



## INSPECTION TEST PLAN

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Confidentiality:	Confidential
Part No.:	7800F20P40
Doc. No.:	AEC_501740_2A
ERP ID: -	Reference No.: AEC_502231_0A

Part name: BOLT-MACHINE, HEX, DRILLED

# IRANIAN AERO ENGINE & EQUIPMENT ENGINEERING & MANUFACTURING Co.

**MAPNA AERO**

## INSPECTION TEST PLAN (ITP)

**Title: BOLT-MACHINE, HEX, DRILLED**

**Project Name: GT-21**

**Prepared by: POA, Minor Parts Manufacturing Dept.**





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## QTP Document (AEC\_502231\_0A)

Rev.	Description	#	Prepared By	Checked By			Approved By		Released By	Declared By
0A	First Issue	Position Title:	Joining Process Expert	Joining Process Expert		Outsourcing Manager	CVE	DOM	HOA	HDO
		Employee ID:	3670	3465	0667	3243	3003	2917	3361	2667
		Date:	2022.09.10	2022.09.10			2022.09.10		2022.09.10	2022.09.10

## ITP Document (AEC\_501740\_2A)

Rev.	Description	#	Prepared By		Checked By	Approved By	
0A	First Issue	Position Title:	Production Expert	Head of Minor Part Production	POA Manager	QC Expert	Quality Manager
		Employee ID:	3540	0667	1724	2191	2939
		Date:	2022.10.10	2022.10.10	2022.10.10	2022.10.10	2022.10.10
1A	Added Items: • Ultimate Double Shear Strength Test on Finished Parts. Deleted Items: • Tensile Test and Fatigue Test on Finished Parts.	Employee ID:	3731	0667	1724	2191	3733
		Date:	2023.11.14	2023.11.14	2023.11.14	2023.11.14	2023.11.14
2A	Added Items: • Ultrasonic Test on Raw Material. • Tensile Test on Finished Parts. • Weight Measurement on Finished Parts. Deleted Items: • Ultimate Double Shear Strength Test on Finished Parts.	Employee ID:	3731	0667	1724	2191	3733
		Date:	2024.09.01	2024.09.01	2024.09.01	2024.10.14	2024.10.14



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#	Part Name	SAP	Drawing No.	Description
A	BOLT-MACHINE, HEX, DRILLED	-	drw-IACO-00011194	Material: Ti 6-4 (AMS4967)





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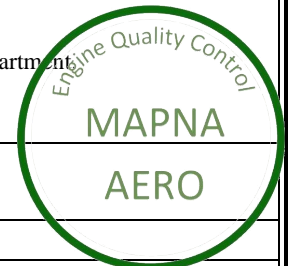
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#	Terms and Definitions		
1	This document is not valid without MAPNA Aero Quality Control Dept. Stamp.		
2	<b>HOLD POINT(H)*:</b> Hold on the process till Purchaser’s MAPNA Aero QC inspector performs inspection and supervises the required test or activity. The Supplier cannot deviate from this rule unless written approval has been given by MAPNA Aero QC and from HOLD POINT will be changed to REVIEW and APPROVED (RA). The Supplier shall notify the Purchaser’s Inspector 7 working days in advance. Notification period for foreign inspection activities shall be considered as 45 days.		
	<b>WITNESS POINT(W)*:</b> The Supplier shall notify the Purchaser’s Inspector, but there is no hold on the process.		
	The Purchaser can waive this inspection based on its discretion. Supplier shall notify the MAPNA Aero QC inspector 7 working days in advance. Notification period for foreign inspection activities (if any) shall be considered as 45 days.		
	<b>REVIEW and APPROVED (RA)*:</b> The Supplier shall submit the relevant documents of inspection/Activity for review and approve within 7 working days after inspection/activity. The Supplier shall not continue the work without Purchaser’s approval.		
3	<b>REVIEW(R):</b> The Supplier shall submit the relevant documents of inspection/Activity for review.		
	Type of Documentation:	<b>C1:</b>	Certificate of Conformity approved by the manufacturer.
		<b>C2:</b>	Certificate of Conformity approved by the manufacturer’s authorized inspection representative/ third party independent of the manufacturing department.
		<b>C3:</b>	Certificate of Conformity approved by MAPNA Aero QC.
		<b>T1:</b>	Test report approved by the manufacturer.
	<b>T2:</b>	Test report approved by the manufacturer’s authorized inspection representative/ third party independent of the manufacturing department.	
	<b>T3:</b>	Test report approved by MAPNA Aero QC.	
	<b>Q:</b>	Qualification Certificate/Procedure/Doc. approved by MAPNA Aero QC.	
4	<b>Approved Project Spec.:</b> Prior to production, each required procedure shall be prepared by the supplier and submitted to MAPNA Aero QC department for final approval.		
5	WPS, PQR, Weld map & NDT map shall be checked and Approved by purchaser/client.		
6	The supplier shall provide the MQCP document covering the requirements of this ITP. The requirements & inspection levels specified in this ITP is at minimum.		
7	In the case of Nondestructive Tests (Penetrant Test, Ultrasonic Test, Eddy Current Test, Magnetic Particle Test and X-ray Radiography Test), the Supplier shall also submit the procedure for each part 30 days in advance and demonstrate it before inspection/activity. The Supplier shall not perform the NDT inspection/Activity without Purchaser’s approval		

Engine Quality Control

MAPNA

AERO



\* In this document MAPNA AERO refers to the Iranian Aero Engine and Equipment Engineering & Manufacturing Company.



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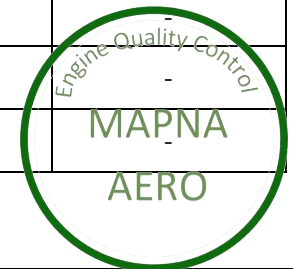
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## Qualification

#	Inspection/Activity	Reference	QC Point (MAPNA Aero)	Documentation	Note
A.1	Laboratory Certificate	Laboratory Certificate	RA	Q	-
A.2	Packing Plan Review	Approved Project Spec.	RA	Q	-
A.3	Calibration Certificate	Approved Project Spec.	RA	Q	-
A.4	NDT Personnel Qualification	EN 4179, SNT-TC-1A	RA	Q	-
A.5	Heat Treatment Furnace Calibration Certificate	Approved Project Spec.	RA	Q	-



## Raw Material Check (Prior Manufacturing)

#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
A.6	Material Certificate	-	EN 10204-3.2	100	100	RA	C3	-
A.7	Chemical Composition Analysis	AMS4967 Rev. M, ASTM E1409, ASTM E1447, ASTM E1941, ASTM E539, ASTM E2371 or ASTM E2994	AMS4967-3.1, AMS2249	100	100	RA	T3	Destructive Test/ From each heat or lot, determined in accordance with Related ASTM for C, O, H & other elements
A.8	Visual Test (VT)	DIN EN 13018, AMS4967-3.3.1 AMS4967-3.6	AMS4967-3.3.1, AMS4967-3.6	100	100	H	T3	Non-Destructive Test/ Bars: Hot finished with or without subsequent cold reduction, annealed, and descaled/



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#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
								Shall be uniform in quality and condition, sound, and free from foreign materials & imperfections.
A.9	Dimensional Check	AMS4967-3.7	Drawing, AMS2241	100	100	H	T3	Non-Destructive Test/ Acc. to Drawing.
A.10	Ultrasonic Test (UT)	-	ASTM E2375-Class AA	100	100	H	T3	Non-Destructive Test
A.11	Microscopic/Metallography Examination	ASTM E3	AMS4967-3.5.1.1.1	20	20	RA	T3	Destructive Test/ As Annealed: Alpha-beta phase field
A.12	Surface Contamination Check	ASTM E3	AMS4967-3.5.1.1.2	20	20	RA	T3	Destructive Test/ As Annealed: Surface Contamination free of any oxygen-rich layer
A.13	Heat Treatment Cycle Check	-	AMS4967-3.5.1.2, AMS2750	100	100	RA	T3	Pyrometry shall be in accordance with AMS2750. Graph shall be reported.
A.14	Tensile Test	ASTM E8/E8M	AMS4967-3.5.1.2.1	20	20	RA	T3	Destructive Test/ After Solution and Precipitation Heat Treatments

Note: sampling and plumping should be done in presence and supervision of MAPNA Aero QC and samples should be sent to the related approved laboratory for test.



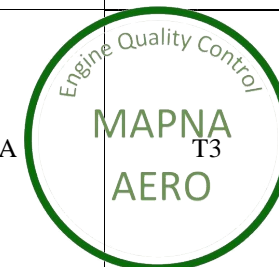
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## After Fabrication Headed Blanks

#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
A.15	Cleaning Check	ASTM B600	AS7461 Rev. D-3.3.1.1	20	According to AS7461-Table 6	RA	T3	Destructive Test/ After heading and prior to heat treatment/ Blank surfaces shall be free of halogen compounds.
A.16	Macroscopic Examination	AS7461-3.6.1, ASTM E381	AS7461-3.6.1.1.1, AS7461-3.6.1.2	20	According to AS7461-Table 6	RA	T3	Destructive Test/ On Headed blank and prior to heat treatment/ Flow lines and internal imperfections shall be examined (no cracks, laps, or porosity...)
A.17	Heat Treatment Cycle Check	AS7461-3.3.2	AS7461-3.3.2.2, AS7461-3.3.2.3	100	100	RA	T3	Headed blanks shall be solution and precipitation heat treated. Graph shall be reported.
A.18	Contamination Removal Check	-	AS7461-3.3.3	20	According to AS7461-Table 6	RA	T3	Destructive Test/ Full body diameter, thread roll diameter and bearing surface of the head. The oxide removal process shall produce no Intergranular attack





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#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
								or corrosion of the blanks.

## Finished Parts (After Cold Rolling of Fillet Radius and Thread Rolling)

#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
A.19	Visual Test (VT)	-	Drawing, AS7461-3.6	100	According to AS7461-Table 4 & 5	H	T3	Non-Destructive Test/ Parts shall be uniform in quality and condition, clean, sound, smooth, and free from burrs and foreign materials, and from imperfections, detrimental to the usage of the parts
A.20	Dimensional Check	-	Drawing, AS7461-3.2, AS8879, AS3062, AS3063	100	According to AS7461-Table 4 & 5	H		Non-Destructive Test/ General measurement tools/ Checking control Go No Go gage, Check including: Surface Texture, Threads, Runout, Chamfer, and Geometric Tolerances.



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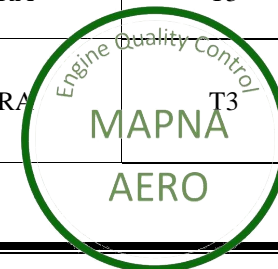
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#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
A.21	Fluorescent Penetrant Inspection (FPI)	ASTM E1417/E1417M, Type 1, Minimum Sensitivity Level 2	AS7461-3.6.3, AS3071	100	According to AS7461-Table 4 & 5	H	T3	Non-Destructive Test/ Prior to any required plating or coating.
A.22	Macroscopic Examination	AS7461-3.6.1, ASTM E381	AS7461-3.6.1.1.2, AS7461-3.6.1.2	20	According to AS7461-Table 6	RA	T3	Destructive Test/ For finished parts/ Threaded portion of the shank; Flow lines threads shall be continuous; and internal imperfections shall be examined (no cracks, laps, or porosity...)
A.23	Microscopic/Metallography Examination	AS7461-3.6.2, ASTM E340, ASTM E407	AS7461-3.6.2	20	According to AS7461-Table 6	RA	T3	Destructive Test/ For finished parts/ Microstructure, Grinding Damage, Surface Hardening and Threads Shall be check.
A.24	Hydrogen Content Determination	ASTM E1447	AS7461-3.7	20	According to AS7461-Table 6	RA	T3	Destructive Test/ Shall not exceed 0.0125% (125 ppm)
A.25	Ultimate Tensile Strength (at Room Temperature)	NASM1312-8	AS7461-3.5.1.1	20	According to AS7461-Table 6	RA	T3	Destructive Test
A.26	Plating or Coating Inspection	-	Drawing	100	According to AS7461-Table 4 & 5	RA	T3	Destructive Test/ Where required, thickness requirement per





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#	Inspection/Activity	Reference of Test Method	Reference of Acceptance Criteria	Frequency of Tests (%)		QC Point (MAPNA Aero)	Documentation	Note
				First Article	Production			
								applicable specification.
A.27	Weight Measurement	-	Drawing, AEC_225928 (Last Revision)	100	According to AS7461-Table 4 & 5	H	T3	Non-Destructive Test

## Final Inspection

#	Inspection/Activity	Reference	QC Point (MAPNA Aero)	Documentation	Note
A.28	Final Visual Check	Drawing; AS7461-3.6.2.6	H	T3	Damage, Quantity and etc.
A.29	Marking Check	Drawing	H	T3	-
A.30	Documentation Check	Acc. to this ITP	RA	Q	1) Final book (Final Dossier) 2) Shipping Documents & Packing list
A.31	Preservation and Packing Check	Acc. to ATA 300	H	C3	-
A.32	IRN (Inspection Release Note)	Acc. to this ITP	H	T3	-

