



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: STEEL BUSH

Dwg No.: 520MX00112 Rev.:F Date: 20.12.2022

Date of Submission: 26.07.2024

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

Nilesh



PPAP CHECK LIST

Format No. :- F-ENGG-006

Rev. No. :- 01

Date :- 20-12-2023

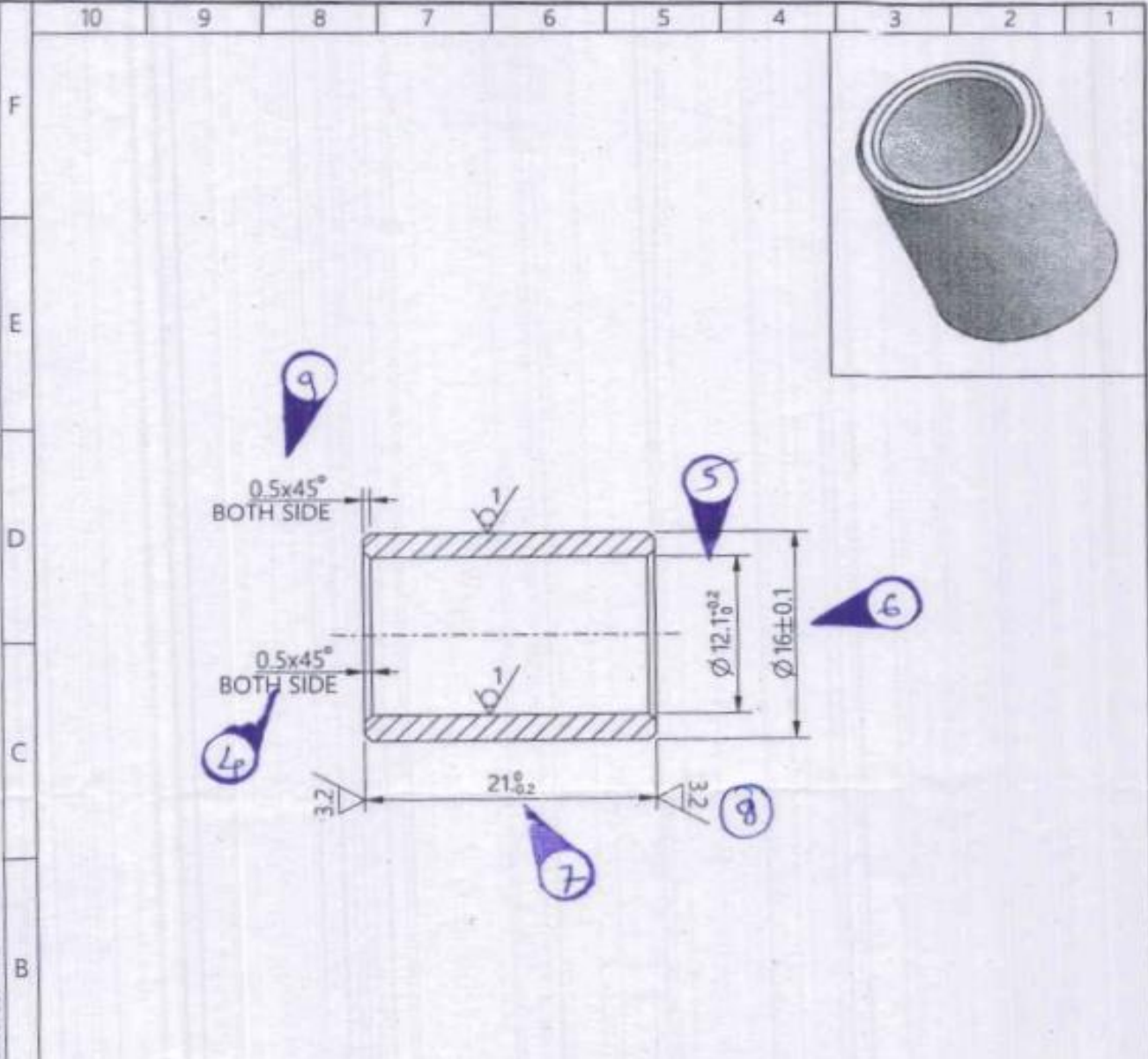
CUSTOMER: Endurance Technologies Ltd. K-226/2

PART NAME: STEEL BUSH

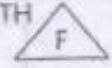
PART NO.: 520MX00112 **Rev.:** F **Date:** 20.12.2022

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

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 - ITEM CODES ENDING WITH '0' REPRESENTS DRAWINGS, CORRESPONDING PART NUMBERS WILL END WITH '00'.
 - ALL DIMENSIONS ARE IN MM.

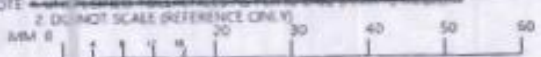


NOTE:
 1) PART TO BE FREE FROM BURR, DENTS, SHARP EDGES, SCRATCHES AND CRACKS.
 2) FINISH: Fe/Zn (WHITE) AS PER ABS00010
 3) TEAR MARK TO BE ALLOWED ON ID AT ONE SPECIFIC LOCATION WITH THE DIMENSIONS NOT EXCEEDING 0.2 mm MAX. AS IN DEPTH & WIDTH



SAFETY CHARACTERISTICS	● = 0
SIGNIFICANT CHARACTERISTICS	○ = 0

				MATERIAL SAE1010 OR CEW 1 TUBE AS DRAWN AS PER IS: 3074 WEIGHT 14.0 gm VOLUME 1785.4 mm ³ SURFACE AREA P/R OR P/LG 1974.3 mm ²		D. E. PART NO - REF. PART NO - SUPERCEDES PART NO 520MX00112 REV E		
				DESCRIPTION STEEL BUSH				
20.12.22	F	1) ALTERNATE MATERIAL ADDED 2) SR. NO. 3 ADDED IN NOTE	1874	3811	PROJECTION ANGLE 		DRG. No./PART No. 520MX00112	REV F
11.06.21	E	CHART DRAWING CONVERTED INTO INDIVIDUAL DRAWING & RE-RELEASE IN NEW ETI. FORMAT	1475	3629	DRAWN BY 	CHECKED BY 	APPROVED BY 	SCALE 2:1
DATE	REV	ALTERATION	CO	CA/CR	SHEET NO. 1 OF 1			
NOTE: 2) DO NOT SCALE (REFERENCE ONE)				SIZE A4	ENDURANCE SUSPENSION DIVISION E-92, MIDC WALUJ, AURANGABAD (M. S.)-431136, INDIA Ph: +91-240-2569625, 2569600. Fax: +91-240-2569689			





PROCESS FLOW DIAGRAM

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

MEPL Code	F523	Supplier	Metaforge Engineering (I) Pvt. Ltd., Mhasrul, Nashik
Part Number	520MX00112	Customer	Endurance Technologies Ltd. K-226/2
Part Name	STEEL BUSH	Submission Date	26.07.2024
Mod Number	F	Mod. Date	20.12.2022

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 1010)	-	-	Inhouse	p	3
20	Forging	Forging Machine	HN-52	Inhouse (Plant -2)	b	3
30	Surface Treatment - Alkaline zinc bright Passivation	Plating Tank	-	Inhouse	b	3
40	Final inspection	-	-	Inhouse	b	3
50	Packing, Labelling , Storage & Dispatch	Manually	-	Inhouse	b	3
60	Transportation	Regular Transport		Inhouse	-	-

Symbol



Inspection



Final Inspection



Operation + In process inspection



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 : 26.07.2024


 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	1
DATE	01.11.2017


Part Number	520MX00112	Process Responsibility	Mr. Sagar Thete	PFMEA No.	F523	
Part Name	STEEL BUSH	Key Date:	01.02.2022	FMEA Date :	26.07.2024	
Core Team: QA + Production + Maintenance	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	S E V E R I T Y	C L A S S	POTENTIAL CAUSES , MECHANISM OF FAILURE	O C C U R R A N C E	CURRENT PROCESS CONTROL		D E T E C T E	R P N	RECOM MENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS				
										PREVENTION	DETECTION					ACTION TAKEN	S E V	O C C U	D E C T E	R P N
10	Raw Material Inward Inspection (SAE 1010 13.80-13.85 mm)	Spectro Machine / Lab Equipment's	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 low.	6	M	1)Improper handling of material. 2)Excess material in storage area.	4	Arrange properly raw material coil.	Checking visually	2	48							
20	Forging	Forging Machine (HN-52) (Plant-2)	Diameter Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end.	6	M	1.Man:-Nil 2.Machine :-Nil 3.Method :-Setup not proper. 4.Material :-Nil 5.Tool :-Punch not ok	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 Diameter with Micrometer.	2	36							
					Customer: Not Acceptable at Customer End/Fitment Not OK															
			Length Undersize /Oversize		Next Operation: Loose or tight fitment at assembly end.	6	M	1.Man:-Nil 2.Machine :- Nil 3.Method :- i)Forging Setting not ok ii) Stopper Pin loose 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 Length with Vernier Caliper	2	36							
		Customer: Not Acceptable at Customer End/Fitment Not OK																		



POTENTIAL FAILURE MODE AND EFFECT ANALYSIS (PROCESS FMEA)

FORMAT NO	F-ENGG-009
REV NO	1
DATE	01.11.2017

Part Number		520MX00112		Process Responsibility		Mr. Sagar Thete		PFMEA No.		F523															
Part Name		STEEL BUSH		Key Date:		01.02.2022		FMEA Date :		26.07.2024															
Core Team: QA + Production + Maintenance				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	S E V E R I T Y	C L A S S	POTENTIAL CAUSES , MECHANISM OF FAILURE	O C C U R R A N C E	CURRENT PROCESS CONTROL		D E T E C T E	R P N	RECOM MENDED ACTIONS	RESP. & TARGET COMP. DATE	ACTION RESULTS									
										PREVENTION	DETECTION					ACTION TAKEN	S E V	O C C U	D E C T E	R P N					
60	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)																				DATE		REV	ALTERATION	CHANGE BY	APPROVED BY

Note: Critical Characteristics are shown by

①



Control Plan

FORMAT NO:

F-ENGG-007

REV NO

0

DATE:

28.06.2015

Prototype:

Pre-Launch:

Production:

Control Plan Number CP-

1

Key Contact: Mr. Sagar Thete / 7887860352

CP Date:

26.07.2024

Part Name / Number

520MX00112 / BUSH STEEL

Supplier Code:

-

CP Rev. No':

-

Core Team

QA + Production + Maintenance

Mod No.:

F

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		
20	Cold Forging	Cold Forging Machine (HN-52) (Plant-2)	3	Hole Diameter			As per Metaforge Process Drawing (F523) (F-ENGG-002,R_03)	Standard Pin	5 No's	Operator: 5 No's/Hr. Inprocess QA Inspector: 5 No's/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)	If Not OK, 1.inform to QA / Production supervisor 2.Hold Production. 3.Quarantine & 100% Inspection. 4.Rework or Rejection. 5.Resetting parameter & QA approve.	
			4	OD Chamfer				Profile Projector	5 No's	Inprocess QA Inspector: 5 No's/ 2 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)		
			5	ID Chamfer				Profile Projector	5 No's	Inprocess QA Inspector: 5 No's/ 2 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)		
			6	Small Line Marking at ID Chamfer				Visually	5 No's	Operator: 5 No's/Hr. Inprocess QA Inspector: 5 No's/4 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)		
			7	Surface Finish				Surface Tester	5 No's	Inprocess QA Inspector: 5 No's/ 2 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)		
			8	Surface Finish				Surface Tester	5 No's	Inprocess QA Inspector: 5 No's/ 2 Hrs.	First 5 Pcs Inspection/Inprocess Inspection Report(F-QA-024)	-	QA (inspector)		
			C		Setup										
			1		Feeder Roller Pressure	①	0.4 - 0.6 MPa	Pressure Gauge	Once	Daily /Each Setup	Setup Approval Report	-	Machine operator	If Not OK, Then Resetting/Reinspection	
			2		Pneumatic / Air Pressure	①	4.0 - 8.0 Kg/CM ²	Pressure Gauge	Once	Daily /Each Setup	Setup Approval Report	-	Machine operator	If Not OK, Then Resetting/Reinspection	
			3		Lubrication / Oil Pressure	①	0.5 - 2.0 Kg/CM ²	Pressure Gauge	Once	Daily /Each Setup	Setup Approval Report	-	Machine operator	If Not OK, Then Resetting/Reinspection	
			4		Die & Punch	①	No Damage & Scratches	Visually	Once	Daily /Each Setup	Setup Approval Report	-	Machine operator	If Not OK, Then Resetting/Reinspection	
			5		Machine Speed (Nos / Min)	①	76 (As Per Production Plan)	Output Product	Once	Daily /Each Setup	Setup Approval Report	-	Machine operator	If Not OK, Then Resetting/Reinspection	
			As Per forging machine control plan -(F-QA-025)												
30	Surface Treatment- Alkaline zinc bright passivation	Plating Tank	A	Visual			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			8-12 micron min	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-026 1-18.02.2021)															



Control Plan

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

Prototype:	Pre-Launch:	Production:	
Control Plan Number CP-	1	Key Contact: Mr. Sagar Thete / 7887860352	CP Date: 26.07.2024
Part Name / Number	520MX00112 / BUSH STEEL	Supplier Code: -	CP Rev. No': -
Core Team	QA + Production + Maintenance	Mod No.: F	
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		
40	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				SAE 1010	RMTC	1 No's	One no's per batch	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			2	Heat Treatment				Nil	Nil	As per Sampling Control Plan- Format No-F-QA-057 Rev. No.- 4 Rev. Date- 11.09.2019	Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			3	Surface Treatment				Alkaline zinc bright passivation	Visually		Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			4	Chamfer				0.5x45°	Acura		Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			5	ID				12.10-12.30	STD Pin (12.10mm)		Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			6	Diameter				15.900-16.100	Micrometer		Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
			7	Total Length				20.80-21.00	Vernier		Each Lot	PDI Report	-	QA (inspector)	If Not OK, Then Reject/Sort/Reinspection
8	Surface Finish				3.2	Surface Testor	Each Lot	PDI Report	-		QA (inspector)	If Not OK, Then Reject/Sort/Reinspection			
9	Chamfer				0.5X45°	Acura	Each Lot	PDI Report	-		QA (inspector)	If Not OK, Then Reject/Sort/Reinspection			
10	Surface Finish				1	Surface Testor	Each Lot	PDI Report	-		QA (inspector)	If Not OK, Then Reject/Sort/Reinspection			
50	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	



Control Plan

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

Control Plan Number CP-	1	Prototype:	Pre-Launch:	Production:	Key Contact: Mr. Sagar Thete / 7887860352	CP Date:	26.07.2024
Part Name / Number	520MX00112 / BUSH STEEL				Supplier Code: -	CP Rev. No': -	
Core Team	QA + Production + Maintenance				Mod No.: F		
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	
60	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

Nilesh
PREPARED BY
Nilesh Kedare
(Development Engineer)

Sagar
APPROVED BY
Mr.Sagar Thete
(Development Head)

DATE	REV	ALTERATION	CHANGE BY	APPROVED BY

Note: Critical Characteristics are shown by

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

CUSTOMER - ENDURANCE TECHNOLOGIES PVT.LTD. PANTNAGAR

ITEM NAME	STEEL BUSH	SAMPLE QTY	05 NOS	CH NO.	
PART NUMBER	520MX00112	SAMPLE DATE	07.02.2024	SIR DATE.	07.02.2024
MOD NO	F			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					Remark
			1	2	3	4	5	
1	Material & Size= SAE1010 OR CEW 1 TUBE (AS DRAWN AS PER IS:3074)	RMTC	Used (SAE 1010) & Attached RMTC					OK
2	Heat Treatment = NIL	Hardness Tester	NIL					OK
3	Surface Treatment = FeZn 8B AS PER ABS 00010	Plating Test Certificate	Attached TC					OK

DIMENSIONAL INSPECTION

Sr.no	Drawing Parameters	Specification	Instrument	Observation on Sample					Remark
				1	2	3	4	5	
4	Chamfer	0.5x45°	Acura	0.44 x 45°	0.45 x 45°19'	0.48 x 45°	0.47 x 45°12'	0.048 x 44°21'	OK
5	ID	12.10-12.30	STD Pin (12.10mm)	OK	OK	OK	OK	OK	OK
6	Diameter	15.900-16.100	Micrometer	15.957	15.986	15.957	15.952	15.958	OK
7	Total Length	20.80-21.00	Vernier	20.95	20.94	20.95	20.96	20.94	OK
8	Surface Finish	3.2	Surface Testor	Unable To Measure Properly					
9	Chamfer	0.5X45°	Acura	0.456 x 45°21'	0.504 x 46°03'	0.491 x 46°26'	0.564 x 44°	0.546 x 45	OK
10	Surface Finish	1	Surface Testor	0.997	0.943	0.712	0.745	0.612	OK

NOTE :-

 Prepared By QA Engg	 Verify By Development Engg	 Approved By Development Head	 Approved By QA Head
---	--	---	---

ZARHAK STEELS PVT. LTD.

(WIRE DIVISION)

Plot No. L-20 MIDC Industrial Area, Taleja Tal Panvel, Dist.Raigad

Navi Mumbai 410208 Maharashtra

Phone 27411905 / 27402909

Email:- wires@zarhak.com



Test Certificate

SOLD TO:

A ETAFORGE ENGG. (INDIA) PVT LTD.

S. NO.223 Nasik - Dindori Road, Wahasri, Nashik,
Maharashtra 422004

T.C. No. & Dt.: 3399 29-10-2022

Invoice No. & Dt.: LJ272 29-10-2022

Challan No. & Dt.: 10126 29-10-2022

Grade: 1010 Mill: JSW

Process: PPD No. of bundles: 4

Tot. Wt (M.Ton): 5.030

Prepared by: Omkar Pawar

Reviewed by: --

Heat No.	No. of Bundles	Coil no	Mill TC No.
B3059974	2	2779	2491874
A3050265	2	2587	2490359

Chemical Composition %

Grade	Element	C %	Mn %	Si %	P %	S %
B3059974	Steel Mill value	0.102	0.4	0.037	0.011	0.006
A3050265	Steel Mill value	0.093	0.43	0.063	0.016	0.006

Sr.No	Characteristic	Evaluation Measurement System	Cust. Specification / Acceptance level		Result	
					Sample Coil No.	Heat No.
1	RM size / Wire Rod size	Digital Micrometre	16.00	mm	16.00	mm
2	Diameter of Finish wire	(Least count 0.001 mm)	14.60/65	mm	14.64	mm
3	Finish UTS	UTM		Kgf/ sq.mm	51.02	Kgf/sq.mm
4	Hardness	Hardness tester		HRB / HRC	82	HRB
				HRB / HRC	77	HRB
5	Reduction Area %	RA gauge			67	%
6	Micro-examination	Spheroidization %	Microscope (1000X)	Min 80% At cross sectional area on sample after annealing	=	%
		Micro-Structure	Microscope (100X)	Pearlite and Ferrite	Pearlite and Ferrite	
		Decarb	Microscope (100X)	Nil	No Decarb	
7	Visual Defects	Observation based on naked eye	No Rusty, No Pit mark, No Damage		No defect	
8	Surface cracks status	Acid Dip, Cleaning, magnified surface	100% of sample dipped into acid & checked		No crack	

Note: Please refer mill tc for other than S element chemistry.

Remarks:

P. Sandhu

MANAGER OF QUALITY ASSURANCE

We hereby certify that material described herein has been manufactured and tested with satisfactory results in accordance with the requirement of the above material specification. Free from radioactive elements contamination. All material supplied by us is 100% recyclable. After life of product ends the material should be recycled.

QAD-W-05, Rev. 02, 22.12.2021



JSW STEEL LIMITED

Vijayanagar Works, PO- Vidyanagar, Village-Toranagallu, Dist: Bellary, Karnataka-583275, INDIA
Regd. Office: JSW Centre, Bandra Kurla Complex, Bandra (East), Mumbai - 400 051

IS 7887:1992



TEST CERTIFICATE FOR MILD STEEL WIRE ROD FOR GENERAL ENGINEERING PURPOSES (According to EN 10204 Type 3.1)

CM/L-6200053992

Test Certificate : WRC/22-23/0002490359

To M/S. JENIL STEEL P. LTD
31 DEVJI RATANSHI MARG BROACH
MUMBAI - 400009 Region: 13

Date : 21.09.2022
SO No./ Item : 401661011 / 90
Product : WIRE ROD COIL
PO No. : 1401720220915113951574839

It is certified that the material described below fully conforms to IS 7887:1992. Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing & Inspection contained in the BIS certification marks Licence No. CM/L-6200053992 are as indicated below against each order No. Etc.
(PLEASE REFER TO IS 7887:1992 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Specification: IS7887_1992 GRADE_4			QTY (MT)	C %	Mn %	S %	P %	Si %	Al %	N %	CE	YS (N/mm ²)	UTS (MPa)	EL %	RA %	Grain Size		
Heat No.	Coil No.	Nominal Size (MM)	Min	0.080	0.30													
		Dia	Max	0.130	0.60	0.050	0.050			0.1000								
A3053689	222WW61465	16.00	2.471	0.101	0.36	0.007	0.014	0.061	0.026	0.0056	0.167	275	365	44.00	75	8.00		
A3051614	219WW60286	16.00	2.520	0.101	0.36	0.009	0.020	0.068	0.033	0.0060	0.166	260	365	44.00	72	8.00		
A3050265	219WW69892	16.00	2.518	0.093	0.43	0.006	0.016	0.063	0.033	0.0043	0.165	270	390	46.00	72	8.00		
A3060265	219WW69686	16.00	2.523	0.093	0.43	0.006	0.016	0.063	0.033	0.0043	0.165	270	390	46.00	72	8.00		
Total Weight in Metric Tonnes			16.032	Grand Total of Coils/Pkt/Bundles/Slab			4											

This is to certify that the above mentioned product produced & supplied by JSW Steel Limited do not contain any radio active element higher than the natural level and it confirms to Standard Rolling, Dimensional & Weight tolerances. The product or packing material does not contain any hazardous substances as per RoHS norms.

Delivery ID : 712180977
Invoice No. : 7104835201
GST Invoice No : 22VJ2900267591
Mode of Transport : Truck
Vehicle No. : RJ47GA3485
LC No. :

Process Route :

BOF-ARS-LHF-CASTER

Legends: BOF = Basic Oxygen Furnace, LHF = Ladle Heating Furnace, CCM = Continuous Casting Machine,
RH = RH Degasser, BRM = Bar Rod Mill, WRM = Wire Rod Mill
Chemistry = Ladle / Tundish sample analysis; CE = [C+Mn%]. 1Mpa= 1N/mm² ;
YS= Yield Strength ; UTS = Ultimate Tensile Strength, EL= %E Elongation on standard gauge length
Decarbonisation = NI ; Surface Condition, Internal Soundness = Satisfactory

Remarks :



Authorised Signatory
For



METAForge ENGINEERING INDIA PVT LTD.

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

PLATING INSPECTION REPORT

Part Name : Steel Bush

Date : 06/02/2024

Part Number : S20MX00112 (Fe/Zn white)

Batch No. & Weight : 10 Nos.

Customer Name : Endurance Technologies

Sr. No.	Parameters	Specification	Observation 1	Observation 2	Observation 3	Observation 4	Observation 5	Remarks
1	Coating Thickness	<u>8-12 u.</u>	<u>8.9</u>	<u>8.7</u>	<u>9.0</u>	<u>8.7</u>	<u>8.3</u>	<u>ok.</u>
2	Gauge Condition							
3	Visual defects	Free from Black Spot, White Patches, Dull Finish, Water Mark, Peel off, Uncover area and Etching mark	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>ok.</u>
4	Salt Spray							

ACCEPTED REJECTED

Inspect by : Sumit
Date : 06/02/2024

Approved by : [Signature]
Date : 06/2/2024

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

Part Name :-

BUSH STEEL

Part No. :-

520MX00112

Vendor Code : 100049

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

SIGN.(VENDOR) : _____

DATE:-02.05.2024

Part Submission Warrant

Format No:- F-QA-013

Rev. No:- 00

Date :- 11-06-2014

Part Name	BUSH STEEL	Customer Part Number	520MX00112
Shown on Drawing No.	520MX00112	Organization Part #	F523
Engineering Change Level	F	Dated	20.12.2022
Additional Engineering Changes		Dated	
Safety and/or Government Regulation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Purchase Order No.	
Weight (kg)			0.0133
Checking Aid No.	F-ENGG-010	Checking Aid Engineering Change Level	0
Dated			28.06.2015

ORGANIZATION MANUFACTURING INFORMATION

Metaforge Engineering (I) Pvt. Ltd., Mhasrul, Nashik

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

Mr. Sachin Raut

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

**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 RESULTSThe results for dimensional measurements material and functional tests appearance criteria statistical process packageThese results meet all drawing and specification requirements: Yes NO (If "NO" - Explanation Required)Mold / Cavity / Production Process 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 20000 / 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 26.07.2024

Print Name Mr. Sagar Thete

Phone No. 7887863884

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	BUSH STEEL	Product No	520MX00112	Model	-
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Vendor Code-100049

Customer Name	Endurance Technologies Ltd.	Supplier Name	Metaforge Engineering (India) Pvt.Ltd
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Pallet/Box/Trollies Dim

Photograph of Final Packing (One Unit)

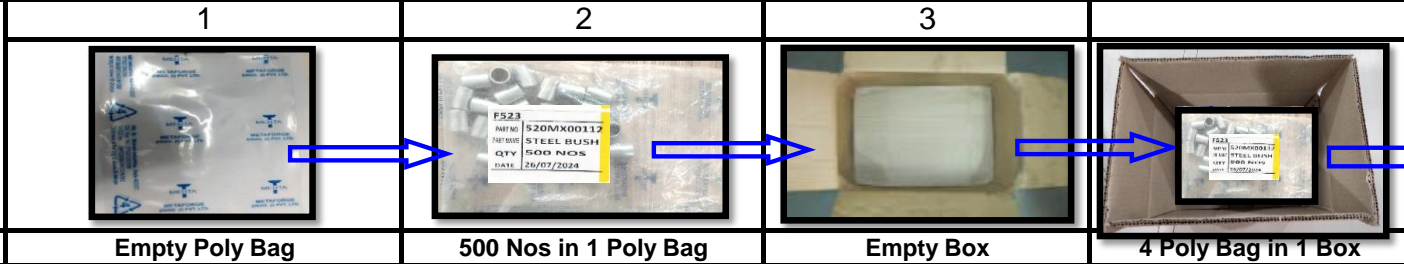


Photograph of Final Pallet/Box/Bin/Trolley



L	W	H
228.6	177.8	127
Weight (Empty)	0.0255 kg	
Weight (Final)	26.8755 kg	
Qty/Package	2000 pcs.	
Instruction for Transporter etc:		


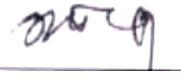
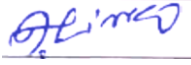
Photos of Different phases of parts packing to be pasted here



Final Packaging



Special instructions and Remarks:

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