESS								
8	CONCENTRICITY								
9	POSITIONAL TOLERANCE								
10	PARALLALISM								
11	THICKNESS								
12	CHAMFER								
13	MARKING								
14	INNER DIAMETER								
15	OUTER DIAMETER								
16	THREADING								
17	PAINTING								
18	COATING THICKNESS								
19	RUNOUT								
20	ANGLE								
21	SPHERICAL RADIUS								
	GENERAL NOTES								
N1									
N2									
N3									
N11									
N12									
N13									

INSPECTED BY:- APPROVED BY:- CTED

7.7 MATERIAL TEST REPORT :-

7.7.1

Material tests must be performed for all parts and product materials when chemical, physical & Metallurgical requirements are specified.

7.7.2

Material tests must be performed for all parts and product materials when chemical, physical & Metallurgical requirements are specified.

7.7.3

All tests required by the design record and related specifications are to be listed in the format. And helps to standardize documentation.

7.7.4

The standardized format to be followed as per the example given in page number 33 of this manual for your reference and easy understanding.

7.7.5

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.

a) **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.**
b) **Indicate testing date.**
c) **Indicate material suppliers name.**

7.7.6

It is the suppliers responsibility to meet all applicable specifications. Every effort must be made to correct the process so that all design record requirements are met.

7.7.7

If the supplier is unable to meet any of these requirements, WIL is to be contacted for determination of corrective action

7.7.8 SAMPLE OF MATERIAL TEST REPORT

ORGANIZATION DETAILS

MATERIAL TEST REPORT

DATE:

Report No :
Source :
Part Name :
Specification :

Description	Spec		Actual	Description	Spec	Heat number
	Minimum	Maximum				
Chemistry - % Wt				**Hardness BHN**		
C				**UTS Kg/mm^2**		
Mn				**YS Kg/mm^2**		
Si				**Elong %**		
P				**Bend Test**		
S				**Micro structure -**		
Al						
Cu						
Nb				**Grain Size -**		
Ti				**Cleanliness -**		
V				**Remarks -**		
				R & D Lab		

7.8 CHECKING AIDS :-

7.8.1

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

7.8.2

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

7.8.3

Helps to standardize documentation the standardized format to be followed as per the example given in page number 34 of this manual for your reference and easy understanding.

7.8.4 SAMPLE OF CHECKING AIDS LIST

Gauge number	Gauge type	Gauge description	Current location	Frequncy	Group	Last calib date	Calib due date
1 AMN 122 - B	AMN	Weight Hole PCD PWN 325	Tool Stores	24	CV	15/01/2010	13/01/2012
1 AMN 122 - C	AMN	Weight Hole PCD PWN 325	Tool Stores	24	CV	05/01/2010	05/01/2012
1 AMN 242 - B	AMN	Setting Piece PCD &Chordal Gauge	Tool Stores	24	LP	07/05/2010	07/05/2012
1 AMN 242 - C	AMN	Setting Piece PCD &Chordal Gauge	Tool Stores	24	EM	07/05/2010	07/05/2012
1 AMN 242 - D	AMN	Setting Piece PCD &Chordal Gauge	Tool Stores	24	EM	07/05/2010	07/05/2012
1 AMN 293 - B	AMN	Height Gauge 8.00 X 20 RIM	Tool Stores	12	CV	15/11/2011	15/11/2012
1 AMN 293 - C	AMN	Height Gauge 8.00 v 20 Rim	Tool Stores	12	CV	26/11/2011	26/11/2012
1 AMN 320 - A	AMN	Taper Machining Gauge CV118 Disc	Tool Stores	12	CV	18/06/2011	18/06/2012
1 AMN 323 - A	AMN	PCD Gauge Pin Wt Hole PCD PWN200	Tool Stores	24	TR	12/05/2010	11/05/2012
1 AMN 334 - A	AMN	Width Gauge for PW 1203	Tool Stores	12	CV	10/10/2011	10/10/2012
1 AMN 334 - C	AMN	Width Gauge for PW 1203	Tool Stores	12	CV	10/10/2011	10/10/2012
1 AMN 401 - A	AMN	Waviness Gauge CV 160 Wheel	Tool Stores	12	CV	16/09/2011	16/09/2012
1 AMN 463 - A	AMN	Offset Checking Gauge 8.25X22.5	Tool Stores	12	CV	17/11/2011	16/11/2012
1 AMN 518 - A	AMN	Height Gauge 1/2 PW 0181	Tool Stores	24	TR	12/05/2010	11/05/2012
1 AMN 523 - D	AMN	Gutter Side Gauge NRP CV RIM	Tool Stores	12	CV	17/12/2010	16/12/2011
1 AMN 523 - E	AMN	Gutter Side Gauge NRP CV RIM	Tool Stores	12	CV	14/07/2011	13/07/2012
1 AMN 531 - A	AMN	Waviness Gauge CV152 Wheel	Tool Stores	12	CV	18/08/2011	17/08/2012
1 AMN 531 - B	AMN	Waviness Gauge CV152 Wheel	Tool Stores	12	CV	18/08/2011	17/08/2012
1 AMN 535 - A	AMN	Waviness Gauge CV160 Wheel	Tool Stores	12	CV	18/08/2011	17/08/2012
1 AMN 550 - A	AMN	Ring Gauge 13 X25 Gutter Section	Tool Stores	12	CV	21/09/2011	21/09/2012
1 AMN 566 - A	AMN	Width Gauge RO204 EM Flange	Tool Stores	12	EM	18/08/2011	17/08/2012
1 AMN 566 - D	AMN	Width Gauge RO204 EM Flange	Tool Stores	24	EM	18/08/2010	17/08/2012
1 AMN 567 - A	AMN	Width Gauge EM Det Flange	Tool Stores	12	CV	21/09/2011	21/09/2012
1 AMN 567 - B	AMN	Width Gauge EM Det Flange	Tool Stores	12	EM	04/11/2011	02/11/2012
1 AMN 570 - C	AMN	RIM Width Checking Gauge RM 201	Tool Stores	12	CV	26/04/2011	26/04/2012
1 AMN 570 - D	AMN	RIM Width Checking Gauge RM 201	Tool Stores	8	CV	08/04/2011	08/12/2011
1 AMN 579 - J	AMN	OD Checkering Ring Gauge EM	Tool Stores	24	EM	19/07/2010	19/07/2012
1 AMN 579 - K	AMN	OD Checkering Ring Gauge EM	Tool Stores	24	EM	19/07/2010	19/07/2012
1 AMN 579 - N	AMN	OD Checkering Ring Gauge EM	Tool Stores	24	EM	02/12/2011	02/12/2013

7.9 PROCESS CAPABILITY STUDIES :-

7.9.1

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

7.9.2

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

7.9.3

The purpose of this study is to find out whether the production process is likely to produce product that will meet WIL requirements. Preliminary process capability study using X bar & R chart is the starting activity.

7.9.4

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 captures all the above variations.

7.9.5

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.

7.9.6

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

7.9.7

If stability cannot be achieved, contact WIL and determine appropriate action.

7.9.8

Helps to standardized documentation. The standardized format to be followed as per the example given in page number 36 for variable data.

7.9.9

Unfilled format for attribute data study in the page number of 49 of this manual for your reference and easy understanding.

7.9.10

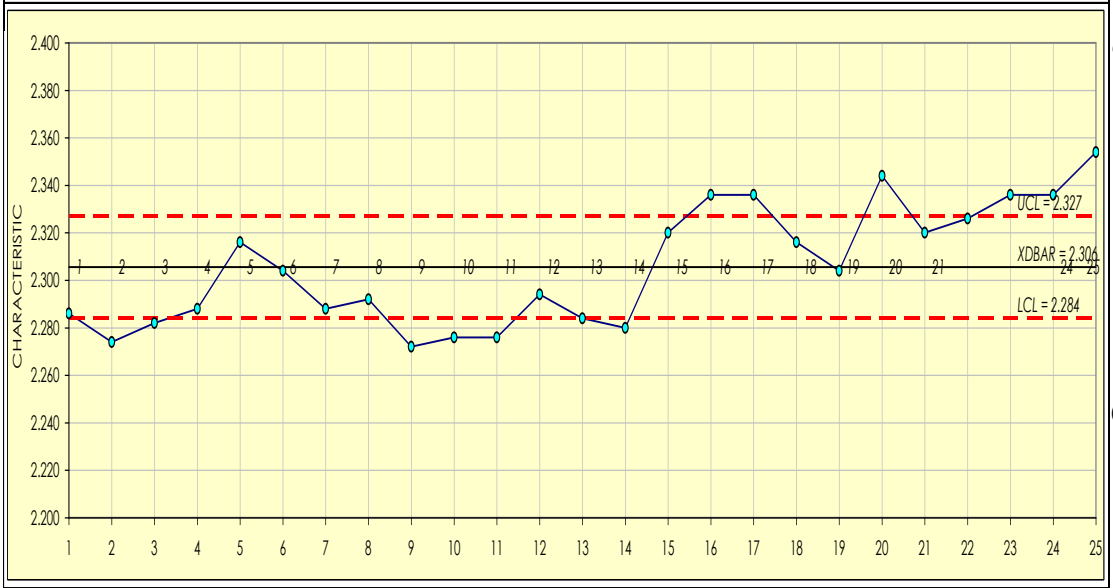
Unfilled format for attribute data study in the page number of 49 of this manual for your reference and easy understanding.

Cpk > 1.67 - Process meets customer requirements
1.33 ≤ Cpk ≤ 1.67 - Process may not meet customer requirements.
Cpk < 1.33 - Process is sub standard for meeting customer requirements.
Ppk > 1.33 - Process meets customer requirements.
Ppk ≤ 1.33 - Process doesn't meet customer requirements.

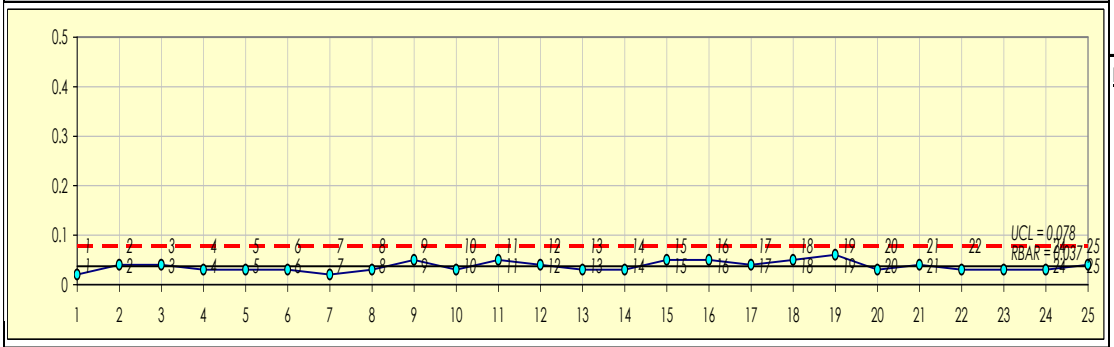
7.9.11 CONTROL CHART

ORGANIZATION DETAILS	CONTROL CHART					Line Date Part Number	
Operation WIPI No. (If Applicable)		Characteristic Gauge description		Upper Specn. limit Lower Specn. limit		Sample Size Sample Freq.	5 1 hour	Part Name Wheel Code	

AVERAGES (X BAR CHART) $\quad \bar{\bar{X}} = 2.306 \quad UCL_{\bar{X}} = 2.33 \quad LCL_{\bar{X}} = 2.28$



RANGES (R CHART) $\quad \bar{R} = 0.037 \quad UCL_R = 0.078 \quad LCL_R = 0.000$



RESULTS

$$\sigma = \frac{\bar{R}}{d_2} = 0.016$$

$$Z_{USL} = \frac{USL - \bar{\bar{X}}}{\sigma}$$

$Z_{USL} = 5.977$

$$Z_{LSL} = \frac{\bar{\bar{X}} - LSL}{\sigma}$$

$Z_{LSL} = 6.686$

Capablity Indices

$$C_{pk} = \frac{Z_{MIN}}{3}$$

$C_{pk} = 1.992$

$$C_p = \frac{(USL - LSL)}{6\sigma}$$

$C_p = 2.111$

Remarks:

DATE																									
& TIME																									
READINGS	1	2.280	2.270	2.260	2.280	2.320	2.290	2.290	2.300	2.270	2.290	2.250	2.290	2.280	2.290	2.300	2.330	2.340	2.340	2.300	2.340	2.340	2.320	2.350	2.340	2.360
	2	2.290	2.290	2.280	2.270	2.320	2.310	2.280	2.310	2.240	2.260	2.270	2.300	2.290	2.280	2.290	2.350	2.350	2.290	2.310	2.350	2.300	2.330	2.320	2.350	2.370
	3	2.300	2.280	2.290	2.290	2.330	2.320	2.280	2.280	2.290	2.270	2.280	2.310	2.300	2.260	2.330	2.360	2.310	2.300	2.280	2.360	2.340	2.340	2.340	2.330	2.370
	4	2.280	2.280	2.300	2.300	2.300	2.300	2.290	2.280	2.280	2.280	2.300	2.300	2.270	2.290	2.340	2.310	2.350	2.330	2.290	2.330	2.310	2.310	2.330	2.340	2.340
	5	2.280	2.250	2.280	2.300	2.310	2.300	2.300	2.290	2.280	2.280	2.280	2.270	2.280	2.280	2.340	2.330	2.330	2.320	2.340	2.340	2.310	2.330	2.340	2.320	2.330
SUM		11.430	11.370	11.410	11.440	11.580	11.520	11.440	11.460	11.360	11.380	11.380	11.470	11.420	11.400	11.600	11.680	11.680	11.580	11.520	11.720	11.600	11.630	11.680	11.680	11.770
X BAR		2.286	2.274	2.282	2.288	2.316	2.304	2.288	2.292	2.272	2.276	2.276	2.294	2.284	2.280	2.320	2.336	2.336	2.316	2.304	2.344	2.320	2.326	2.336	2.336	2.354
RANGE		0.020	0.040	0.040	0.030	0.030	0.030	0.020	0.030	0.050	0.030	0.050	0.040	0.030	0.030	0.050	0.050	0.040	0.050	0.060	0.030	0.040	0.030	0.030	0.030	0.040

Constants used

$n =$	5
$d_2 =$	2.330
$D_4 =$	2.110
$D_3 =$	0.000
$A_2 =$	0.580

The DataGiven below is meant for Plotting the Chart

UCLX	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327	2.327
XBAR	2.286	2.274	2.282	2.288	2.316	2.304	2.288	2.292	2.272	2.276	2.276	2.294	2.284	2.280	2.320	2.336	2.336	2.316	2.304	2.344	2.320	2.326	2.336	2.336	2.354
LCLX	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284
XDBAR	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306	2.306
UCLR	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776	0.0776
RANGE	0.020	0.040	0.040	0.030	0.030	0.030	0.020	0.030	0.050	0.030	0.050	0.040	0.030	0.030	0.050	0.050	0.040	0.050	0.060	0.030	0.040	0.030	0.030	0.030	0.040
RBAR	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368	0.0368

7.9.12 PROCESS CAPABILITY STUDY (ATTRIBUTE TYPE)

PROCESS CAPABILITY STUDY (ATTRIBUTE TYPE)

FORMAT NO :
MONTH / YEAR :

PART NUMBER :	ENGG.CHANGE LEV :
PART NAME :	SPECIFICATION :
GAUGE NAME :	GAUGE NUMBER :

SL NO	DATE	SHIFT	TIME	QTY CHECKED	RESULT		SIGNATURE
					OK	NOT OK	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

CONCLUTION:-

REVIEWED BY:

QAD-SIGNATURE:-

If these acceptable values of Cpk or Ppk is not achievable it is essential to restore 100% inspection of that particular characteristic as an containment action.

High priority should be given for improving the process and methods in order to achieve the above acceptable values.

7.10 MSA (MEASUREMENT SYSTEM ANALYSIS) STUDIES :-

7.10.1

It is a statistical study conducted for analyzing the variation present in the results of each type of measuring and test equipment system referenced in Production Control Plan.

7.10.2

The following are certain properties that all measurement system must have

1. The measurement system must be in statistical control. This means that the variation in measurement system is due to common causes only and not due to special causes.
2. Variability of the measurement system must be small compared with manufacturing process variability.
3. Variability must be small compared with specification limits.
4. The increments of measure must be small relative to the smaller or either the process variability or the specification limits.

7.10.3

The common thumb rule is that increments not to be greater than one tenth of the smaller of either the process variability or the specification limits.

1. The statistical properties of the measurement system may change as the items being measured vary.

7.10.4

If so, then the largest variation of the measurement system must be small relative to the smaller of either the process variation or the specification limits.

7.10.5

The gauge study is two types depending upon type of measurement

1. Variable measurement system study.
2. Attribute measurement system study.

a) **Variable measurement system study:**

The following methodological sequence is to be carried out for conducting the study,

The standardized format to be followed as per the example given in page number **41** of this manual for your reference and easy understanding.

1) **Obtain a sample of 10 parts from a batch**

2) **Select 3 appraisers coded as A,B,C.**

3) **Number the parts 1 through 10**

4) **Ensure that only calibrated gauges are used.**

5) **Let appraiser "A" measure 10 parts at random and have another observer enter the results in the respective tabulation. Let B & C measure the same 10 parts and enter the results in the tabulation.**

6) **Repeat the cycle using a different random order of measurement. Enter data in the tabulation as per the part identification number on samples.**

7) **If three trials are needed repeat the cycles.**

8) **Calculate the respective average values of observed data in the repeated trials.**

9) **Sum the observed average data. Divide the sums by 10 for each appraiser and enter the data in correct place of the tabulation as per the given example in page 41.**

10) **Add averages and divide the total by number of trials and enter the values in the tabulation, similarly calculate for all data.**

11) **Find the maximum and minimum from the average data for each appraiser to determine the difference between maximum and minimum average and enter in the correct place of the tabulation as per the given example in page 41 and labeled as XDIFF.**

12) **Sum the measurement for each trial, for each part and divide the total by the number of measurements. Enter the results in the tabulation as per the given example in page 41.**

13) **Subtract the smallest part average from the largest part average and enter the same at the location of Rp in the tabulation as per the given example in page 41.**

14) **Perform calculations under the columns entitled "Measurement Unit Analysis" and % Total variation.**

15) **Check the results to make sure no errors has been made and refer the standardized format as per the example given in page number 41 of this manual for your reference and easy understanding.**

b) Attribute measurement system study:

1) **The study conducted by selecting 20 parts. It is desirable that some of the parts are slightly below and above both specification limits.**

2) **Two appraisers then measure all parts twice in a manner that will prevent operator bias. The page is acceptable if all measurement decisions (four per part) agree.**

3) **If the measurement decisions do not agree, the page must be improved and re-evaluated. If the gauge cannot be improved, it is unacceptable and acceptable alternate measurement system should be found.**

4) **Helps to standardize documentation, the standardized format to be followed as per the example given in page number 42 of this manual for your reference and easy understanding.**

5) **The criteria as to whether a measurement system is acceptable are dependent up on the percentage of the part tolerance or the manufacturing production process variability that is consumed by measurement system variation.**

6) **For measurement system whose purposes to analyze a process,the measurement system acceptability is as follows:**

   Gauge R&R result

   a) **Under 10% error - Acceptable Measurement System**

   b) **10 – 30 % error - May be acceptable based upon importance of application cost of measurement device, cost of repair etc.**

   c) **Over 30 % error - Considered as not acceptable.**

7.10.6 VARIABLE GAUGE STUDY REPORT

MEASUREMENT SYSTEM ANALYSIS

Study no. :
Date : **22.11.2011**

MME'S No.	**QMM 095**	No. of Appraisers	**3**
MME'S Description	**Thinning dial (0-10mm)**	No. of Trials	**3**
MME'S Least Count	**0.01mm**	No. of Parts	**10**
Char. measured	**Thinning at G**	Upper Spec. limit	**-**
Component Desc.	**LP 1338 Rim (6j x15)**	Lower Spec. limit	**2**

APPRAISER	**PART**										**AVERAGE**	
TRIAL #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**		
Appraiser I	SATHICK											
1	2.04	2.05	2.09	2.15	2.06	2.10	2.12	2.11	2.12	2.15		2.099
2	2.04	2.05	2.09	2.15	2.06	2.11	2.12	2.11	2.13	2.15		2.101
3	2.04	2.05	2.08	2.15	2.06	2.11	2.13	2.11	2.14	2.15		2.102
Average	2.04	2.05	2.09	2.15	2.06	2.11	2.12	2.11	2.13	2.15	$\bar{X}_a =$	2.101
Range	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.02	0.00	$\bar{R}_a =$	0.005
Appraiser II	Balasubramani											
1	2.04	2.04	2.09	2.15	2.06	2.10	2.12	2.11	2.12	2.15		2.098
2	2.03	2.05	2.09	2.15	2.05	2.10	2.12	2.10	2.12	2.15		2.096
3	2.04	2.04	2.09	2.15	2.05	2.10	2.12	2.11	2.12	2.15		2.097
Average	2.04	2.04	2.09	2.15	2.05	2.10	2.12	2.11	2.12	2.15	$\bar{X}_b =$	2.097
Range	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	$\bar{R}_b =$	0.004
Appraiser III	Eswarapandi											
1	2.04	2.04	2.09	2.15	2.05	2.11	2.12	2.10	2.12	2.15		2.097
2	2.04	2.04	2.09	2.14	2.05	2.11	2.12	2.10	2.12	2.14		2.095
3	2.04	2.05	2.09	2.15	2.05	2.11	2.12	2.10	2.12	2.15		2.098
Average	2.040	2.043	2.090	2.147	2.050	2.110	2.120	2.100	2.120	2.147	$\bar{X}_c =$	2.097
Range	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.010	$\bar{R}_c =$	0.003
Part average $(\bar{X}_p)$	2.039	2.046	2.089	2.149	2.054	2.106	2.121	2.106	2.123	2.149	$\bar{\bar{X}} =$ $R_p =$	2.098 0.110

Mean of Means of Range A, B & C.	$\bar{\bar{R}} = (\bar{R}_a + \bar{R}_b + \bar{R}_c) / \text{No of Appraisers}$	$\bar{\bar{R}} =$	0.004
Difference in mean measurements	$\bar{X}_{DIFF} = Max(\bar{X}_a, \bar{X}_b, \bar{X}_c) - Min(\bar{X}_a, \bar{X}_b, \bar{X}_c)$	$\bar{X}_{DIFF} =$	0.004
Upper Control Limit for Range	$UCL_R = \bar{\bar{R}} \times D_4$ $D_4 =$ 2.58	$UCL_R =$	0.010

MEASUREMENT SYSTEM ANALYSIS

			% Based on Total Variation	Constants Used	
Equipment Variation	$EV = \bar{\bar{R}} \times K_1 =$	**0.002**	**6.80%**	K_1 =	0.5908
Appraiser Variation	$AV = \sqrt{\left[(X_{DIFF} \times K_2)^2 - (EV^2 / nr)\right]} =$	**0.002**	**5.89%**	K_2 =	0.5231
				n =	10
Gage R & R	$R\&R = \sqrt{(EV^2 + AV^2)} =$	**0.003**	**9.00%**	r =	3
Part Variation	$PV = R_p \times K_3 =$	**0.035**	**99.59%**	K_3 =	0.3146
Total Variation	$TV = \sqrt{(R\&R^2 + PV^2)} =$	**0.035**			
No of distinct data categories	$ndc = 1.41(PV / GRR) =$	**15.605**	≅ **16**		

Follow up actions if any :

Nil

RESULT :

Measurement System is Acceptable.

Signature - QAD **Date :**

7.10.7 ATTRIBUTE GAUGE STUDY REPORT

	ATTRIBUTE GAUGE STUDY REPORT				F/QAD/184 JAN-03
Gauge No	59 BO 8070	**Samples**	50	**Date**	14/11/2011
Gauge Description	Circumference Tape	**Appraisers**	3	**Study By**	P.Yoganathan
Product	4J * 13 Rim	**Trials**	3		
Char. Measured	Well Circumference	**Specification**	Min~Max		

Cross Tab DataSheet

Appraiser 1	Sathaick	**Appraiser 2**	Eswarapanadi	**Appraiser 3**	Palanikumar

	Appraiser1			Appraiser2			Appraiser3				
	A-1	**A-2**	**A-3**	**B-1**	**B-2**	**B-3**	**C-1**	**C-2**	**C-3**	**Reference**	**Code**
1	1	1	1	1	1	1	1	1	1	1	+
2	1	1	1	1	1	1	1	1	1	1	+
3	1	1	1	1	1	1	1	1	1	1	+
4	1	1	1	1	1	1	1	1	1	1	+
5	1	1	1	1	1	1	1	1	1	1	+
6	1	1	1	1	1	1	1	1	1	1	+
7	1	1	1	1	1	1	1	1	1	1	+
8	1	1	1	1	1	1	1	1	1	1	+
9	1	1	1	1	1	1	1	1	1	1	+
10	1	1	1	1	1	1	1	1	1	1	+
11	1	1	1	1	1	1	1	1	1	1	+
12	1	1	1	1	1	1	1	1	1	1	+
13	1	1	1	1	1	1	1	1	1	1	+
14	1	1	1	1	1	1	1	1	1	1	+
15	1	1	1	1	1	1	1	1	1	1	+
16	1	1	1	1	1	1	1	1	1	1	+
17	1	1	1	1	1	1	1	1	1	1	+
18	1	1	1	1	1	1	1	1	1	1	+
19	1	1	1	1	1	1	1	1	1	1	+
20	1	1	1	1	1	1	1	1	1	1	+
21	1	1	1	1	1	1	1	1	1	1	+
22	1	1	1	1	1	1	1	1	1	1	+
23	1	1	1	1	1	1	1	1	1	1	+
24	1	1	1	1	1	1	1	1	1	1	+
25	1	1	1	1	1	1	1	1	1	1	+
26	0	0	0	0	0	0	0	0	0	0	-
27	1	1	1	1	1	1	1	1	1	1	+
28	1	1	1	1	1	1	1	1	1	1	+
29	1	1	1	1	1	1	1	1	1	1	+
30	1	1	1	1	1	1	1	1	1	1	+
31	1	1	1	1	1	1	1	1	1	1	+
32	0	0	0	0	0	0	0	0	0	0	-
33	1	1	1	1	1	1	1	1	1	1	+
34	1	1	1	1	1	1	1	1	1	1	+
35	1	1	1	1	1	1	1	1	1	1	+
36	1	1	1	1	1	1	1	1	1	1	+
37	1	1	1	1	1	1	1	1	1	1	+
38	1	1	1	1	1	1	1	1	1	1	+
39	1	1	1	1	1	1	1	1	1	1	+
40	1	1	1	1	1	1	1	1	1	1	+
41	1	1	1	1	1	1	1	1	1	1	+
42	0	0	0	0	0	0	0	0	0	0	-
43	1	1	1	1	1	1	1	1	1	1	+
44	1	1	1	1	1	1	1	1	1	1	+
45	1	1	1	1	1	1	1	1	1	1	+
46	1	1	1	1	1	1	1	1	1	1	+
47	1	0	1	1	1	1	1	1	1	1	x
48	1	1	1	1	1	1	1	1	0	1	x
49	1	1	1	1	1	1	1	1	1	1	+
50	1	1	1	1	1	1	1	1	1	1	+

Cross Tab Study Results

kappa	A	B	C
A	---	**0.94**	**0.89**
B	**0.94**	---	**0.94**
C	**0.89**	**0.94**	---
Ref	**0.94**	**1.00**	**0.94**

Effectiveness	% Appraiser			% Score Vs Attribute		
Source	A	B	C	A	B	C
Total Inspected	50	50	50	50	50	50
# Matched	49	50	49	49	50	49
False Negative	-	-	-	0	0	0
False Positive	-	-	-	0	0	0
Mixed	-	-	-	1	0	1
95% UCI	99.95%	100.00%	99.95%	99.95%	100.00%	99.95%
Calculated Score	**98.00%**	**100.00%**	**98.00%**	**98.00%**	**100.00%**	**98.00%**
95% LCI	89.35%	94.18%	89.35%	89.35%	94.18%	89.35%

	Effectiveness	Miss Rate	False Alarm Rate
A	98.0%	0.0%	0.71%
B	100.0%	0.0%	0.00%
C	98.0%	0.0%	0.71%

	System% Effective Score			System% Effective Score Vs Reference		
Total Inspected	50	50	50	50	50	50
# in Agreement	48	48	48	48	48	48
95% UCI	99.51%	99.51%	99.51%	99.51%	99.51%	99.51%
Calculated Score	**96.00%**	**96.00%**	**96.00%**	**96.00%**	**96.00%**	**96.00%**
95% LCI	86.29%	86.29%	86.29%	86.29%	86.29%	86.29%

7.11 PART SUBMISSION WARRANT :-

☐ Phase 1 ☐ Phase 2 ☐ Phase 3

DAIMLERCHRYSLER Ford GM

PPAP Submission Warrant Status

PART INFORMATION

Part Name _____ Cust. Part Number _____

Shown on Drawing Number _____ _____ Organization Part Number _____

Engineering Change Level _____ Date _____

Additional Engineering Changes _____ Date _____

Optional Tracking Number _____

Safety and/or Government Regulation ☐ Yes ☐ No Purchase Order No. _____ Weight (kg) _____

Checking Aid Number As per control plan Checking Aid Change Level As per control plan Dated _____

Organization Name and Supplier Code

Customer Name/Division

Street Address

Buyer/Buyer Code

City State/County/Province Zip Country

Application

REASON FOR SUBMISSION

- ☐ Initial submission
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ 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 and limited supporting data submitted to customer.
- ☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.
- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

DECLARATION and SUBMISSION RESULTS

I affirm that the samples represented by this warrant are representative of our parts which were made by a process which meets all current edition Production Part Approval Process Manual requirements including all Customer-specific requirements. I further affirm that these samples were produced at the production rate of 800 / 8 hours using single production streams. I also certify that documented evidence of such compliance is on file and is available for review. I have noted any exceptions from this declaration below.

EXPLANATION/COMMENTS _____

List Molds / Cavities / Production Processes: _____

(Attach a separate page if additional space is necessary) _____

Supplier Authorized Signature _____ Date _____

Print Name _____ Phone No. _____ Fax _____

Title _____ Email _____

FOR CUSTOMER USE ONLY

	PPAP	Non-PPAP [a/]
Phased PPAP Warrant Status:	☐ Approved	☐ Rejected ☐ Interim Accepted

Customer Signature _____ Date _____

Print Name _____

Interim Submission: ☐

Engineering Authorization: _____ Alert, Temp. PCM, TPD Number

Description: (Incomplete PPAP Requirements) _____

a/ Non-PPAP indicates the part does not satisfy one or more PPAP requirements and is considered *incomplete* until all PPAP requirements are satisfied.

Customer GPPSS1 December 2004 | The original copy of this document shall remain at the supplier's location while the part is active | A4 Format GPP Submission Status_Final Dec 2004.xls

7.12 DEVIATION / CONCESSION REQUEST :-

7.12.1

The following explains the manner of requesting WIL for approval in case of a special case.

7.12.2

Deviation / concession request can be made on a standard format to be followed as per the example given in page number 45 of this manual for your reference and easy understanding.

7.12.3

When it is found out during inspection at any stage in suppliers end that some quality characteristic does not conform to standards and it cannot be rectified. This must be submitted to WIL well before dispatch of parts so that decision of acceptance on concession / rejection is taken by WIL.

7.12.4

The form should contain details regarding the characteristic which are deviating from standards i,e. what is wrong with parts and exact quantity. It should also contain the reason for deviation to occur and the corrective and preventive action plan with target dates in order to avoid recurrence in future.

7.12.5

In case the deviation / concession is accepted by WIL, the supplier should specifically Intimate WIL regarding identification mark on the components before dispatch.

7.12.6 DEVIATION / CONCESSION REQUEST FORM

	CONCESSION / DEVIATION FORM	SL.No. :

INSP. LOT NO: _____ INSP LOT DATE : _____ DEVIATION : ☐ CONCESSION : ☐

INSP. LOT QTY : _____ DESCRIPTION : _____

DRAWING NO.: _____ QTY.INVOLVED/PERIOD : _____

SOURCE / SUB CONTRACTOR : _____

Nature of non-conformity and actual specifications:

REQUESTED BY (DEPT.) : PURCHASE NAME : T.NO :

PURCHASE COMMENTS:

DATE : NAME : T.NO :

QUALITY ASSURANCE COMMENTS:

DATE : NAME : T.NO :

TOOL DESIGN COMMENTS:

DATE : NAME : T.NO :

MANUFACTURING COMMENTS:

DATE : NAME : T.NO :

DISPOSITION : R & D

DATE : NAME : T.NO :

Person authorized to sign the form:

Purchase	:	*Concerned Module Incharge*
R&D	:	*Concerned Module Leader*
Mfg	:	*Concerned Methods Engineer*
QAD	:	*Concerend QA Inchage*
Tool Design	:	*Concerned Module Incharge*

Format No:----------: , Rev -------- - month/year

Attach annexures if necessary.

7.13 CORRECTIVE & PREVENTIVE ACTIONS :-

7.13.1

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 WIL and also depending upon the magnitude of problem.

7.13.2

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.

7.13.3

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

7.13.4 CORRECTIVE ACTION REPORT:-

	VENDOR CORRECTIVE ACTION REPORT	F/PUR/014 Rev : 2 Page 1 of 1

SL.NO :
DATE :

VENDOR NAME:

COMPLAINT DESCRIPTION:

WIL USE	S.NO.	ITEM DESCRIPTION	NATURE OF COMPLAINT	QUALITY QUANTITY	DELIVERY REFERENCE

WIL REP. SIGNATURE:

CORRECTIVE ACTION :

SUPPLIER USE	COMP LAINT NO	ROOT CAUSE	CORRECTIVE ACTION PROPOSED	TARGET DATE	CORRECTIVE ACTION IMPLEMENTATION EFFECTIVENESS VERIFICATION

*ANALYSIS TOOLS USED:
☐ Brainstorming ☐ Histogram ☐ SQC Tools
☐ Pareto analysis ☐ Cause & Effect Diagram ☐ Scatter Diagram
☐ 5 why analysis

*DOCUMENTS REVIEWED:
☐ Process Flow ☐ Control Plan ☐ Process/Product audit plan
☐ FMEA ☐ Work Instruction

Provide photograph of improvement BEFORE & AFTER

*Documental evidence required

VENDOR SIGNATURE:

7.13.5

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

7.13.6

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

a) **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.**

b) **Consider if it is possible to install error-proofing devices in the process to prevent errors.**

c) 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.

7.13.7

Helps to standardize the documentation and the standardized format to be followed as per the example given in page number 60 of this manual for your reference and easy understanding.

7.14 CONTINUAL IMPROVEMENT :-

Explained in page 14 of this manual.

7.15 TRAINING :-

Explained in page 14 of this manual.

8.0 SUPPLIER QUALITY RATING PROCEDURE :-

	WORK INSTRUCTION FOR VENDOR QUALITY RATING FOR RAW MATERIALS/BOUGHT OUT ITEMS AND CONSUMABLES	WI/QAD/RMS/042 PAGE: 1 OF 2 REV.: 6

SCOPE: COVERS THE VENDOR RATING PROCEDURE FOR SUPPLIERS OF RAW MATERIALS , BOUGHT OUT ITEMS AND CONSUMABLES.

ACTION BY: DEPUTY MANAGER - QUALITY ASSURANCE

1. Vendor Quality Rating for Raw materials , bought out items and consumables are done on a monthly basis for high impact suppliers (REFER HIGH IMPACT SUPPLIER LIST SENT BY PURCHASE) and for others vendors on a quarterly basis.

2. The incoming material details like :

   a) Description of the item received
   b) Source of supply
   c) GIN/GAN no.
   d) Consignments accepted directly / concessionally accepted / accepted with rework or segregation and consignments rejected are retrieved from the SAP system by QAD personnel for calculation purposes.

3. *The vendor quality rating (VQR) is done as per the formula given below :*

$$VQR \rightarrow \frac{N1 + (X1 * N2) + (X2 * N3) + (X3 * N4)}{N} * 100\ \%$$

Where
N -> total number of consignments
N1 -> no. of consignments accepted directly
N2 -> no. of consignments accepted concessionally
N3 -> no. of consignments accepted after rework / segregation
N4 -> no. of consignments rejected

DEMERIT FACTOR : X1 = 0.6, X2 = 0.4, X3 = 0

DEC 2009		REVIEWED:	APPROVED:

SCOPE: COVERS THE VENDOR RATING PROCEDURE FOR SUPPLIERS OF RAW MATERIALS , BOUGHT OUT ITEMS AND CONSUMABLES.

RATING OF VENDORS :

100 % - EXCELLENT. KEEP IT UP

95 - 99 % - GOOD. TO AIM FOR 100 %

80 - 94 % - SATISFACTORY. COULD IMPROVE FURTHER.

61 - 79 % - AVERAGE. TO IMPROVE FURTHER.

50 - 60 % - BELOW AVERAGE. SHOULD IMPROVE.

BELOW 50 % - POOR.

FORMAT OF RECORDING : F/QAD/025

DISTRIBUTION POINT : RM QA ,PURCHASE DEPT

DEC 2009		REVIEWED:	APPROVED:

8.1 MONITORING OF QUALITY RATING :-

8.1.1 PURPOSE:

To specify the system for monitoring and re-evaluation of suppliers of products and services.

8.1.2

This rating procedure is applicable to suppliers of items that affect quality.

Note:

In this rating procedure the term supplier is used to denote suppliers of raw material, bought out products and finishing services.

Suppliers quality rating of delivered product quality (incoming items / parts / services) would be calculated on a quarterly basis.

WIL would monitor the suppliers Quality System by on-site assessment.

8.1.3 AUDIT FREQUENCY:

The supplier quality system audit is once in a two years for consumable suppliers and once in a year for other suppliers and sub-contractor, except steel producers (would be done once in five years).

The priority and frequency of audit is based on their performance (Quality/Delivery).

8.1.4

Audit would be conducted in the immediate quarter if the suppliers performance do not meet WIL acceptable levels continuously for more than one month.

The Suppliers have been classified into two categories as,

a) High Quality Impact suppliers.

b) Non High Quality Impact suppliers.

8.1.5

Supplier Quality rating for incoming items would be calculated based on monthly basis for the High Impact suppliers.Quaterly basis for Non-high impact suppliers.

8.1.6

However, for High Quality Impact Suppliers (Due to the criticality of application – steel , electrode , paints & critical services) , whenever the supplier gets a quality rating of less than 95% (on monthly monitoring)corrective action would be requested from supplier and the corrective action would be verified.

8.1.7

For all other Non High Quality Impact suppliers, any supplier getting less than 85% rating (on quarterly basis) corrective action plan would be requested and verified.

8.2 PENALTY CLAUSE :-

Penalty for poor quality rating

8.2.1

The de-listing criteria for all suppliers would be 50%.

9.0 SUPPLIER DELIVERY RATING PROCEDURE :-

Delivery performance of all suppliers listed under "Approved supplier list would be monitored on a monthly basis , based on the schedule.

Based on the delivery performance of suppliers have been classified in to two categories as,

a) **Delivery watch (75 – 90 %)**

b) **Delivery alarm (<75%)**

Performance rating criteria would be as follows:

a) **If the % age of delivery completed before schedule before scheduled date:**

For Raw Materials Item	Rating	For Product store & Sub contracted items	Rating
80 % - 120 %	1	90 % - 120 %	1
70 % - 79 %	0.9	80 % - 89 %	0.9
60 % - 69 %	0.75	70 % - 79 %	0.75
50 % - 59 %	0.5	60 % - 69 %	0.5
Less than 50% & Greater than 120%	0	Less than 50 % & Greater than 120 %	0

b) **Supplier would also be monitored for the following :**

DESCRIPTION	
I) Material discrepancy in terms of quantity/documents	
II) Packing and labelling	
III) Any communication failures	
Method of monitoring :	Number of instances reported
Frequency :	Monthly

Rating Criteria for delivery related performance:

Score (I + II + III) based on number of instances	Rating (negative rating)
1 to 5	-0.25
6 to 10	-0.50
11 to 15	-0.75
16 to 20	-1.00

The above rating criteria would be referred in "Delivery Performance of Suppliers"

Monthly schedules would be provided to suppliers before 25th of the instant month.

Where schedules are changed for a particular period, delivery performance would be evaluated only against the changed schedule.

For sub contractors, delivery performance is measured by number of consignments received against number of consignments sent within a month.

When the monthly delivery performance of all suppliers is less than 90 % in the first instance, The supplier would be cautioned and corrective action would be obtained.

9.1 PENALTY CLAUSE:-

Penalty for poor delivery rating.

9.1.1

Delivery performance less than 75 % for consecutive three months would attract a detailed joint assessment by WIL and supplier on the capacity of the supplier in meeting the requirements. Based on the assessment action would be initiated on delisting / addition of New source.

9.1.2

To facilitate Suppliers monitoring the performance of their manufacturing processes,all the relevant information (trends on quality , delivery , and any other complaints from customers) would be sent to them on a regular basis.

9.1.3

WIL would verify suppliers corrective action and preventive action plans through on-site assessments and monitor the effectiveness.

9.2 RE - EVALUATION CRITERIA:-

Following are the conditions for RE-EVALUATION:

9.2.1

Whenever the supplier Quality rating reaches below 80 % for consecutive 3 months.

9.2.2

Supplier delivery rating reaches below 75 % for consecutive 3 months. Customer end disturbance due to parts / items supplied by supplier. Customer complaints including fields failures due to parts / items supplied by supplier.

9.2.3

Premium freight incidences, due to parts / items supplied by supplier .Any addition of special customer notifications.

9.2.4

In the above condition, the supplier would be requested to give Corrective action. The same would be verified and on satisfaction to WIL, the supplier will be RE – INDUCED.

10.0 SUPPLIER ASSESSMENT DATA SHEET:-

Supplier Audit Assessment is categorized into four Types.

1. IATF Certified supplier. (F/PUR/007)
2. ISO Certified supplier. (F/PUR/007/A)
3. Sub-Contractor (Job Work). (F/PUR/007/B)
4. Packing supplier. (F/PUR/007/C)

SUPPLIER ASSESSMENT DATA SHEET

Serial Number:-

SUPPLIER DETAILS	Date		Prefered Over All Rating		
Name of the Supplier:			> 90 %	✓	Preffered Rating -----> Plan to Sustain
Registered Address:			75 ~ 90 %		Approved Rating -----> Minor Improvements Required
			50 ~ 75 %		90 days Max time to close issues before orders places-----> Major Improvements Required
			< 50 %		Total Assessment requird after minimum 6 month no orders till these
Phone No(s). (with ISD/STD codes):			Minimum Applicable System Certification is : ISO 9001:2015	✓	If More:
Email:			QUALITY ACCREDITATION DETAILS		
Type of Organization: (1) Public Ltd. (2) Pvt. Ltd. (3) Proprietary/Partnership :			S.No.	Description	Status
Industry Segment: (1) Large-scale (2) Mid-scale (3) Small-scale :			1	ISO 9001 : 2015 Certification/CB/ Expiry Date	
Year of Incorporation:			2	IATF 16949 Certification/CB/ Expiry Date	
			3	ISO 14001 : 2015 Certification/CB/ Expiry Date	
Purpose & Status of Vendor Evaluation			4	ISO 45001 : 2018 Certification/CB/ Expiry Date	
New Evaluation:-		Description of Products / Process:			
Re-Evaluation:-					
Annual Schedule:-			Responsible Person for Quality :		
Over all score Rating		Any Sub-supplier / Sub-contractors:	Responsible Person for Delivery :		
			Responsible Person for Price :		

Over all Expansion Plan For the Next Three Years

WIL Recommendations : Do mention relevant information of the audit system)	

F/PUR/007 REV-06 Dec'18

Manufacturing Facilities

Sl.No.	Machine Description	Make	Year	Condition	Remarks

Inspection / Lab Facilities

Sl.No.	Instrument Description	Make	Calib. status	Condition	Remarks

SUPPLIER'S HUMAN RESOURCE

S.No.	Manpower	No of people (Permanent)	No of people (Temporary / contractor)
1	Skilled Manpower		
2	Unskilled Manpower		
3	Service Dept. Manpower		

Legal Requirements

Description	Observation
Factory license	
Concent to Operate (Air & Water)	
Environmental statement submission in PCB (form-5)	

F/PUR/007 REV-06 Dec'18

SUPPLIER ASSESSMENT DATA SHEET FOR QMS

S.NO	IATF 16949 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
1	----	Are the WIL requirements fulfilled in terms of Quality Management System?	IATF 16949 : 2016						
2	5.2	In the company, is there a defined quality policy with derived quality targets, e.g. continuous quality improvements ?	- Quality policy						
3	4.4.1	Quality management system planning	Quality manual and Procedure are updated as per latest santioned interpetation 'Are the Procedure coverd are the shall requirments as per IATF standard						
4	5.1.1, 5.1.2,5.3	Top management leadership, commitment and customer focus and Whether Roles & Responsibility are documented	-Department manual -Authority to stop shipment and stop production						
5	7.1.3, 7.1.3.1, 7.1.4.1	Plant Facilities & Infrastructure Management	-Sufficient Lighting / Air ventilation arrangement -Covered Shed availability -Alternate power source -Storage area -Material handling equipment's						
6	7.1.4	Environment for the operation of processes (Work environment)	-Safety operating procedure -Adherence to PPE's -Free from safety Hazard -5 S practice						
7	8.2.3	Contract review for New and regular processing	-Once in year review evidence -Contract review checklist						
8	9.2	Internal audit	-Audit plan -Audit schedule -Audit report -NC report -List of internal auditors -Internal auditor certificate -Follow up audit for NC closure -Repeated NC trend -Effectiveness of previous internal and external audit NCR's						
9	9.2.2.3	Manufacturing process audit	-Process audit plan -Process audit plan Vs actual -Process audit report -Evidence for shift handover details in report -NC report and corrective actions -Follow up audit & NC closure						
10	9.2.2.4	Product audit	-Product audit plan -Product audit plan Vs actual -NC report and corrective actions -Follow up audit & NC closure						

SUPPLIER ASSESSMENT DATA SHEET FOR QMS

S.NO	IATF 16949 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
11	9.3	Management review	-MRM agenda -MRM minutes -Effectiveness of previous MRM actions -Measurable and out come of actions						
12	8.6.2	Layout inspection and functional testing	-layout inspection and planning work instruction -layout inspection plan as per customer requirement -Inspection and functional test reports -layout inspection plan Vs actual						
13	6.1.2.3	Preventive action	-List of preventive action -Preventive action effectiveness						
14	8.4.2.4,8.4.2.4.1	Quality performance - Effectiveness (LAST ONE YEAR):	Are they meeting adequate Quality rating 'Does the Quality rating monitored periodically 'Does the CAPA implemented and followed when the rating is lower 'Does the CAPA effectiveness is monitored and adhered						
15	8.4.2.4	Delivery performance - Effectiveness (LAST ONE YEAR):	Are they meeting adequate Delivery rating 'Does the Delivery rating monitored periodically 'Does the CAPA implemented and followed when the rating is lower 'Does the CAPA effectiveness is monitored and adhered						
16	6.2,9.1	Objective Deployment	Evidence of objectives & targets for previous and current year -Action to achieve objectives -Corrective action and effectiveness monitoring if not met .						
17	8.5.1 ,8.5.1.7	Capacity	Are the supplier having ability to supply product in accordance with the WIL requirements						
18	9.1.1.3	Application of statistical concepts	-SPC monitoring as per requirement -Control chart establishment (X bar chart ,R chart) -Evidence of Process capability (Cp) , Process capability index (Cpk) , Initial process capability (Pp) and initial process capability index (ppk) -Event log register during out of control situation						
19	6.1	Risk Assessment	-Needs and expectations of Interested parties. -Internal and external issues and identification of risk and opportunity and evaluation.						
20	6.1.2.3	Contingency plan	-Key equipment failures, interruption from externally provided products ,processes ,and services; recurring natural disasters; fire; utility interruptions ;labour shortage ; or infrastructure disruptions; -Evidence for periodically test the contingency plan for effectiveness (e.g., simulation ,as appropriate)						

SUPPLIER ASSESSMENT DATA SHEET FOR QMS

S.NO	IATF 16949 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
21	8.1, 8.1.1, 8.1.2, 8.2.1.1, 8.2.2, 8.2.2.1, 8.3.1, 8.3.1.1, 8.3.2, 8.3.2.1, 8.3.3, 8.3.3.1, 8.3.3.2, 8.3.3.3, 8.3.4, 8.3.4.1, 8.3.4.2, 8.3.4.3, 8.3.5, 8.3.5.1, 8.3.5.2	New product Development	Documents as per AIAG-APQP manual Design and development File - Only for ISO Supplier. **Design not responsibility suppliers - 8.3 Design and development of products and services Exclusion.						
22	8.3.4.4	PAPP with sing off	-Documents as per AIAG-PPAP manual -PSW sign off -Submission level as per WIL requirement						
23	8.5.6.1	Change Management system	-Change management planning sheet -Change intimation note -Change record -Change management control -Evidence for WIL intimation / approval						
24	6.1.2.1	Lesson learned and best practices (TGW & TGR) at the time of proto-type,pre-launch & production phase	- Poka Yoke identified and planned for horizontal deployment - Lessons learned register						
25	7.1.5.1, 7.1.5.1.1, 7.1.5.2, 7.1.5.2.1, 7.1.5.3	Control of Monitoring and Measuring resource(Equipment), MSA	Ensure the instruments used for inspection is with in due of calibration -Ensure instrument selection in place (ex: Least count of instruments match with product characteristics) - Calibration only for ISO supplier						
26	6.1.2.1	Does the organization follows PFMEA? Are the PFMEA kept up to date?	- PFMEA document available and covers all the process stages, risks, - AIAG guidelines are used and followed - High severity and RPN has action plan in place - PFMEA is updated regularly and change log. - PFMEA matches PFD - Training on PFD/PFMEA						
27	8.5.1.1	Are the relevant details derived from control plans and been established in production/inspection documents?	- PFD and control plans - Process parameters and setting charts - First piece and set up approvals - Work instruction sheets - Inspection instruction sheet - Poka yoke identification and implementation - Quality records for process/quality parameters and approval status - Process control charts - Work station with adequate lighting, tools and equipment, gauges. bins, pallets and material handling, WIS and control plans.						
28	7.2	Competence	-Training need identification including customer specific requirement. -Training calendar yearly and monthly -Training attendance and plan Vs actual -Training feedback on training and trainer -Training effectiveness monitoring						
29	7.1.6, 7.2, 7.2.1, 7.2.2, 7.2.3, 7.2.4, 7.3, 7.3.1, 8.5.5.1	Organisation knowledge, Competence, training and awareness	-Competence requirement & Job knowledge -Awareness in customer specific requirement						
30	8.5.1	Manufacturing Process - Is it carried out under controlled condition?	- Controlled process parameters as per control plan and validation report						

SUPPLIER ASSESSMENT DATA SHEET FOR QMS

S.NO	IATF 16949 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
31	8.5.1	Process validation, Re-validation for all processes	- Process validation Work Instruction -Record of process validation - Re-Validation and set frequency. - Evidence of trial report						
32	8.5.1.4	Verification after planned or unplanned shutdown	-Work instruction to restart of production process in various stages . -Product approval and traceability evidence						
33	8.5.2 & 8.5.2.1	Is it traceable to R/M in which component produced	- Raw material to Despatch traceability evidence. (Ex. Heat Number , MTR Number ,part number ,shift code ,date/month/year code & batch code etc. are traceable)						
34	8.5.3	Control of WIL property	Identification and monitoring of customer and supplier property						
35	8.5.4, 8.5.4.1	Preservation (Handling, Protection & Storage)	- Handling, Protection & Storage work instruction -FIFO prevent from surface deterioration. -Slow moving part control and identification						
36	8.6, 8.6.1, 8.6.2, 8.6.4, 8.6.5, 8.6.6	Visual acceptance criteria, lux level, operator Qualification .	- Visual Standards - Quality gate lux level report. - Skill matrix						
37	8.5.6.1.1	Temporary change of process control	-Evidence of temporary change request -List of alternate process control including all Measuring instruments / gauges and error -proofing. -Temporary process verification record.						
38	8.7.1, 8.7.1.1, 8.7.1.2, 8.7.1.3, 8.7.1.4, 8.7.1.5, 8.7.1.6, 8.7.1.7, 8.7.2, 10.2.1, 10.2.2	Document evidence for NC/concession/Rework & Re inspection	-Record or register -NC/concession/Rework & Re inspection - Evidence of concession obtained from either R&D (or) quality (or) customer						
39	8.7.1.4 & 8.7.1.5	Control of rework and repaired product	- Rework FMEA. - Repair FMEA. -Re-Inspection record and work instruction -Re-Inspection and traceability requirement						
40	10.2	Non-conformity and corrective action	-All internal / external non-conformance related to product and process -Root cause analysis using appropriate quality tool -Evidence of corrective action -Effectiveness monitoring -Action linkage to FMEA						

SUPPLIER ASSESSMENT DATA SHEET FOR QMS

S.NO	IATF 16949 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
41	10.3,10.3.1	Continual improvement and variation reduction	- Kaizen sheet - QCC projects -List of improvement done - Six sigma & DOE projects evidence.						
42	10.2.4	Daily monitoring system error proofing	- Master list of Poka yoke - monitoring of Poka yoke - Poka yoke linkage between PFMEA and control plan -Reaction plan for Poka-yoke and linkage in control plan						
43	8.5.2, 8.5.2.1	Identification, Handling, Packing, storage and protection in preservation control.	-Location Identification -SOP -Work instructions -Packaging standard as per customer requirement -Preservation requirement as per WI/Procedure						
44	8.5.4, 8.5.4.1	Condition of product in stock shall be assessed at appropriate planned intervals	-Slow moving part handling work instruction -Evidence of Re-inspection record						
45	8.5.4	FIFO	- Work instruction or SOP or Procedure - Stock monitoring system - Stock status comparison system Vs actual						
46	8.5.1.6	Management of production tooling ,manufacturing ,testing ,inspection tooling and equipment's	- Tool History card - Tool Delay in % Of Sch hr - PM Adherence -Tools in % - Tool change frequency record.(Including perishable) -Tool identification including customer owned. -Monitoring of outsourced processes -Tool inspection record as per drawing						
47	7.1.1,7.1.3,8.5.1.5	Total productive maintenance and plant engineering	- Control on critical spares -List of machines & equipment's -OEE linkage with break down hrs -MTBF & MTTR. -Adherence of Preventive maintenance -Preventive and predictive maintenance Plan -Maintenance record -Periodic overhauling plan and status -Ensure history card is followed						
48	8.3.4,8.6.2	How does the Organization's testing facilities ensure product durability and reliability?	- Engineering and product lab test results - Test methods and suitability - Product qualification and re-qualifications - Test data and lab traceability , correlation of test results - Testing frequency - Validation and reliability test plan (in case of changes and modifications)						
TOTAL POINTS SCORED				0	0	0	0		

0-	No system available and not practiced.
1-	System procedure available and not practiced.
2-	System available but partially practiced.
3-	System procedure available and practiced.
NA-	Not Applicable

Guide lines for score:

1) Above 80% --Approved

2) 60 - 80 % conditionally approved.

3) Below 60% not approved.

4) For individual score 0 and 1 - Get the action to achieve score 3

Percentage scored: Total Points scored x 100 / Total Applicable Points	0

Note:

SUPPLIER ASSESSMENT DATA SHEET FOR EHS

S.NO	EMS ISO 14001 : 2015 Clause	REQUIREMENTS	GUIDELINES (What to look for)	SCORE				NA	OBSERVATION
				0	1	2	3		
1	----	EHS certificate if any	- ISO 14001 : 2015 & ISO 45001 : 2018						
2	5.2	Policy	- EHS policy						
3	6.1	Does the organization follow EMS standard, environmental statutory and regulatory norms? Does the organization have responsibility defined internally?	Actions to address risks and opportunities						
4	6.1.2		Environmental aspects						
5	6.1.3		Hazardous waste disposal						
6	6.1.3		Display at gate for EMS data						
7	10.2		Past record on Environmental performance & Corrective action effectiveness (Ex: Non-conformities, etc.)						
8	---	WIL Requirements	Does the safety work instruction established and followed?						
9	---		Does the operational personnel uses required and adequate PPE's ?						
10	---		Does the work environment maintained free from unsafe condition / act ?						
11	---		Does the supplier aware of WIL QSHE Policy and followed?						
TOTAL POINTS SCORED				0	0	0	0		

0-	No system available and not practiced.
1-	System procedure available and not practiced.
2-	System available but partially practiced.
3-	System procedure available and practiced.
NA-	Not Applicable

Guide lines for score:

1) Above 80% --Approved

2) 60 - 80 % conditionally approved.

3) Below 60% not approved.

4) For individual score 0 and 1 - Get the action to achieve score 3

Percentage scored: Total Points scored x 100 / Total Applicable Points	0	

Note:

SUPPLIER - ADDITIONAL ENVIRONMENTAL REQUIREMENTS- CHECK LIST
(ONLY FOR VOLVO AND SCANIA RELATED SUPPLIER)

Sl. No.	Elements	Score Status						
		0	1	2	3	NA	Track NC	REMARKS
	Additional Environmental requirements:							
1	Do they have a third party certified (ISO 14001 or EMAS) management system covering all relevant activities (eg. Product planning & development, Production, Purchase & Sales)							
2	Are there plans or activities to improve existing products or production process with regard to environment impact							
3	Are products delivered to Volvo group are free from chemicals on the black list							
4	Are the production processes free from chemicals notified on the Volvo's black list							
5	Are products delivered to Volvo group free from chemicals on the grey list?							
6	Are production processes free from chemicals notified on the Volvo's grey list							
7	Is the material content of the product available to be reported in IMDS (according to IMDS reporting for Volvo Group institutions							
TOTAL MARKS		0	0	0	0			
0-	**No system available and not practiced.**	*						
1-	**System procedure available and not practiced**		*					
2-	**System available but partially practiced.**			*				
3-	**System procedure available and practiced.**				*			
NA-	**Not Applicable**						*	
Guide lines for score:								

1) Above 80% --Approved

2)60 - 80 % conditionally approved.

3) Below 60% not approved.

4) For individual score 0 and 1 - Get the action to achieve score 3

Percentage scored: $\frac{\text{Total Points scored}}{\text{Total Applicable Points}} \times 100$ = **0**

Note:

F/PUR/007 REV-06 Dec'18

SUPPLIER -CORPORATE SOCIAL RESPONSIBILITY (CSR) - CHECK LIST
(ONLY FOR VOLVO AND SCANIA RELATED SUPPLIER)

Element No.	Element	Evaluation score						Remarks
		0	1	2	3	NA	TRACK NC	
1	**CSR**							
1.1	Have audits, with focus on human rights and workplace practice, been conducted 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 be compliant with issues outlined in this assessment?							
1.4	Are laws and other regulations regarding working conditions in your country and/or region observed?							
1.5	Are the premises adequately designed for the operation that are conducted eg. Lightning, 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 personal protective equipment such as goggles, gloves, earplugs, boots and protective clothing freely available at to the employees?							
1.8	Are all chemical substances labelled and safely stored?							
1.9	Is guaranteed that all employees are adequately informed about the danger and trained 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 the chemicals are used?							
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 exists properly marked?							

SUPPLIER -CORPORATE SOCIAL RESPONSIBILITY (CSR) - CHECK LIST
(ONLY FOR VOLVO AND SCANIA RELATED SUPPLIER)

Element No.	Element	Evaluation score						Remarks
		0	1	2	3	NA	TRACK NC	
1.15	Are emergency exists properly marked?							
1.16	Are working hours in your company in compliance with statutory requirements in the country or region?							
1.17	Is every employee 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 atleast the minimum age required by country law or other regulations?							
1.21	Are employees allowed to leave the factory premises after work at any time as far as in compliance with statutory regulations?							
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 authorisation of your company?							
1.23	Are all employees treated in a non-discriminatory manner regarding benefits, hiring procedure, job assignment, retirement provisions, and access 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 behaviour, 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 part of 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 prevent and 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 candate, or any person related by blood, marriage or otherwise such persons (i) own beneficially, directly or indirectly, the whole or a part of your operation; or (ii) in the last three years served as an officer, director or manager of your operation? f yes, please use separate sheet to describe.							
1.29	During the last three years has your operation been involved in any investigation, lawsuit, or other proceeding concerning the issues addressed in this assessment? F yes, please use separate sheet to describe.							
	TOTAL MARKS	0	0	0	0			
0-	**No system available and not practiced.**	*						
1-	**System procedure available and not practiced**		*					
2-	**System available but partially practiced.**			*				
3-	**System procedure available and practiced.**				*			
NA-	**Not Applicable**					*		

Steps

1 **Take out NA and add total target marks. (Applicable No. of questions X 3)**
2 **Add actual marks obtained.**
3 **Calculate the total for 100%.**

Guide lines for score:
1) Above 80% --Approved
2) 60 - 80 % conditionally approved.
3) Below 60% not approved.
4) For individual score 0 and 1 - Get the action to achieve score 3

Percentage scored: $\frac{\text{Total Points scored}}{\text{Total Applicable Points}} * 100$ = **0**

Note:

F/PUR/007 REV-06 Dec'18

SUPPLIER ASSESSMENT

SCORE SHEET

S.NO	AUDIT ELEMENTS	% SCORED
1	SUPPLIER ASSESSMENT DATA SHEET FOR QMS	
2	SUPPLIER ASSESSMENT DATA SHEET FOR EHS	
3	Additional Environmental requirements	
4	Corporate Social responsibility (CSR)	

PIs Note:- PART 3 & 4 - ONLY FOR VOLVO RELATED SUPPLIER

Name of the Auditors	Designation	Signature

Approved by:

HEAD - QUALITY ASSURANCE

SUPPLIER NON-CONFORMITY REPORT:-

Non-conformance will be tracked for effective corrective action closure to be within 60 days, manual tracking sheet will be used and Verification details of implementation & effectiveness followed to next Audit.

	SUPPLIER ASSESSMENT NON - CONFORMITY REPORT	**Report Number**

Audit date :	Auditor(s):		Supplier Responsible person :		
	Standard :	IATF 16949 : 2016 ☐ ISO 9001 : 2015 ☐ ISO 14001 : 2015 ☐ ISO 45001 : 2018 ☐	Audit category :	QMS ☐ EMS ☐ OHSAS ☐	

Non-Conformity details:

As per clause:

Objective evidence:

Cause(s) for Non-Conformity :

Correction **Target date:**

Corrective Action: **Target date :**

Supplier Signature :	Date:

FOLLOW UP AUDIT DETAILS: (Verification details of implementation & effectiveness)

Horizontal deployment if any:

NON CONFORMITY CLOSED:-	WIL Rep: Signature:		Date:

F/QAD/450, 17.03.2017 Rev 1

11.0 SUPPLIER MANAGEMENT:-

11.1 QUALITY - CAPABLE STEEL SUPPLIER SELECTION:-

Before suppliers are specified, as an assessment of the QM system (certification/auditing) must be obtained.

If there are deviations from the organization's own selection criteria, the further procedure must be decided on. Experience from evaluations of quality performance assessments must be taken into account for existing suppliers.

Risks in the supply chain must be determined and assessed and must be reduced by appropriate action (Strategy for emergencies).

Following are the EHS criteria in which the contractors / outsourced processes are being controlled and ensured during procurement process through supplier selection / periodical assessment process

a) Suppliers of products and services have to take part in the EHS initiatives of WIL.
b) Products and services offered to WIL should have minimal negative impact on the environment, health and safety.
c) Please understand MSDS requirements of WIL for the products ordered and submission of MSDS documents in advance to WIL is must, before commencing physical supplies, if not submitted earlier.
d)Suppliers must follow the WIL QSHE (Quality, Safety, Health & Environment) policy, while working on site and during supply of material and services to WIL
e) The suppliers should ensure occupational health & safety in keeping with domestic standards and will promote the continual improvements of the work place environment.

11.2 CUSTOMER REQUIREMENTS:-

Suppliers in the supply chain must be controlled and monitored in terms of their engagements and performance (depending on the risk classification of the product).

Interfaces are recognized and secured. The forwarding of customer requirements must be controlled and traceable. Change management must also be taken into account.

11.3 TARGET AGREEMENTS FOR DELIVERY PERFORMANCE:-

Target agreements must be agreed and implemented with suppliers to cover delivery performance, to ensure the continuous improvements of products and processes (quality control circle). In the event of discrepancies actions must be agreed and their implementation monitored, including timing dates.

11.4 APPROVALS / RELEASES FOR THE OUT-SOURCED PRODUCTS / SERVICES:-

An approval/release must be issued for all out-sourced products and services before they are used in serial production.

In the case of modules (unless otherwise agreed) the supplier has full responsibility monitoring the quality of all the individual components.

Evidence must therefore be provided of comprehensive change management, from the customer to the sub-supplier.

To monitor the quality of the out-sourced goods and services, regular checks are carried out, documented and evaluated.

Requalification checks are carried out to the customer's requirements.

Test, inspection and measurement equipment must be stored in an orderly manner and associated work-stations must be laid out appropriately.

11.5 :-STORAGE OF INCOMING GOODS:-

Incoming materials and goods containers must be placed in stores in accordance with their release status so that they cannot be damaged or mixed up.

"Suspect" and quarantined products must be stored securely to prevent access to them.

Restarting Operations after COVID-19 Lock-Down - WIL Suppliers

	Checklist for Restarting Operations after COVID-19 Lock-Down - WIL Suppliers				
S.NO	CHECK POINTS	STATUS (YES / NO/ NA)	REASON FOR (NO / NA)	COUNTER MEASURE (NO)	REMARKS / Other Information
Supplier Name :					
Address :					
1	**Self declaration by employees for the health**				
a	Have you ensured to receive the self declaration				
2	**Travel to & fro from workplace (office / factory)**				
a	Have you designated pick point at company to ensure appropriate social distancing (Square/round marks on pick up area at suitable distance)				
b	Have you ensured alternate seating arrangements in the bus / van/ car for employees commutation				
c	Have you ensured cleaning of seats, floors, windows, front/rear glasses, handles, handrails, switches, and doors need to be carried out before every journey				
d	Have you released guidelines for employees to prefer personal car/two wheeler as preferred commutation means?				
e	Have you communicated your employees there is no pillion rider				
3	**At work place**				
a	Have you made arrangements for checking the temperature for all employee at plant entry				
b	Have you informed your employees to wear face mask at all times				
c	In case you are using fingerprint scanner have you planned to changed the same to some contact less swiping machine				
d	Have you ensured social distancing while inside factory				
e	Have you ensured proper social distancing in the locker / Rest room area.				
f	Have you guided employees to maintain 1 meter away from others and no mass exit during lunch break / tea break. Maintain the social distancing from starting to end				
g	Have you ensured employees to keep 1 meter distance during meetings.				
h	Have you ensured employee to clean the hands before having water in a water cooler				
i	Have you guided employee to avoid spitting on the floor / walls and no chewing gum inside factory to maintain personal hygiene.				
j	Have you guided employee to avoiding anyone who appears to be sick, or who is coughing or sneezing.				
k	Have you ensured no product / tools / gauges / equipment / panels to be touched with bare hands. Gloves must be used.				
l	Have you ensured employee shall sanitize their hands before & after using the PC. Sanitize all touch points on mouse, mouse pad, key board, operating console, push button station, hand tools, gauges and equipment's.				
m	Have you ensured Forklift sanitization to be done in all the touch points in the vehicle.				
n	Have you ensured PPE's like helmet, goggle, face shield shall be sanitized before use.				
o	Have you ensured pallets received from customer shall be sanitized before use.				
p	Have you provided basic facilities to ensure personal hygiene for customer representatives				
4	**Facilities management**				
a	Have you created emergency response team				
b	Have you Sanitizing whole office/plant with disinfectants to ensure safe workplace for all				
c	Have you placed Hand Sanitizers at specific locations and ensure replenishments of the sanitizer.				
d	Have you ensured availablility of medical facility in case of emergency				
e	Have you planned to switch off air conditioning where ever possible, AC unit filters will be cleaned once in a month. Air Conditioner that are required to run (e.g., CMM room) will be cleaned every fortnight				
f	Have you Ensured availability of sufficient masks for all employees & disposal of used masks				
g	Have you created quarantine facility and earmarking ambulance and medical staff.				
h	Have you made plan for Cleaning of all doors, knobs, railings every two hour in office/ shop floor.				
i	Have you reworked Shift timings to ensure social distancing and reduce shift overlap.				
j	Have you planned audits for monitoring the guidelines				
k	Have you identified list of Hospital and clinics treating COVID-19 near your work place and shared these contacts with all team members				
l	Have you planned sanitization for: Vehicles entering the plants bringing material, Vehicles dispatching the finish goods				
m	Have you ensured Toilet cleaning protocol to be followed including cleaning of walls & hand sanitizer to be used after use of rest room by personnel				
n	Have you formed a Task Force team to enforce implementation inside factory, canteen, and office areas.				
5	**Canteen/ Dining Hall**				
a	Have you planned Staggered dining times to ensure smaller group of employees at one time in dining hall				
b	Have you made provisions for Employees to sanitize/ wash their hands before entering dining hall				
c	Have made plans to serve the employees by canteen staff to avoid self service.				
d	Are you encouraging employees to bring their own food and water to avoid overcrowding in dining hall.				
e	Have you made plans to check personal hygiene of canteen staff before they start the work.				
f	Have provided PPE's such as head gear, gloves, masks for food handlers.				
g	Are you ensuring cleaning of all utensils with hot water & The knives and handles shall be sterilized before and after use				

ACRONYMS

FIFO	First In First Out.
FMEA	Failure Modes & Effect Analysis
ISO	Internal Organization for Standardization
MSA	Measurement System Analysis
PFD	Process Flow Diagram
P FMEA	Process Failure Modes & Effects Analysis
P PAP	Production Part Approval Process
PPE	Personnel Protective Equipment
RPN	Risk Priority Number
TS	Technical Specification
WIL	Wheels India Limited

Prepared by

WHEELS INDIAL LIMITED
Quality Assurance Department
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1st Revision -January'2010
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WHEELS INDIA LIMITED

PADI , CHENNAI – 600 050.