Format No. :- F-ENGG-006

Rev. No. :- 01

Date :- 20-12-2023

SUBMISSION OF PPAP

Customer: Endurance Technologies Ltd. K-226/2
Supplier: Metaforge Engg (I) Pvt. Ltd. Nashik

Part Name: LOCK NUT N-TORQ
Dwg No.:B2RZ01126O Rev.:XA Date: 06.12.2023
Date of Submission: 15.02.2024

Project leader : Mr. Nilesh Kedare.
(Process design and development)

MEHTA	PPAP CHECK LIST	Format No. :- F-ENGG-006 Rev. No. :- 01 Date :- 20-12-2023

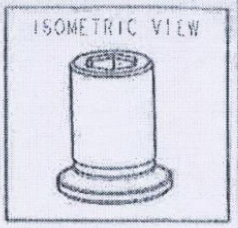
CUSTOMER: Endurance Technologies Ltd.

PART NAME: LOCK NUT N-TORQ

PART NO.: B2RZO1126O Rev.: XA Date: 06.12.2023

SR. NO.	ITEM	COMMENTS
1.	Design Record - For all other components/details	Yes
2.	Engg. Change Documents, if any	Not Applicable
3	Customer Engg. Approval, if any	Not Applicable
4	Process Flow Diagram (PQCS 1)	Yes
5	PFMEA	Yes
7	Control Plan (PQCS2)	Yes
8	Measurement System Analysis Studies(for Significant & Critical Characteristics)	Yes
9	Dimensional Results	Yes
10	Material, Performance Test Results	Yes
11	Initial Process Study (for Significant & Critical Characteristics)	Yes
12	Qualified Laboratory Documentation	Yes
13	Appearance Approval Report(AAR)	Not Applicable
14	Sample Product	Yes
15	Master Sample	Not Applicable
16	Checking Aids	Yes
17	Records of Compliance With Customer - Specific Requirements	No
18	DFMEA (applicable to Sub supplier in case of supplier design / Proprietary part)	Not Applicable
19	Part Submission Warrant(PSW)	Yes
20	Packaging Agreement	Yes

FIRST ANGLE PROJECTION – PLEASE DO NOT SCALE THE DRAWING ASK IF IN ANY DOUBT – ALL DIMENSIONS IN mm



CONTROLLED COPY
Released To : NPD
Sign.:
Date : 14-2-24

MASTER COPY

NOTES:
1. FINISH: MFZn2-B(WHITE PASSIVATION) GRADE-2 AS PER HES D 2003-17
2. PART SHOULD BE FREE FROM BURRS.
3. DATAM SURFACE B SHALL BE FLAT WITH IN 0.1
4. HARDNESS 20-30 HRC
5. BRACKET DIMNS ARE FOR REFERENCE ONLY.
6. UNSPECIFIED TOLERANCE AS PER
HES D0001-08 GRADE 2 FOR MACHINING AND HES D0006-08 GRADE 2 FOR FORGING
7. HOLE PERPENDICULARITY WILL BE CHECKED BEFORE TAPPING.

DATE	REV	ALTERATION	ECRD
06/12/2023	XA	NEW RELEASE	7877

SUPERSEDES

SIGNIFICANT | SAFETY | SHEET SIZE: A4

SCALE:	1:1
DRAWN	SSD
CHECKED	VV
APPROVED	PMK
MATERIAL :	SAE 15B25 OR EQUIVALENT OR PROPERTY CLASS 8 (ISO-898-2)
PART NAME:	LOCK NUT (NTORQ/U388/N282)
O.E.PART NO. & DCN NO.	
RAW DWG/PART NO.	
DRG. REV.	XA
TOLERANCES	REFER NOTE 6
RAW WEIGHT:	---
FINISH:	---
HEAT TREATMENT:	---
FINISHED WEIGHT:	~15.3gms
DWG/PART NO.	B2RZ011260

ENDURANCE TECHNOLOGIES LTD.
BRAKING DIVISION

PROCESS FLOW DIAGRAM

Format No.	F-Engg-008
Rev No:	00
Date:	28-06-2015

MEPL Code	F366	**Supplier**	Metaforge Engineering (I) Pvt. Ltd., Mhasrul, Nashik
Part Number	B2RZ01126O	**Customer**	Endurance Technologies Ltd. K-226/2
Part Name	LOCK NUT N-TORQ	**Submission Date**	15.02.2024
Mod Number	XA	**Mod. Date**	06.12.2023

OPN. NO.	OPERATION	MACHINE	MACHINE NO.	Location	MATL HANDLING (b / c / p / t)	OPERATOR Level:1,2,3,4
10	Raw Material Inward Inspection(SAE 15B25)	-	-	Inhouse	p	3
20	Forging	Forging Machine	HN-16	Inhouse (Plant -2)	b	3
30	CNC Machining Set up 1 (Collar Machining, Facing, Drilling & Id chamfer , Groving & Tapping)	CNC M/c	CNC M/C	Outsource	b	3
40	CNC Machining Set up 2 (End Facing, Chamfering, Drilling & ID chamfer)	CNC M/c	CNC M/C	Outsource	b	3
50	Punching	Punch M/c	PP-01	Outsource	b	3
60	Hardening &Tempering (22-28HRC)	Furnace	HT-2	Inhouse (Plant -2)	b	3
70	Surface Treatment- Alkaline Zinc Bright Passivation	Plating Tank	-	Inhouse	b	3
80	Final inspection	-	-	Inhouse	b	3
90	Packing, Labelling , Storage & Dispatch	Manually	-	Inhouse	b	3
100	Transportation	Regular Transport		Inhouse	-	-

Symbol

10 Inspection

10 Final Inspection

10 Operation + In process inspection

10 Dispatch & Transportation

Transportation

b: bin; c: chute; p: pallet; t: trolley
Level 4: Can Do & Teach;
Level 3: Can Do Independently;
Level 2: Can Do, Requires Supervision;
Level 1: Can Not Do

Date	REV	ALTERATION	CHANGE BY	APPROVED BY

AUTHORISED BY :Mr. Sagar Thete

DATE : 15.02.2024

Prepared By **Nilesh Kedare** (Dev. Engg.)	**Approved By** **Mr.Sagar Thete** (Development Head)

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
10	Raw Material Inward Inspection (SAE 15B25)	Spectro Machine / Lab Equipments	Wrong Raw Material Grade		**Safety Of Product:** Part Or Assembly Failure	6	M	Wrong PO Sent (Material Grade Specification)	4	Batch Code & Heat No. for Traceability/Verification Before Sending PO	Raw Material TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))/3rd party tc Colour code given to the coils as per grade (F-QA-062)	2	48							
					Next Operation: After Heat Treatment, Hardness Failure/Material Requirement Not Fulfilled	6	M	Identification Not Available/Wrong Identification	4	Identification of Material with Colour Cards Or Tags (TG-QAD-028) /FIFO Register Maintained/Incoming material inspection report (F-QA-012)	Raw Material TC/Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))/3rd party tc Colour code given to the coils as per grade (F-QA-062)	2	48							
			Surface Defects like rusty/pitmark/damage/crack .		**Customer:** Not Acceptable at Customer End/Aesthetical Requirements Not Fulfilled	6	M	Inspector Negligence	4	Inspection for rusty/pitmark/damage/crack etc./100 % Inspection	Checking visually each lot, Incoming material inspection report (F-QA-012).	2	48							
			Storage Area		More lead time required.Efficiency	6	M	1)Improper handling of material.2)	4	Arrange properly raw material coil.	Checking visually	2	48							
20	Forging	Forging Machine (HN- 16) (Plant-2)	Head Diameter Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- Forging Setting not ok 4. Material :-Nil 5.Tool :- 1) wear out	5	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting. 3)Die history card maintained (MFG/R/06) (Die Frequency -1.5 Lac Pieces)	Checking Head Diameter with Vernier Caliper	2	60							
			Head Thickness Undersize /Oversize		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok ii) Stopper Pin loose 4. Material :-Nil 5.Tool :- Nil	4	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting. 3)Die history card maintained (MFG/R/06) (Die Frequency -1.5 Lac Pieces)	Checking Head Thickness with vernier caliper.	2	40							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECTE	RPN
20	Forging	Forging Machine (HN- 16) (Plant-2)	Radius Not ok		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok 4. Material :-Nil 5.Tool :- Nil	3	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting. 3)Die history card maintained (MFG/R/06) (Die Frequency -1.5 Lac Pieces)	Checking Radius with Profile Projector.	2	36							
			Shank Diameter Undersize /Oversize		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok 4. Material :-Nil 5.Tool :- 1) Tool wear out.	3	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting. 3)Die history card maintained (MFG/R/06) (Die Frequency -1.5 Lac Pieces)	Checking Shank Diameter with Micrometer.	2	36							
			Total Length undersize / oversize		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok ii) Stopper Pin loose 4. Material :-Nil 5.Tool :- Nil	4	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting.	Checking Total Length with vernier caliper.	3	60							
			Hex A/F		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok 4. Material :-Nil 5.Tool :- 1) Tool wear out.	3	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting.	Checking Hex A/F r with Gauge.	2	36							

MEHTA

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERIT	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
20	Forging	Forging Machine (HN- 16) (Plant-2)	Hex Depth		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok 4. Material :-Nil 5.Tool :- 1) Tool wear out.	4	1) Setup Approval (Format No:- F-QA-022) / First 5 Pieces Inspection at process stage (F-QA-024) / Resetting 2) Tools inspection done before Setting. 3)Die history card maintained (MFG/R/06) (Die Frequency -1.5 Lac Pieces)	Checking Hex Depth with Vernier/Gauge.	2	48							
			Perpendicularity not ok		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**		M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) Forging M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Perpendicularity with dial gauge	3	60							
			Concentricity		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) Forging M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	3	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking concentricity with dial gauge	2	36							
30	CNC Machining Set up 1 (Collar Machining, Facing, Drilling & Id chamfer , Groving & Tapping)	CNC M/c	Head Diameter Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	3	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Head Diameter with Vernier Caliper	2	36							
			Chamfer Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	3	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Chamfer with Profile Projector .	2	36							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
30	**CNC Machining Set up 1 (Collar Machining, Facing, Drilling & Id chamfer , Groving & Tapping)**	**CNC M/c**	Head Thickness Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	**5**	**M**	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	**4**	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking hed thickness with vernier caliper.	**3**	**60**							
			Dimension		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	**5**	**M**	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	**4**	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking dimension with vernier caliper.	**2**	**40**							
			Total Length undersize / oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	**6**	**M**	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	**3**	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Total Length with vernier caliper.	**2**	**36**							
			Groove Distance Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	**5**	**M**	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	**4**	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking groove distance profile projector	**2**	**40**							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
30	CNC Machining Set up 1 (Collar Machining, Facing, Drilling & Id chamfer , Groving & Tapping)	CNC M/c	Hole diameter 1		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking hole diameter with standard pin	2	40							
			Hole depth 1		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking hole depth with vernier caliper	2	40							
			Diameter		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking diametr with vernier caliper	2	40							
			Perpendicularity not ok		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Perpendicularity with dial gauge	2	40							
			Angle Not ok		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking angle with profile projector.	2	40							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
40	CNC Machining Set up 2 (End Facing, Chamfering, Drilling & ID chamfer)	CNC M/c	Drill Diameter Undersize/ Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking Drill diameter with standard pin	2	40							
			Chamfer Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Chamfer with Profile Projector.	2	40							
			Drill Depth undersize/oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Drill depth with vernier caliper	2	40							
			Angle Not ok		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Angle with Profile Projector.	2	40							
			Chamfer Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	Checking Chamfer with Profile Projector.	2	40							
			Total Length undersize / oversize		Next Operation: Loose or tight fitment at assembly end. **Customer: Not Acceptable at Customer End/Fitment Not OK**	5	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i) CNC M/C Setting not ok . 4. Material :-Nil 5.Tool :- Tool wear out.	4	1) Setup Approval (Format No:- F-QA 072) / First 5 Pieces Inspection at process stage (F-QA/R/02) / Resetting 2) Collet runout check Before each setting	checking Total Length with Vernier Caliper.	2	40							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
50	Punching	Punch M/c	Hex A/F Undersize/ Oversize		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	5	M	1.Man:- Oprator negligence. 2.Machine :- Setting not ok 3.Method :- Nill 4. Material :-Nil 5.Tool :- tool wear out	4	1) Setup Approval (Format No:- F-QA 022) / First 5 Pieces Inspection at process stage (F-QA-024-A) / Resetting 2)Die Life Monitoring/Replace Die after 10000 Pieces	Checking Hex A/F With Gauge.	2	40							
			Hex Depth Undersize/oversize		**Next Operation:** Loose or tight fitment at assembly end. **Customer:** Not Acceptable at Customer End/Fitment Not OK	5	M	1.Man:- Oprator negligence. 2.Machine :- Setting not ok 3.Method :- Nill 4. Material :-Nil 5.Tool :- tool wear out	4	1) Setup Approval (Format No:- F-QA 022) / First 5 Pieces Inspection at process stage (F-QA-024-A) / Resetting 2)Die Life Monitoring/Replace Die after 10000 Pieces	checking Hex Depth with Vernier Caliper.	2	40							
60	Hardening & Tempering (22-28 HRC)	(HT-02) (Plant - 2)	Low Hardness		**Safety Of Product:** Risk of Failure/Poor Loading Capacity.	6	M	Low Carbon Potential (Below 0.25%C)	3	Early Alarm for Fan Failure/RPM Indication. Less Soaking Time & Temp. Maintained (Above 850°C)-Alarm System (As per pokayoke list F-QAD-0011)	Fan Belt Tension & Wear Monitoring (JH-PM)	3	54							
					Next Operation: Tempering Temp. will be Lowered/Rework.	6	M	Low Temperature (Below 850°C)	3	Early Alarm for Low MV, Soaking Time Adjusted/Revised (As per annex-1)	Monthly Audit for Alarms, Daily Burner Flame Inspection	2	36							
					Next Operation: Quenching	6	M	Quench Medium Cleanliness	3	Quench Oil Viscosity Inspection Weekly (As per annex-1)	Quench Tank Cleaning Freq. Followed	2	36							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
DATE	28.06.2015

Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
60	Hardening & Tempering (22-28 HRC)	(HT-02) (Plant - 2)	Low Hardness		**Subsequent Operation:** Rejection/Rework.	6	M	Oily Material	3	Prewashing of Components	Water Lines Inspection on Regular Basis	2	36							
					Customer: Not Acceptable at Customer End/Poor Loading Capacity.	6	M	Material Mix-up/Low Hardenability	3	Identification Tags/Cards for Material	Online Inspection/Customer Complaint	2	36							
					End User: Low Service Life due to Poor Microstructure.	6	M	Final Inspection not Implemented Effectively	3	100% Inspection at Final Stage/Sampling Plan should be Followed	Final Inspection(Sampling Plan)/Customer Complaint	2	36							
			High Hardness (Tempering) (22-28 HRC)		**Safety Of Product:** Risk of Failure/Poor Loading Capacity	5	M	Low Carbon Potential (Below 0.25%C)	3	Early Alarm for Fan Failure/Replacement of Oxygen Probe	Fan Belt Tension & Wear Monitoring (JH-PM)	2	30							
					Next Operation: Processed Lot will be Rejected/Reworked	6	M	As Quench Hardness Low	3	Setup Approval & Sample Hardness Monitoring	Online Inspection on Hardness Tester by Quality Inspector	2	36							
					Subsequent Operation: Rejection/Rework	5	M	Low Tempering Temperature (Below 480°C)	3	Early Alarm for Low MV	Monthly Audit for Alarms, Daily Burner Flame Inspection	2	30							
					Customer: Breakage at Assembly/Poor Loading Capacity	6	M	Tempering Heating & Soaking Time Less/More	3	Soaking Time & Temp. Maintained (Above 480°C)-Alarm System. (As per pokayoke list F-QAD-0011)	Monthly Audit for Timer/Online Inspection on Hardness Tester	2	36							
					End User: Low Service Life due to Poor Microstructure	6	M	Final Inspection not Implemented Effectively	3	100% Inspection at Final Stage/Sampling Plan should be Followed	100% Hardness check/Sampling Check Tray wise	2	36							
70	Surface Treatment-Alkaline Zinc Bright Passivation	Plating Tank	Wrong Surface treatment		**Customer:** Not Acceptable at Customer End/Aesthetical Requirements Not Fulfilled	5	M	Identification Card not attached to lot	3	Identification Card provided with lot	Inward Inspection/ Visual Inspection	2	30							
			Surface treatment Thickness Undersize		**Customer:** Not Acceptable at Customer End/Aesthetical Requirements Not Fulfilled	5	M	Current deposition low Plating time is low	3	1.Controlled by scada sysytem 2.Maintained palting time	Checking plating thickness with plating thickness tester.	2	30							
			Surface treatment Thickness Oversize		**Customer:** Not Acceptable at Customer End/Aesthetical Requirements Not Fulfilled	5	M	Current deposition high Plating time is lmore	3	1.Controlled by scada sysytem 2.Maintained palting time	Checking plating thickness with plating thickness tester.	2	30							

POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	0
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Part Number	B2RZ01126O	**Process Responsibility**	Mr. Sagar Thete	PFMEA No.	F366
Part Name	LOCK NUT N-TORQ	**Key Date:**	06.10.2023	FMEA Date :	15.02.2024
Core Team:Nilesh Kedare, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete,Nilesh Kedare, Santosh Tuplondhe		**Customer**	Endurance Technologies Ltd. K-226/2	FMEA Rev No.	-

OPN. NO	PROCESS FUNCTION / REQUIREMENTS	MACHINE/MACHINE NO.	POTENTIAL FAILURE MODE	CC	POTENTIAL EFFECTS OF FAILURE	SEVERITY	CLASS	POTENTIAL CAUSES , MECHANISM OF FAILURE	OCCURANCE	CURRENT PROCESS CONTROL		DETECTED	RPN	RECOMMENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	SEV	OCCUR	DETECT	RPN
80	Final Inspection		Visual Defects Passed		**Customer:** Not Acceptable at Customer End/Fitment Not OK/Aesthetically Poor	6	M	Inspector Negligence	5	Inspection for Burr, Scratches etc./100 % Inspection	Visual Inspection	2	60							
					Customer: Not Acceptable at Customer End/Fitment Not OK/Aesthetically Poor	6	M	Low Luminous Intensity at Inspection Table	5	Proper Lighting Provided Through LED/CFL Lamps	Visual Inspection	2	60							
					End User: Degradation of Comfort Level/Aesthetically Poor/Audible Noise	6	M	Passed at Assembly Stage	5	Inspection for Burr, Scratches etc./100 % Inspection	Visual Inspection	2	60							
			Defective Part Passed (Due to Instruments)		**Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	Instrument Or Equipment Error/Gauge Wear Out	5	Calibration of Instruments, Equipment's & Gauges on Defined Frequency	Inspection Through Various Instruments, Equipment's & Gauges	2	60							
					Customer: Not Acceptable at Customer End/Fitment Not OK	6	M	Dimensional Tolerance Not Followed	5	Specified & Unspecified Dimensional Tolerances Displayed & Followed	Inspection Through Various Instruments, Equipment's & Gauges	2	60							
			Defective Part Passed (Due to Inspector)		**Customer:** Not Acceptable at Customer End/Fitment Not OK	6	M	Inspector Fatigue	5	Inspection According to Shift/Breaks after Certain Interval/Proper Seats Provided	Inspection Through Various Instruments, Equipment's & Gauges	2	60							
					Customer: Not Acceptable at Customer End/Fitment Not OK	6	M	Monotonous Work	5	Tray wise Inspection/Alternative Inspection of Parts	Inspection Through Various Instruments, Equipment's & Gauges	2	60							
			Mix-up of Similar Parts		**Next Operation:** Before Labelling, Visual Inspection Required	5	M	Operator Negligence	3	100% Sorting at Packing Table/Inline Inspection	Visual Inspection	2	30							
					Customer: Not Accepted at Customer End / Dissatisfaction in Terms of Delivery	5	M	Identification Tag Not Attached	3	100% Sorting at Packing Table / Inline Inspection	Visual Inspection	2	30							
90	Packing & Labelling	Heat Sealing Machine, Printers & Weighing Equipment's	Packed Quantity Less/More		**Next Operation:** Before Labelling, 100% Weighing of Bags	5	M	Rounding Off Quantity	3	Unit Weight Checked for Accuracy of No. of Pieces/Setup of Weighing Machine	Weighing Scale Reading	2	30							
					Customer: Not Accepted at Customer End/Shortage of Parts at Assembly	5	M	Weighing Scale Error	3	Setup of Weighing Machine/Checking "0" Scale Before Weighing	Weighing Scale Reading	2	30							
			Dents, Damage & Poor Handling		**Customer:** Not Acceptable at Customer End	4	M	Poor Material Handling/Trays Or Bins Not Available	3	Proper Handling / Bins Provided	Visual Inspection	3	36							
100	Transportation		Dents, Damage & Poor Handling		**Customer:** Not Acceptable at Customer End	4	M	Poor Material Handling/Trays Or Bins Not Available	3	Proper Handling / Bins Provided	Visual Inspection	3	36							

PREPARED BY Mr.Nilesh Kedare (Development Engineer)		**APPROVED BY** Mr.Sagar Thete (Development Head)		

DATE	REV	ALTERATION	CHANGE BY	APPROVED BY

Note: Critical Characteristics are shown by

Control Plan

FORMAT NO:	F-ENGG-007
REV NO	0
DATE:	28.06.2015

Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Key Contact: Mr. Sagar Thete / 7887860352

CP Date: 15.02.2024

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O

Supplier Code: -

CP Rev. No': -

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe

Mod No.: XA_6.12.2023

Supplier: METAFORGE ENGINEERING (I) PVT. LTD.

Customer Name :- **Endurance Technologies Ltd. K-226/2**

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS			CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING		CONTROL METHOD	RESPONSIBILITY		REACTION PLAN
			NO.	PRODUCT	PROCESS				SAMPLE SIZE	FREQUENCY		MFG	QA	
10	Raw Material Inward Inspection(15B25)	Spectro Machine / Lab Equipments	A	**Visual**										
			1	Surface Defects like Finish, Burr, Rust, Pitted Marks, Rolling Seam, Cracks, Damage etc.			Should be Free from Burr, Rust, Pitted Marks, Rolling Seam, Cracks, Damage etc.	Visual Inspection	1 Sample from Each Lot	Each Lot	Raw Material Resgister / Inward Inspection (F-QA-012)	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			B	**Physical Properties**										
			1	Wire Size			11.60 / 11.65	Micrometer	1 Sample from Each Lot	Each Coil / Lot	RM TC /Inhouse chemical composition check (Test report -Raw Material (F-LAB-011)) / 3rd party tc/ Inward Inspection (F-QA-012)	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			2	UTS			61.89 kgf/ mm2	RM Test Certificate	1 Sample from Each Lot	Each Coil / Lot	RM TC /Inhouse chemical composition check (Test report -Raw Material (F-LAB-011)) / 3rd party tc/ Inward Inspection (F-QA-012)	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			C	**Chemical Properties**										
			1	Grade			SAE 15B25	RM Test Certificate / 3rd Party Lab TC	1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			2	C%			0.245		1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			3	Mn%			0.943		1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			4	Si%			0.18		1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			5	S%			0.003		1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
			6	P%			0.013		1 Sample from Each Lot	Each Coil / Lot	RM TC / Inhouse chemical composition check (Test report -Raw Material (F-LAB-011))	–	**QA (inspector)**	If Not OK, Then Reject/Resend to Supplier/Reorder
20	Cold Forging	Forging Machine (HN-16) (Plant-2)	A	**Visual**										
			1	Surface Defects like Dent,Burr,crack,damage etc.			Should be free from Surface Defects like Dent,Burr,crack,damage etc.	Visual Inspection	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report (F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			B	**Dimensional**										
			1	Head diameter			AS PER COLD FORGING PROCESS SHEET	Vernier caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			2	Head thickness				Vernier caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			3	Radius				Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			4	Shank diameter				Micrometer	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection

Control Plan

FORMAT NO:	F-ENGG-007
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Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe

Supplier: METAFORGE ENGINEERING (I) PVT. LTD.

Key Contact: Mr. Sagar Thete / 7887860352

Supplier Code: -

Mod No.: XA_6.12.2023

Customer Name :- **Endurance Technologies Ltd. K-226/2**

CP Date: 15.02.2024

CP Rev. No': -

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS			CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING		CONTROL METHOD	RESPONSIBILITY		REACTION PLAN
			NO.	PRODUCT	PROCESS				SAMPLE SIZE	FREQUENCY		MFG	QA	
20	Cold Forging	Forging Machine (HN-16) (Plant-2)	5	Total length			AS PER COLD FORGING PROCESS SHEET	Vernier caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			6	Hex A/F				Gauge	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			7	Hex depth				Gauge / vernier caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			8	Perpendicularity				Dial Gauge	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			9	Concentricity				Dial Gauge	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			C		**Setup**									
			13		Roller Pressure		0.1 - 0.4 Mpa	Pressure Gauge	Once	Daily / Each Set Up	Setup Approval Report/PM Checksheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			14		Hydraulic Cylinder Pressure		0.1 - 0.4 Mpa	Pressure Gauge	Once	Daily / Each Set Up	Setup Approval Report	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			15		Lubrication Oil Pressure		0.05 - 0.5 Mpa	Pressure Gauge	Once	Daily / Each Set Up	Setup Approval Report	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			16		Pnuematic Pressure		0.5 - 0.7 Mpa	Pressure Gauge	Once	Daily / Each Set Up	Setup Approval Report/PM Checksheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			17		Die & Punch		No Wear & Tear	Visually/Die History Card	Once	Daily / Each Set Up	Die History Card	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			18		Length of Cutting Speed (Feed)		As Per Machine Model (mm)	Output Product	Once	Daily / Each Set Up	Setup Approval Report	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			As Per forging machine control plan -(F-QA-025)											
30	CNC Machining (Head Surface Facing , Turnning & Grooving)	CNC M/c	**A**	**Visual**										
			1	Surface Defects like Burr,Dent,crack,damage			Should be Free from Surface Defects like Burr,Dent,crack,damage	Visual Inspection	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			B	**Dimensional**										
			1	Head diameter			16.25/16.75	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			2	Chamfer			0.20x45°	Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			3	Head thickness			1.90/2.10	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			4	Dmension			1.40/1.60	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection

Control Plan

FORMAT NO:	F-ENGG-007
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Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Key Contact: Mr. Sagar Thete / 7887860352

CP Date: 15.02.2024

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O

Supplier Code: -

CP Rev. No': -

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe

Mod No.: XA_6.12.2023

Supplier: METAFORGE ENGINEERING (I) PVT. LTD.

Customer Name :- **Endurance Technologies Ltd. K-226/2**

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS			CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING		CONTROL METHOD	RESPONSIBILITY		REACTION PLAN
			NO.	PRODUCT	PROCESS				SAMPLE SIZE	FREQUENCY		MFG	QA	
30	CNC Machining (Head Surface Facing , Turnning & Grooving)	CNC M/c	5	Total length			21.70/22.30	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			6	Hole diameter 1			6.75/6.85	Standard Pin	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			7	Hole depth 1			12.40/12.60	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			8	Diameter			11.80/11.95	Vernier caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			9	Perpendicularity			0.05	Dial Gauge	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			10	Angle			31°	Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			C		**Setup**									
			1		Motor RPM		1440 RPM	Tachometer	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			2		V - Belt		Proper Tensioning/ No Slack Wear	Visually / Physically	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			4		Bed / Slide Movement		Sufficient lubrication for proper sliding and vibration free movement.	Visually / Physically	Once	Daily / Each Set Up	PM Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			5		Tool & Die Holder		Bolts Tightened/ Sharpening of Tool after every 500 pcs.	Tool History Card	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
40	CNC Machining Set up 2 (End Facing, Chamfering, Drilling & ID chamfer)	CNC M/c	**A**	**Visual**										
			1	Surface Defects like Burr,Dent,crack,damage			Should be Free from Surface Defects like Burr,Dent,crack,damage	Visual Inspection	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			B	**Dimensional**										
			1	Drill Diameter			5.90-6.00	Standard Pin	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			2	Chamfer			0.3/0.5x45°	Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			3	Drill Depth			8.90-9.10	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			4	Angle			140°	Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			5	Chamfer			0.50x45°	Profile Projector	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			6	Total Length			21.70-22.30	Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			C		**Setup**									
			1		Motor RPM		1440 RPM	Tachometer	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			2		V - Belt		Proper Tensioning/ No Slack Wear	Visually / Physically	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			4		Bed / Slide Movement		Sufficient lubrication for proper sliding and vibration free movement.	Visually / Physically	Once	Daily / Each Set Up	PM Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			5		Tool & Die Holder		Bolts Tightened/ Sharpening of Tool after every 500 pcs.	Tool History Card	Once	Daily / Each Set Up	Setup Approval Report F-QA-072 / JH Check sheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection

Control Plan

FORMAT NO:	F-ENGG-007
REV NO	0
DATE:	28.06.2015

Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Key Contact: Mr. Sagar Thete / 7887860352 **CP Date:** 15.02.2024

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O **Supplier Code:** - **CP Rev. No':** -

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe **Mod No.:** XA_6.12.2023

Supplier: METAFORGE ENGINEERING (I) PVT. LTD. **Customer Name :-** **Endurance Technologies Ltd. K-226/2**

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS NO.	CHARACTERISTICS PRODUCT	CHARACTERISTICS PROCESS	CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING SAMPLE SIZE	SAMPLING FREQUENCY	CONTROL METHOD	RESPONSIBILITY MFG	RESPONSIBILITY QA	REACTION PLAN
50	Punching	Punch M/c	A	**Visual**										
			1	Surface Defects like Burr,Dent,crack,damage			Should be Free from Surface Defects like Burr,Dent,crack,damage	Visual Inspection	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			B	**Dimensional**										
			1	Hex A/F			6.02-6.14	Gauge	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
			2	Hex Depth			8.00-9.00	Gauge / Vernier Caliper	5 Nos	**Operator:** 5 Nos/Hr. **Inprocess QA Inspector:** 5 Nos/4 Hrs.	First 5 Pcs Inspection / Inprocess Inspection Report QA/R02/	–	**QA (inspector)**	If Not OK, Then Reject/Resetting/Reinspection
60	Hardening & Tempering (Heat Treatment)	Furnace (HT-02) (Plant-2)	A	**Visual**										
			1	Surface Defects like Finish, Burr, Scratches, Sharp Edges Cracks, Dents, Damage etc.			Should be Free from Burr, Burr, Scratches, Sharp Edges Cracks, Dents, Damage etc.	Visual Inspection	5 Nos	**Operator:** 3 Nos/Batch **Inprocess QA Inspector:** 3 Nos/Lot	HT Process Validation Report F-HT-022 / HT Register/	–	**QA (inspector)**	If Not OK, Then Reject/Rework/Sort/Resetting/Reinspection
			B	**Dimensional**										
			1	Hardness			22-28 HRC	Hardness Tester	5 Nos	**Operator:** 5 Nos/Batch **Inprocess QA Inspector:** 5 Nos/Lot	HT Process Validation Report F-HT-022 / HT Register/	–	**QA (inspector)**	If Not OK, Then Reject/Rework/Resetting/Reinspection
			C		**Setup**									
			1		Hardening		860°±10°C 2700 / 3600 Sec	Temperature Indicator/Speed indicator	Once	Daily / Each Set Up	Setup Approval Report/PM Checksheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			2		Quenching		40°-80°C Max 600 Sec	Temperature Indicator/Speed indicator	Once	Daily / Each Set Up	Setup Approval Report/PM Checksheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			3		Tempering		480° ±10°C 4800 / 5280 Sec	Temperature Indicator/Speed indicator	Once	Daily / Each Set Up	Setup Approval Report/PM Checksheet	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
			4		Total cycle Time		9480 Sec	Temperature Indicator/Speed indicator	Once	Daily / Each Set Up	Setup Approval Report/Tool History Card	–	**Machine operator**	If Not OK, Then Resetting/Reinspection
70	Surface Treatment-Alkaline Zinc Bright Passivation	Plating Tank	A	**Visual**										
			1	Surface Defects like Finish, Poor Plating, Shade Variation, Scratches, Sharp Edges etc.			Should be Free from Finish, Poor Plating, Shade Variation, Scratches, Sharp Edges etc.	Visual Inspection	3 Nos Per Lot	Each Lot	Proper Material Handling	–	**QA (inspector)**	If Not OK, Then Reject/Rework/Sort/Resetting/Reinspection
			B	**Dimensional**										
			1	Surface treatment			Alkaline Zinc Bright Passivation	Visually	3 Nos Per Lot	Each Lot	Identification Tag / Challan Attached with Material (AS Per cp-F-QA-25)	–	**QA (inspector)**	If Not OK, Then Reject/Rework/Sort/Resetting/Reinspection
			2	Surface Treatment			8 Micron	Surface treatment Thickness Tester	3 Nos Per Lot	Each Lot	Identification Tag / Challan Attached with Material (AS Per cp-F-QA-25)	–	**QA (inspector)**	If Not OK, Then Reject/Rework/Sort/Resetting/Reinspection

As Per Plating control plan F-QA-025

Control Plan

FORMAT NO:	F-ENGG-007
REV NO	0
DATE:	28.06.2015

Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Key Contact: Mr. Sagar Thete / 7887860352 **CP Date:** 15.02.2024

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O **Supplier Code:** - **CP Rev. No':** -

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe **Mod No.:** XA_6.12.2023

Supplier: METAFORGE ENGINEERING (I) PVT. LTD. **Customer Name :-** **Endurance Technologies Ltd. K-226/2**

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS			CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING		CONTROL METHOD	RESPONSIBILITY		REACTION PLAN
			NO.	PRODUCT	PROCESS				SAMPLE SIZE	FREQUENCY		MFG	QA	
80	Final Inspection		A	Visual										
			1	Surface Defects like Finish, Burr, Scratches, Sharp Edges etc.			No Burr, Scratches, Sharp Edges etc.	Visual Inspection	As per Sampling Plan	Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			B	Dimensional										
			1	Material			15B25	RMTC	1 No's	One no's per batch	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			2	Heat Treatment			22-28 HRC	Hardness tester	As per Sampling Control Plan	Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			3	Surface Treatment			Alkaline Zinc Bright Passivation	Plating Tester		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			4	A\F			6.02-6.14	Vernier caliper		As per sst plan-S-QAD-015	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			5	Collar diameter			16.25-16.75	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			6	chamfer			0.5x45°	Profile Projector		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			7	Collar Thickness			2	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			8	Radius			1.5	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			9	Tapping Length			10.00min	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			10	Drill Depth			12.5	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			11	Chamfer			0.5x45°	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			12	Surface roughness Value			3.2	Surface Roughness Testor		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			13	Shank Diameter			11.80-11.95	Micrometer		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			14	Angle			(140°)	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			15	Concentricity			0.2	Dial Gauge		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			16	Chamfer			0.3-0.5x45°	Profile Projector		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			17	total Length			21.70-22.30	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			18	Dimension			8.00-9.00	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			19	Angle			(31°)	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			20	Dimension			3.80-4.20	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection

Control Plan

FORMAT NO:	F-ENGG-007
REV NO	0
DATE:	28.06.2015

Prototype: Pre-Launch: Production:

Control Plan Number CP- _

Part Name / Number LOCK NUT N-TORQ/B2RZ01126O

Core Team Vijay Aher, Ganesh Dhikale, Adarsh Aher, Mayur Ramkishor, Ravindersingh Pabala, Vasant Valve, Mahesh Jadhav, Sagar Thete, Mahesh Sonawane, Nilesh Kedare, Santosh Tuplondhe

Supplier: METAFORGE ENGINEERING (I) PVT. LTD.

Key Contact: Mr. Sagar Thete / 7887860352

Supplier Code: -

Mod No.: XA_6.12.2023

Customer Name :- **Endurance Technologies Ltd. K-226/2**

CP Date: 15.02.2024

CP Rev. No': -

OPN. NO	PROCESS / OPERATION / DESCRIPTION	MACHINE / MACHINE NO.	CHARACTERISTICS			CC	PRODUCT / PROCESS SPECIFICATION (WITH TOLERANCE)	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLING		CONTROL METHOD	RESPONSIBILITY		REACTION PLAN
			NO.	PRODUCT	PROCESS				SAMPLE SIZE	FREQUENCY		MFG	QA	
80	Final Inspection		21	chamfer			0.2x45°	Profile Projector	As per Sampling Control Plan	Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			22	Perpendicularity			0.05	Dial Gauge		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			23	Diameter			5..00	Vernier caliper		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			21	Tap Size			8x1.25-6H	T R G		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			22	Dimension			0.2	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			23	Groove Width			1.5	Accura		Each Lot	PDI Report	_	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
90	Packing, Labelling & Dispatch	Heat Sealing Machine, Printers & Weighing Equipment's	A	Visual										
			1	Surface Defects like Finish, Shade Variation, Burr, Scratches, Sharp Edges, Mix-up, Dents etc.			Should be Free from Burr, Shade Variation, Burr, Scratches, Sharp Edges, Mix-up, Dents etc.	Visual Inspection	100%	Each Lot	Visual Inspection & Sorting Machine	_	Dispatch inspector	If Not OK, Then Reject/Sort/Reinspection
			2	Packed Qty. / Weight			As per Mentioned on Stickers	Weighing Scales/Barcode Scanner/Auto-Data Entry System	100%	Each Polythene Bag	Weighing Scales/Barcode Scanner/Auto-Data Entry System	_	Dispatch inspector	If Not OK, Then Reject/Sort/Reinspection
100	TRANSPORTATION		1	Dent, Damage & Handling			Should be Free from Dents & Damage	Visually	As per Sampling Plan	Each Lot	Proper Handling/Trays Or Bins Used	_	_	If Not OK, Then Reject/Sort/Reinspection

PREPARED BY
Nilesh Kedare
(Development Engineer)

APPROVED BY
Mr.Sagar Thete
(Development Head)

DATE	REV	ALTERATION	CHANGE BY	APPROVED BY

Note: Critical Characteristics are shown by

Statistical Process Control Study

Format No.	F/QA/019
Rev No:	0
Date:	11-06-2014

PART NAME:	LOCK NUT N-TORQ			INSTRUMENT:	Vernier Caliper			L.COUNT:	0.01 MM		SUPPLIER Name	METAFORGE ENGINEERING (INDIA) PVT.LTD					
PART NO.:	B2RZ01126O			SPECIFIC:	17.50-18.00			MACHINE:	Forging M/c		DATE	15.02.2024					
SAMPLE SIZE:	50			OPERATION:	Forging			NO.OF DECIMALS:	2		Character	Head Diameter					

DATA COLLECTION: -

SNO.	1	2	3	4	5	6	7	8	9	10	U.T.L.	18.00
1	17.59	17.56	17.56	17.59	17.56	17.59	17.56	17.59	17.56	17.60		
2	17.59	17.58	17.59	17.59	17.58	17.56	17.59	17.56	17.58	17.56		
3	17.59	17.59	17.58	17.56	17.59	17.59	17.58	17.59	17.59	17.59	L.T.L.	17.50
4	17.58	17.60	17.56	17.60	17.60	17.58	17.56	17.58	17.60	17.58		
5	17.60	17.58	17.58	17.59	17.55	17.59	17.58	17.55	17.55	17.55		

CALCULATIONS: -

FOR HISTOGRAM

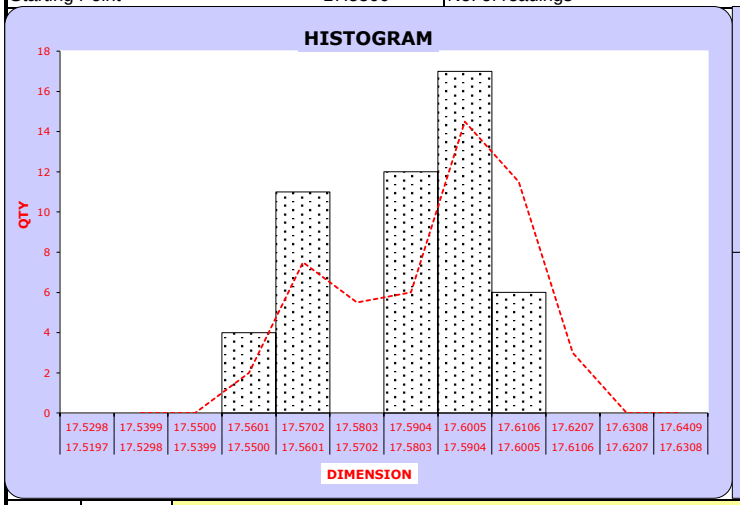
X_{LARGE}	17.6000	17.6000	17.5900	17.6000	17.6000	17.5900	17.5900	17.5900	17.6000	17.6000	Xmax.=	17.6000
X_{SMALL}	17.5800	17.5600	17.5600	17.5600	17.5500	17.5600	17.5600	17.5500	17.5500	17.5500	Xmin.=	17.5500
RANGE	0.0200	0.0400	0.0300	0.0400	0.0500	0.0300	0.0300	0.0400	0.0500	0.0500	R - BAR =	0.03800
AVG.	17.5900	17.5820	17.5740	17.5860	17.5760	17.5820	17.5740	17.5740	17.5760	17.5760	X - BAR =	17.5790

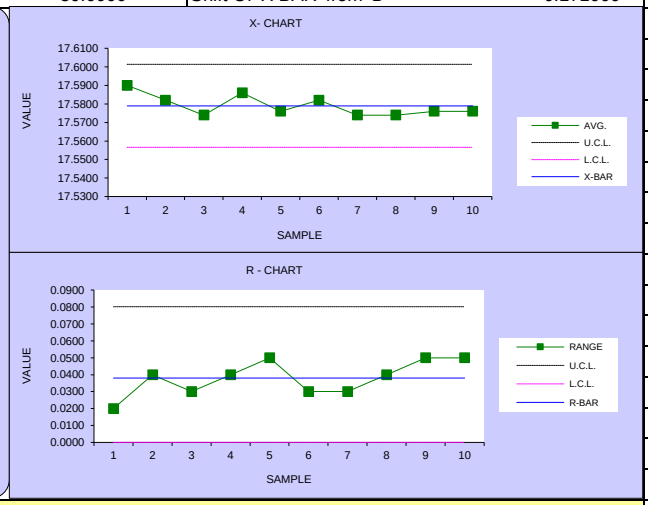
NO.OF NON CONFORMING PART = 0 NOS.

NO. OF PARTS ABOVE U.T.L. = 0 NOS.

NO. OF PARTS BELOW L.T.L. = 0 NOS.

Process Width (P) =	0.0501	Specification Width(S) =	0.5000	Index (K)={2 x (D-XBAR) / S}=	0.6840
Design Centre (D) =	17.7500	Interval =	0.010100	Selecting no. of classes =	5
Starting Point =	17.5500	No. of readings=	50.0000	Shift Of 'X-BAR' from 'D' =	0.171000





INTERVAL		FREQ.	CU. FREQ.
17.5197	17.5298	0	0
17.5298	17.5399	0	0
17.5399	17.5500	0	0
17.5500	17.5601	4	4
17.5601	17.5702	11	15
17.5702	17.5803	0	15
17.5803	17.5904	12	27
17.5904	17.6005	17	44
17.6005	17.6106	6	50
17.6106	17.6207	0	50
17.6207	17.6308	0	50
17.6308	17.6409	0	50

$U.C.L._{XBAR}$ =	17.60142
$L.C.L._{XBAR}$ =	17.55658
$U.C.L._{RBAR}$ =	0.08018
$L.C.L._{RBAR}$ =	0
Std.Dev."s"=	0.01568
Cp=(S/6s)=	5.31410
Cpk=Min(Cpu,Cpl)=	1.67923

Result	PROCESS IS EXCELLENT

Nilesh Kedare (Dev Engg)	Sagar Thete (Dev Head)
Prepared By	Approved by

GAUGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET

Format No.	F/QA/014
Rev No:	0
Date:	11-06-2014

Part Number	Gage Name	Appraiser A
B2RZ01126O	Digital Vernier Caliper	Mr. Akshay Bhandare
Part Name	**Gage Number**	**Appraiser B**
LOCK NUT N-TORQ	DGVC-55	Mr. Sandeep Ahirrao
Characteristic / **Specification**	**Gage Type**	**Appraiser C**
Head Thickness 2.10 2.40	Variable	Mr.Nilesh Kedare

Characteristic Classification	Trials	Parts	Appraisers	Date Performed
2.10-2.40	3	10	3	15.02.2024

APPRAISER/ TRIAL #		OPERATOR:- 1	2	3	4	5	6	7	8	9	10	AVERAGE
1. A	1	2.25	2.29	2.27	2.25	2.29	2.30	2.27	2.29	2.32	2.36	2.289
2.	2	2.26	2.28	2.27	2.25	2.28	2.31	2.26	2.28	2.33	2.37	2.289
3.	3	2.25	2.29	2.27	2.25	2.29	2.31	2.26	2.29	2.32	2.37	2.290
4.	AVE	2.25	2.29	2.27	2.25	2.29	2.31	2.26	2.29	2.32	2.37	X_a= 2.289
5.	R	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	r_a= 0.008
		OPERATOR:-										
6. B	1	2.26	2.28	2.27	2.25	2.28	2.31	2.26	2.28	2.32	2.37	2.288
7.	2	2.26	2.28	2.27	2.25	2.28	2.30	2.27	2.28	2.33	2.36	2.288
8.	3	2.26	2.28	2.27	2.26	2.29	2.31	2.27	2.29	2.33	2.37	2.293
9.	AVE	2.26	2.28	2.27	2.25	2.28	2.31	2.27	2.28	2.33	2.37	X_b= 2.290
10.	R	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	r_b= 0.007
		OPERATOR:-										
11. C	1	2.25	2.28	2.27	2.26	2.29	2.31	2.27	2.29	2.31	2.37	2.290
12.	2	2.25	2.28	2.27	2.25	2.29	2.30	2.27	2.29	2.30	2.37	2.287
13.	3	2.26	2.28	2.27	2.25	2.29	2.31	2.28	2.28	2.31	2.36	2.289
14.	AVE	2.25	2.28	2.27	2.25	2.29	2.31	2.27	2.29	2.31	2.37	X_c= 2.289
15.	R	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	r_c= 0.007
16. PART AVERAGE		2.26	2.28	2.27	2.25	2.29	2.31	2.27	2.29	2.32	2.37	X= 2.289 R_p= 0.114
17.		$(r_a + r_b + r_c) / (\#\ OF\ APPRAISERS=3)$ =										R= 0.007
18.		x_{DIFF} = (Max X - Min X) =										X_{DIFF}= 0.001
19.		* $UCL_R = \bar{R} \times D_4$ =										UCL_R= 0.019

* D_4 =3.27 for 2 trials and 2.58 for 3 trials. UCL_R represents the limit of individual R's. Circle those that are beyond this limit. Identify the cause and correct. Repeat these readings using the same appraiser and unit as originally used or discard values and re-average and recompute R and the limiting value from the remaining observations.

Notes:

Nilesh Kedare (Dev Engg)
Prepared By

GAUGE REPEATABILITY AND REPRODUCIBILITY DATA SHEET

Part Number	Gage Name	Appraiser A
B2RZ01126O	Digital Vernier Caliper	Mr. Akshay Bhandare
Part Name	**Gage Number**	**Appraiser B**
LOCK NUT N-TORQ	DGVC-55	Mr. Sandeep Ahirrao
Characteristic	**Gage Type**	**Appraiser C**
Head Thickness	Variable	Mr.Nilesh Kedare

Characteristic Classification	Trials	Parts	Appraisers	Date Performed
2.10-2.40	3	10	3	15.02.2024

Measurement Unit Analysis

Repeatability - Equipment Variation (EV)

EV = $R \times K_1$
= 0.007 x 0.5908
= 0.004

Trials	K1
2	0.8862
3	0.5908

Reproducibility - Appraiser Variation (AV)

AV = $\{(X_{DIFF} \times K_2)^2 - (EV^2/nr)\}^{1/2}$
= {(0.001 x 0.5231)^2 - (0.004 ^2/(10 x 3))}^1/2
= 0.000

n = parts r = trials

Appraisers	2	3
K_2	0.7071	0.5231

Repeatability & Reproducibility (GRR)

GRR = $\{(EV^2 + AV^2)\}^{1/2}$
= {(0.004^2 + 0.000^2)}^1/2
= 0.004

Parts	K_3
2	0.7071
3	0.5231
4	0.4467
5	0.4030
6	0.3742
7	0.3534
8	0.3375
9	0.3249
10	0.3146

Part Variation (PV)

PV = $R_P \times K_3$
= 0.114 x 0.3146
= 0.036

Tolerance (Tol)

Tol = Upper - Lower / 6
= (2.4 - 2.1) / 6
= 0.050

% Tolerance (Tol)

% EV = 100 (EV/Tol)
= 100(0.004/0.050)
= 8.67

% AV = 100 (AV/Tol)
= 100(0.000/0.050)
= 0.00

% GRR = 100 (GRR/Tol)
= 100(0.004/0.050)
= 8.67
Gage system O.K

% PV = 100 (PV/Tol)
= 100(0.036/0.050)
= 72.01

ndc = 1.41(PV/GRR)
= 1.41(0.036/0.004)
= 11
Gage discrimination acceptable

For information on the theory and constants used in the form see *MSA Reference Manual* , Fourth edition.

Sagar Thete (Dev Head)
Approved By

Metaforge Engineering (I) Pvt. Ltd. Nasik Dindori Road, Mhasrul, Nasik - 4 Telephone - (0253) 2530505, 2530506 Fax - (0253) 2531585, 2530013 Email dev@metaforgeindia.com	**SAMPLE INSPECTION REPORT**	Format No - F-QMS-05 DATE - 22/12/2017 Rev - 00

CUSTOMER - ENDURANCE TECHNOLGIES LIMITED (BRAKING DIVISION)

ITEM NAME	LOCK NUT	SAMPLE QTY	05 NOS	CH NO.	
PART NUMBER	B2RZ011260	SAMPLE DATE	02.01.2024	DATE.	02.01.2024
MOD NO	XA			QTY	05 Nos

VISUAL INSPECTION

Sr.No.	Drawing Specification	Instrument	Observation on Sample					Remark
			1	2	3	4	5	
1	Burr, Rust, Dust, Damages etc.	Visually	Material is free from Visual Defects					OK
2	Surface Finish =	Visually	Material is free from Visual Defects					OK

FUNCTIONAL CHECK (IF ANY)

Sr.No.	Drawing Specification	Instrument	Observation on Sample					
			1	2	3	4	5	
1	Material & Size= SAE 15B25 OR EQU. OR PROPERTY CLASS 8 (ISO-898-2)	RMTC	Used (SAE 15B25) Material & Attached RMTC					OK
2	Heat Treatment = 20-30 HRC	Hardness Tester	Attached TC					OK
3	Surface Treatment = MFZn2-B (WHITE PASSIVATION) AS PER HES D 2003-17	Plating Test Certificate	Attached TC					OK

DIMENSIONAL INSPECTION

Sr.no	Drawing Parameters	Specification	Instrument	Observation on Sample					Remark
				1	2	3	4	5	
4	A/F	6.02-6.14	Vernier	6.11	6.10	6.14	6.12	6.12	OK
5	Collar Diameter	16.25-16.75	Vernier	16.46	16.44	16.47	15.40	16.42	OK
6	Chamfer	0.5X45°	Visual	OK	OK	OK	OK	OK	OK
7	Collar Thickness	2.00	Acura	2.13	2.11	2.12	2.13	2.11	OK
8	Radius	1.50	Acura	1.84	1.86	1.84	1.85	1.84	OK
9	Tapping Length	10.00 Min	Vernier	10.60	10.61	10.64	10.61	10.59	OK
10	Drill Depth	(12.5)	Vernier	12.68	12.71	12.68	12.66	12.68	Ref. Dimn
11	Chamfer	0.5X45°	Acura	0.728X45°32'	0.819X44°30'	0.774X45°14'	0.734X45°19'	0.781X44°51'	OK
12	Surface Roughness Value	3.20	Surface Roughness Testor	1.141	1.237	1.117	1.259	1.228	OK
13	Shank Diameter	11.80-11.95	Micrometer	11.864	11.867	11.854	11.864	11.863	OK
14	Angle	(140°)	Acura	Unable to measure properly					Ref. Dimn
15	Concentricity	0.20	Dial gauge	0.15	0.13	0.14	0.16	0.15	OK
16	Chamfer	0.3-0.5 X45°	Visual	OK	OK	OK	OK	OK	OK
17	Total Length	21.70-22.30	Vernier	21.94	21.96	22.01	22.10	21.94	OK
18	Dimension	8.00-9.00	Vernier	8.16	8.12	8.18	8.17	8.14	OK
19	Angle	(31°)	Acura	Unable to measure properly					Ref. Dimn
20	Dimension	3.80-4.20	Acura	3.941	3.928	3.942	3.897	3.938	OK
21	Chamfer	0.2X45°	Visual	OK	OK	OK	OK	OK	OK
22	Perpendicularity	0.05	Dial Gauge	OK to Perpendicularity Gauge					OK
23	Diameter	(5.00)	Vernier	Unable to measure properly					Ref. Dimn
24	Tap Size	M8x1.25-6H	TPG	Ok	Ok	Ok	Ok	Ok	OK
25	Dimension	0.20	Acura	0.211	979.000	0.208	0.199	0.212	OK
26	Groove Width	1.50	Acura	1.414	1.109	1.398	1.443	1.391	OK

NOTE :-

Prepared By QA Er.	Verify By Devlopment Er.	Approved By Devlopment Head	Approved By QA Head

VIDUSHI WIRES PVT. LTD.
An ISO 9001:2015 Company

Factory : C/6 & C6/1, Additional Ambernath, M. I. D. C., Anand Nagar, Ambernath, Maharashtra - 421 506. Ph.: (0251) 2620515 / 2620469

QUALITY ASSURANCE TEST CERTIFICATE- FAO03

To	**METAFORGE ENGG. (INDIA) PVT.LTD.** S.NO.22/3 NASIK -DINDORI RD MHASRUL NASIK-422004 LBT NO.NSK 401811.	T.C. No.	**4551**	Date 27-Feb-23
		Inv. No.	0 01/1432	Date 27-Feb-23
		No Of Coils	6	Weight In Kgs. 6100

We hereby certify that the material described below fully confirms to your requirment

Type of Wire / Grade 15B25 PPD — Batch No. 0

Order Size (mm) 11.65 — Heat No. F10753

Source

CHEMICAL COMPOSITION :-

%C	%Mn	%Si	%P	%S	%Ni	%Cr	%Cu	B(Ppm)	%AL	%V	%Mo	%Pb	%Ti	%Ca	N2 (Ppm)
0.245	0.943	0.180	0.013	0.003	0.021	0.165	0.015	17	0.035	0.002	0.005	0.001	0.038	16	68

MECHANICAL & METALLURGICAL PROPERTIES

Property	Initial Dia. (mm)	UTS Kgf / mm2	% RA	Micro Structure	Spherodization	Hardness	Upset Test	Grain Size	Decarb (μ)
Specified Value	11.60/65								
Observed Value	11.65	61.89	66.58	HR	--	--	OK	7-8	70-80

INCLUSION RATING AS PER ASTM E - 45A :-

A		B		C		D	
T	H	T	H	T	H	T	H
1.0	-	-	-	-	-	0.50	-

Oil/Quench/Hardness 40-42 HRC

For Vidushi Wires Pvt. Ltd.

(Q.A. Dept)

230228J523- 528.

JSW STEEL LIMITED - SALEM WORKS

Works: pottaneri Village, Mecheri Post - 636 453, salem, india
Registered Office: "JSW CENTRE", Bandra Kurla Complex, Bandra (East), Mumbai - 400 051

Ch: QA / 54

TEST CERTIFICATE

Certificate No. : 504042	Date : 28.01.2023	Po Number: JSW/WZ/VWPL/2022-23/
Customer Name: Vidushi Wires Pvt Ltd	SO No : 401706862	Po date :10.12.2022
Cust. Address : C6 & C6/1 ADDL.AMBERNATH M.I.D.C.	SO Date : 18.11.2022	Packing Slip No :712841717
THANE,Maharashtra-421506,India	Truck No.: TN52J7738	Invoice No :22SL3300067065

Heat No	Grade	Size (mm)	Length (mm)	M/L (mm)	No. of Bundles	No. of PCS	Weight	Billet/Bloom Size
F10753	15B25	12.00 mm DIA			10	10	13.740 MT	160mm_160mm

TDC NO : STD_15B25_SPEC

Process Route : BF_EOF_LRF_VD_CCM_EMS_BRM

Reduction Ratio : / - 226.47 : 1

CHEMICAL ANALYSIS

Prod STD No : QDQA06_387

Element	C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	B ppm	V%	Cu%	Pb%	Sn%	Ti%	Nb%	Zr%	As%	Sb%	Al%	Ca ppm	CE%
MIN	0.2300	0.100	0.800						5												
MAX	0.2900	0.300	1.100	0.040	0.0500	0.200			30					0.0500					0.0500		
Actual	0.245	0.180	0.943	0.013	0.003	0.165	0.005	0.021	17	0.002	0.015	0.001	0.002	0.0380	0.002	0.002	0.002	0.002	0.035	16	0.439

Gas Levels : N ppm : [/] -68 O ppm : [/] -10.7 H ppm : [/] -1.46

MECHANICAL PROPERTIES :

	Tensile Test ( )				Hardness Test			Impact Test ( )					
Cond.								Spec.					
Spec.	YS	UTS	Elong.	RA	As Rolled	As Quenched	As Q&T	Test Temp	Imp. Value (min)	1	2	3	Avg.
		Kgf/mm²	%	%		HRC							
Min													
Max													
Actual		57.770		66.060		45.00							

Edge / Corner Radius (mm) : Upset Type : Upsetability :

JOMINY HARDENABILITY ( )

Ideal Diameter (DI) : [/] -

Distance																				
MIN (HRC)																				
MAX (HRC)																				
Actual(HRC)																				

METALLURGICAL PROPERTIES & PHYSICAL INSPECTION

	Surface Inspection	Step Down Test	BFT Test	MPI Test	Segregation Test	Spark Test	Spectra Test	Met. scope Test
Actual	OK					100 % OK	100 % OK	100% OK
	Macro Etch Test	Micro Structure	CN	CZ Looser	CZ Closer	GBC Level	DEG. SPH	Distortion
Spec			/	/	/			
Actual	C1R1S1	Ferrite - Pearlite						

	Grain Size	Decarb (mm)	Banding (µm)	A		B		C		D		DOS µm	Ultrasonic Test
				Thin	Thick	Thin	Thick	Thin	Thick	Thin	Thick		
Spec	/	/	/										
Actual	7.00	0.090 mm		0.00	0.00	1.00	0.00	0.00	0.00	0.50	0.00		

Inclusion Rating Test Standard: ASTM E45 - 18A
Macro Etch Test Standard: ASTM E381 - 2020

Grain Size Standard: ASTM E112 - 21
Banding Test Standard:

Decarb Standard: SAE J419_201801
UT Standard:

JSW COLOR CODE :

CUSTOMER COLOR CODE :

INSPECTION CERTIFICATE 3.1 ACCORDING TO EN 10204 : 2004

Supply Condition : AS ROLLED

Remarks :

Reference : WE HERE BY CERTIFY THAT THE MATERIAL SHIPPED UNDER THIS TEST CERTIFICATE DID NOT COME IN CONTACT WITH ANY MERCURY, CADMIUM HEXAVALENT CHROMIUM CONTAINING DEVICES, FREE FROM RADIOACTIVE CONTAMINATION. EMPLOYING A SINGLE BOUNDARY OF CONTAINMENT DURING THE MANUFACTURING PROCESS,TESTS, INSPECTION AND STORAGE.

WE CERTIFY THAT CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND MEET THE REQUIREMENTS OF THE PURCHASE ORDER,TECHNICAL DELIVERY CONDITION, GENERAL STEEL REQUIREMENTS AND THE MATERIAL CERTIFICATION REQUIREMENTS.

NOTE:
1. THE RESULTS RELATES ONLY TO THE ITEM TESTED.
2. CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF ISSUING AUTHORITY

Vidushi Wires Pvt. Ltd. Q.A. Dept.

For JSW STEEL LIMITED

02/02/23

V. Jambukeswaran - AGM(QAD)

Metaforge Engg. (I) Pvt. Ltd.

MEHTA

S. No. 22/3, Nashik-Dindori Raod, Mhasrul, Nashik - 422 004.
Ph. : (0253) 2530505, 2530506

Certificate No. : 1100 Date : 30.12.2023.

HEAT TREATMENT TEST CERTIFICATE

To, Endurance Tech. Ltd.

This is to certify that material is heat treated at our end, as per your requirement given below.

Part Name : lock Nut (CB2RZ011260).

Material : 15B25

Process Done : HT

Quantity 55 Nos/ ~~Kgs.~~

HARDNESS SCALE : HRC / ~~HRB~~ / ~~HV~~ / ~~BHN~~ - REQ: 22~28 HRC

OBSERVATION : 1) 24 2) 26 3) 25 4) 24

5) 26 6) ..... 7) ..... 8) .....

9) ..... 10) .....

Batch Date : 30 / 12 / 2023.

Shift No. I.

For **Metaforge Engg. (I) Pvt. Ltd.**

INSPECTED BY

MEHTA **METAFORGE ENGINEERING INDIA PVT LTD.**

Format No. : F-PL-24
Rev. No. : 0
Rev. Date : 12.01.2021

PLATING INSPECTION REPORT

Part Name : Lock Nut. Date : 1/1/2024.

Part Number : B2R2011260. (Fe/Zn white). Batch No. & Weight :

Customer Name : Endurance. Tech. Ltd.

Sr. No.	Parameters	Specification	Observation 1	Observation 2	Observation 3	Observation 4	Observation 5	Remarks
1	Coating Thickness	8 ~ 12 µ	8.4	8.1	8.3	8.6	8.0	ok.
2	Gauge Condition	—	—	—	—	—	—	—
3	Visual defects	Free from Black Spot, White Patches, Dull Finish, Water Mark, Peel off, Uncover area and Eieching mark	—	—	—	—	—	ok
4	Salt Spray							

☑ ACCEPTED ☐ REJECTED

Inspect by : Sumit
Date : 1/1/2024

Approved by : 01/10/24
Date :

CHECKING AIDS LIST

Format No:- F-ENGG-010
Rev. No:- 0
Date :- 28-06-2015

(For Gauges, Instruments & Testing Equipment)

Vendor Name:- METAFORGE ENGINEERING (INDIA) PVT.LTD

Vendor Code : 100049

Part Name :- LOCK NUT N-TORQ

Part No. :- B2RZ01126O

SR.NO	GUAGES NAME	Gauges/Instruments Test equipment's no.	Calibration Freq.	Least count	MSA YES/NO/NR
1	Digital Vernier Calliper	DGVC-55	6 Month	0.01	YES
2	Digital Micrometer	DGMC-56	6 Month	0.001	
3	Profile Projector	PP-01	1 Year	0.005	
4	Plating Tester	PPT-01	1 Year	_	

SIGN.(VENDOR) : _____

DATE:-06.12.2023

Part Submission Warrant

Format No:-	F-QA-013
Rev. No:-	00
Date :-	11-06-2014

Part Name	LOCK NUT	Customer Part Number	B2RZ01126O
Shown on Drawing No.	B2RZ01126O	Organization Part #	F366
Engineering Change Level	XA	Dated	06.12.2023
Additional Engineering Changes		Dated	
Safety and/or Government Regulation	☑ Yes ☑ No	Purchase Order No.	
Weight (kg)	0.0153		
Checking Aid No.	F-ENGG-010	Checking Aid Engineering Change Level	0
Dated	28.6.2015		

☑ No

ORGANIZATION MANUFACTURING INFORMATION

METAFORGE ENGINEERING (INDIA) PVT.LTD

Organization Name & Supplier/Vendor Code

Organization Name & Supplier/Vendor Code

Street Address

NASHIK | 422004 | INDIA

City | Region | Postal Code | Country

CUSTOMER SUBMITTAL INFORMATION

Endurance Technologies Ltd. K-226/2

Customer Name/Division

_

Buyer/Buyer Code

Application

MATERIALS REPORTING

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

Submitted by IMDS or other customer format:

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

REASON FOR SUBMISSION (Check at least one)

- ☑ Initial Submission
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or additional
- ☐ Correction of Discrepancy
- ☐ Tooling Inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts Produced at Additional Location
- ☐ Other - please specify below

METAFORGE ENGG. (I) PVT. LTD. NASIK

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 organization's manufacturing location.

SUBMISSION RESULTS

The results for ☑ dimensional measurements ☐ material and functional tests ☐ appearance criteria ☐ statistical process package

These results meet all drawing and specification requirements: ☐ Yes ☐ NO (If "NO" - Explanation Required)

Mold / Cavity / Production Process: Cold Forging

DECLARATION

I hereby affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 30000 / 8 hours.

I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION / COMMENTS:

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

Organization Authorized Signature		Date	29.01.2024
Print Name	Mr. Sagar Thete	Phone No.	7887860352
Fax No.	0253-2531585		
Title	Development Head	E-mail	dh@metaforgeindia.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other

Customer Signature | Date

Print Name | Customer Tracking Number (optional)

Metaforge Engineering (I) Pvt. Ltd.

Packing Procedure

Format No.:	QF/QA/82
Rev. No.:	0
Rev. Date :	15-10-2018

Product Name	LOCK NUT N-TORQ	Product No	B2RZ01126O	Model	_
Customer Name	Endurance Technologies Ltd.	Supplier Name	Metaforge Engineering (India) Pvt.Ltd	Vendor Code-100049	

Photograph of Final Packing (One Unit)

Photograph of Final Pallet/Box/Bin/Trolley

L	W	H
228.6	177.8	127

Weight (Empty)	0.0255 kg
Weight (Final)	7.6755 kg
Qty/ Package	500 pcs.

Instruction for Transporter etc:

Photos of Different phases of parts packing to be pasted here

1	2	3		Final Packaging
				
Empty Poly Bag	100 Nos in 1 Poly Bag	Empty Box	5 Poly Bag in 1 Box	500 Nos In 1 Box

Special instructions and Remarks:

Supplier Approval			Customer Approval		
Mktg / Production	Dispatch	Quality	Purchase / Sourcing	Stores	SQA/Quality