

15

SENIOR QUALITY ASSURANCE ESTT (ARMTS)



GCF POST, JABALPUR

155 mm / 45 Cal HOWITZER DHANUSH

PROVISIONAL

QUALITY ASSURANCE PLAN

OF

LOADING PENDULUM
(ARTICLE NO 1145142)

SENIOR QUALITY ASSURANCE ESTABLISHMENT (ARMTS)
GCF POST JABALPUR (M.P.)

PREFACE


THE GENERAL PROCEDURE GOVERNING QUALITY ASSURANCE ACTIVITIES OF **LOADING PENDULUM TO ARTICLE NO 1145142 OF 155 mm / 45 Cal HOWITZER DHANUSH** HAS BEEN LAID DOWN IN THIS QUALITY ASSURANCE & SURVEILLANCE PLAN. THE PRODUCTION OF LOADING PENDULUM ASSEMBLY HAS BEEN UNDER-TAKEN BY THE GUN CARRIAGE FACTORY, JABALPUR IN THEIR AIR DEFENCE GUN SHOP AND QUALITY ASSURANCE COVERAGE IS BEING PROVIDED BY ADQ SECTION OF SQAE(A) GCF JABALPUR.

THE QUALITY ASSURANCE ACTIVITIES MUST BE CONDUCTED STRICTLY IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS MENTIONED IN THE QUALITY ASSURANCE & SURVEILLANCE PLAN IN CONJUNCTION WITH DIRECTIVES/ INSTRUCTIONS RECEIVED FROM THE AHSP.

SHOULD ANY DEPARTURE BE CONSIDERED NECESSARY FROM THE LAID DOWN PROCEDURES IN THIS QUALITY ASSURANCE & SURVEILLANCE PLAN IN ANY RESPECT, IT SHOULD BE APPROVED FROM THE SENIOR QUALITY ASSURANCE ESTABLISHMENT (ARMAMENTS) JABALPUR.

DATE: 18 Jan 18

PLACE: JABALPUR


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Senior Quality Assurance Officer
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GCF, JABALPUR

QAP NO : DHANUSH/MAJ ASSY/15

REF NO : CQA(W) JABALPUR LNo. 1A3100-Tech-CQAW DATED 21 Apr 2012

155 MM / 45 CAL HOWITZER DHANUSH

PROVISIONAL

QUALITY ASSURANCE PLAN

OF

LOADING PENDULUM

(Article No 1145142)

PREPARED BY



SQAE(A) GCF JABALPUR

AGREED BY

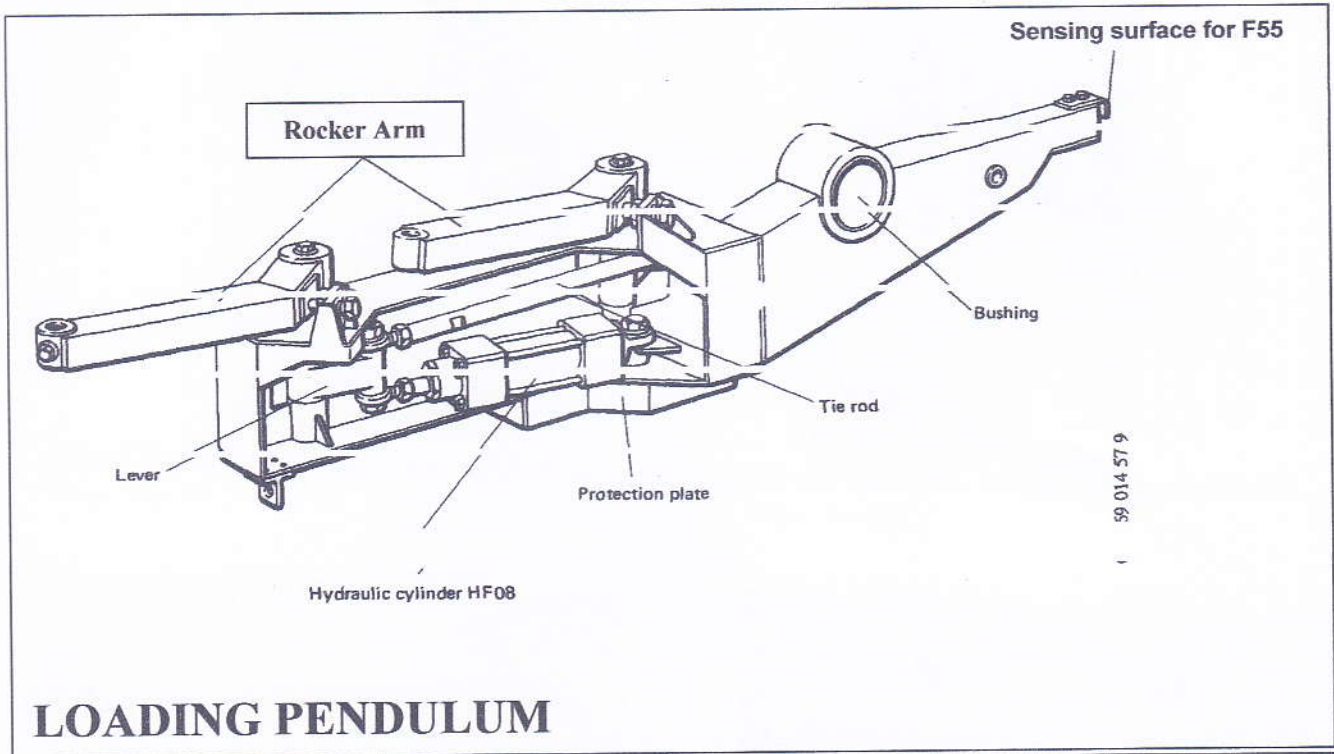


GCF, JABALPUR

APPROVED BY

CQA(W) JABALPUR





59 014 57 9

LOADING PENDULUM

LOADING PENDULUM (1145142)
Check Sheet No. 155 mm Dhanush/LP/08
Page No. 20



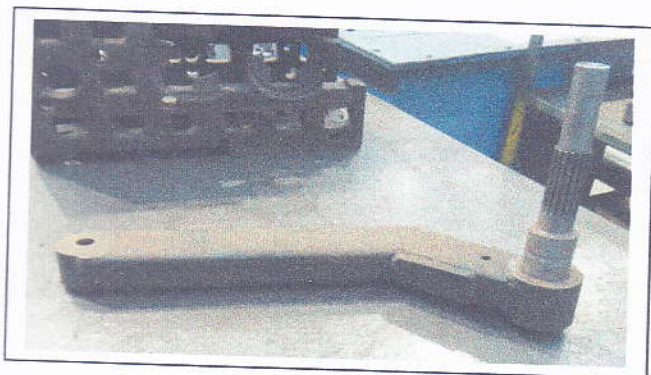
PENDULUM LEVER (1147155)
Check Sheet No. 155 mm Dhanush/LP/01
Page No. 10



Check Sheet No. 155mmDhanush/LP/02
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LEVER (1147158)
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LEVER (5176544)
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1. INTRODUCTION

1.1 GENERAL INFORMATION.

The Loading Pendulum to Article No 1145142 is a main Assy of 155mm /45 Cal Howitzer "Dhanush" Gun being manufactured indigenously at GCF, Jabalpur and being Quality Audited by SQAE, Jabalpur.

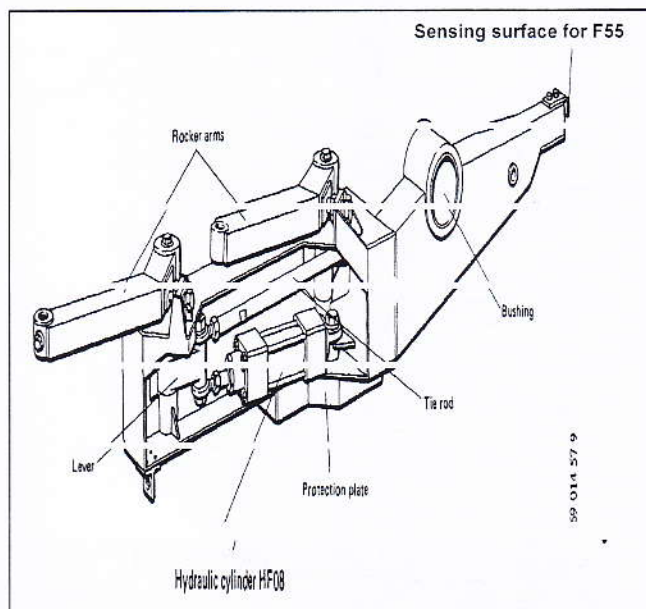
The general procedure governing QA activities for Loading Pendulum to Article No. 1145142 of 155/45 mm Cal Howitzer "Dhanush" have been laid down in this QA Plan. This has been prepared based on standards and inspection parameters laid down in the relevant drawings and specifications.

This QA Plan is the property of SQAE (A) Jabalpur, which is liable to be updated by AHSP authorities and therefore liable for amendments.

Plates used in Loading Pendulum fabrication are being supplied by Steel Authority of India (SAIL) and profile cutting is carried out at Vehicle Factory Jabalpur.

This QA Plan is a general guide for Quality Audit, Surveillance and final acceptance inspection of Loading Pendulum. The bought out items, material, dimension and manufacturing detail are to be conformed to the drawings and specifications. Any change or deviation from specification or drawing dimension must be with the consent of SQAE (A) after due approval of CQA (W).

1.2 BRIEF DESCRIPTION



The loading pendulum is supported by a bushing on the extended part of the right elevation trunion. It is driven between the upper and lower position by hydraulic cylinder HF07. Hydraulic cylinder HFO8 is fitted on the pendulum to provide inward and outward movement of the loading tray. The pendulum is stopped in its upper position by a hydraulic shock absorber fitted on the mounting body and at the lower position by a rubber buffer on the right hand side of the cradle. The loading tray is pivoted on two rocker arms on the upper side of the pendulum. The rear rocker arm is driven by the piston rod of hydraulic cylinder HFO8 fitted to a lever on the spindle of the rocker arm. The forward rocker arm is driven by a tie rod connected to the lever on the rear rocker arm spindle. Four sensors, protected by a plate, are fitted under the forward rocker arm spindle. Sensor F57 notes when the pendulum is at the cradle, the lower position. The three remaining sensors note the various positions of the loading tray. They are activated by a disc fitted on the lower part of the rocker arm-spindle. F61 senses when the loading tray is swung into the ramming position, F112 when the loading tray is swung half way in and out respectively and F59 when the loading tray is swung out. Sensor F55 fitted on the mounting body in front of the pendulum senses when the pendulum is at the loading table, the upper position. F55 is activated by a plate is screwed onto the most forward part of the pendulum.

1.3 FUNCTIONS.

The function of Loading Pendulum is to provide inward and outward movement to Loading Tray and thereby position the shell in front of Breech end for it's ramming.

1.4 **TECHNICAL DATA** Inspection of components & Assembly of Loading Pendulum is done as per Drawings/specification & technical Manual held with GCF. Material used for manufacturing the components of Loading Pendulum has been mentioned in the drawing.

(a) **TOTAL NUMBER OF COMPONENTS**

PLATES : 26
 CASTINGS : 03
 BARS : 26

(b) Type- Fabricated structure

1.5. **SAFETY/SECURITY ASPECTS IF ANY**

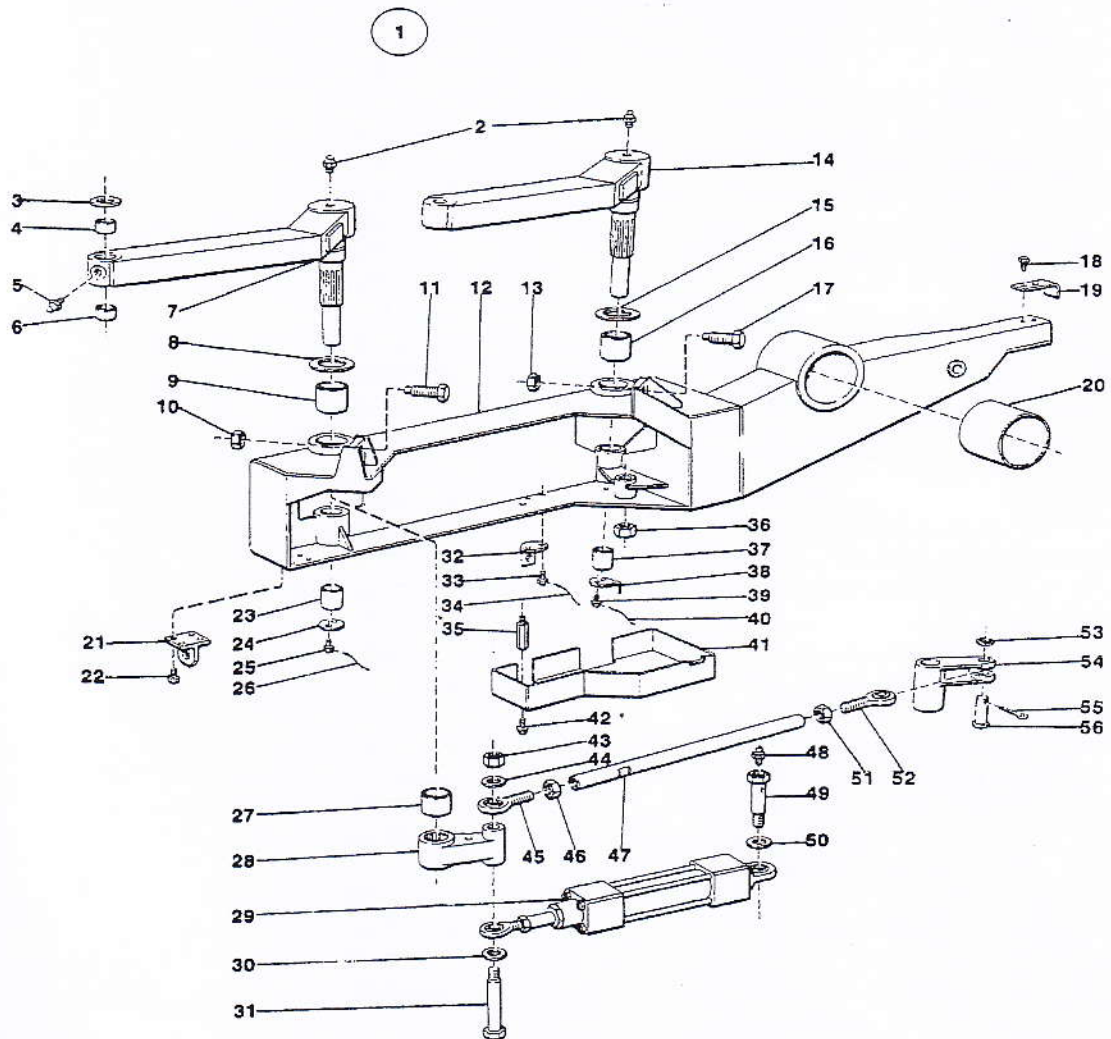
Not Applicable

1.6. **COMPONENTS OF LOADING PENDULUM**

69 003 926
 1991-05-15

LOADING PENDULUM

2-139



<u>SER No.</u>	<u>Qty</u>	<u>Article/Drawing. No.</u>	<u>Nomenclature</u>
1.	1	1 145142	Loading Pendulum
2	2	10302168	Lubricator N12-6-1
3	1	10351 977	Thrust Washer N5-75-26x44
4	1	10351 882	Bushing N5-74-24x15
5	1	10302168	Lubricator N12-6-1
6	1	10351882	Bushing N5-74-24x1 5
7	1	1 147158	Lever
8	1	10314701	Thrust Washer N5-9003-WC40DU
9	1	10351 898	Bushing N5-74-40x40
10	1	10310934	Hexagon Nut N3-56-16
11	1	10651 629	Stop screw N2-143-16x45
12	1	1 147155	Pendulum Lever
13	1	10310934	Hexagon Nut N3-56-16
14	1	1 147159	Lever
15	1	10314701	Thrust Washer N5-9003-WC40DU
16	1	10351898	Bushing N5-74-40x40
17	1	10651629	Stop Screw N2-143-16x45
18	2	10648366	Hexagon Screw N2-140-6x12
19	1	6362704	Plate
20	1	10351 915	Bushing N5-74-90x90
21	1	6361 086	Bracket
22	4	10650364	Hexagon Screw N2-140-6x1 2
23	1	10470772	Bushing N5-9001-24x30
24	1	6361 057	Washer
25	2	10650325	Hexagon Screw N2-142-5x10
26	Req	12002019	Wire S18-1-1
27	1	6361 085	Distance Piece
28	1	5176545	Lever
30	1	10288185	Washer N5-1-17x34
31	1	5169911	Bolt
32	4	6361 060	Bracket
33	8	10650364	Hexagon Screw N2-142-6x1 0
34	Req	12002019	Wire S18-1-1
35	3	10322945	Distance N5-44-6x40-8
36	1	5177362	Locking Nut Type Mid-Grip M1 6
37	1	10470772	Bushing N5-9001-24x30
38	1	6361 058	Washer
39	2	10650325	Hexagon Screw N2-142-5x1 0
40	Req	12002019	Wire S1 8-1 -1
41	1	1 148885	Cover
42	3	10994366	Hex Sock Screw N2-240-6x1 2
43	1	5177362	Locking Nut Type Mid-Grip M1 6
44	1	10288185	Washer N5-1-17x34
45	1	6339978	Link Bearing
46	1	10351 190	Hexagon Nut N3-114-16
47	1	5169908	Bar
48	1	10302168	Lubricator N 12-6-1
49	1	5169912	Bolt
50	1	10288185	Washer N5-1-17x34
51	1	10310934	Hexagon Nut N3-56-16
52	1	6339977	Link Bearing
53	1	10287185	Washer N5-1-17x30
54	1	5176544	Lever
55	1	10264197	Split Pin N4-8-4x25
56	1	6361 087	Pin

2. LIST OF DRAWINGS2.1 Drawings

SER No	Article No./ Drg No.	Designation	Templates for plates	Part used in
1.	3054123	PLATE	JP-3428	LEVER (1147156)
2.	5176550	PLATE	-	-do-
3.	5176926	PLATE	-	-do-
4.	5176927	PLATE	-	-do-
5.	5176927	HOUSING	-	-do-
6.	6360804	HOUSING	-	-do-
7.	6360805	HOUSING	-	-do-
8.	6360806	PLATE	-	-do-
9.	6360807	PLATE	-	-do-
10.	6360808	PLATE	-	-do-
11.	6360809	PLATE	-	-do-
12.	6360810	PLATE	-	-do-
13.	6360811	PLATE	-	-do-
14.	6360812	PLATE	-	-do-
15.	6360813	PLATE	-	-do-
16.	6360814	PLATE	-	-do-
17.	6360815	PLATE	-	-do-
18.	6360816	PLATE	-	-do-
19.	6360817	PLATE	-	-do-
20.	6360823	HUB	-	-do-
21.	6361083	LIST	-	-do-
22.	6361084	PLATE	-	-do-
23.	3054124	PLATE	-	LEVER (1147157)
24.	6081534	PLATE	-	-do-
25.	6360818	PLATE	-	-do-
26.	6360819	PLATE	-	-do-
27.	6360820	PLATE	-	-do-
28.	6360821	PLATE	-	-do-
29.	1147156	LEVER	JP-3450	PENDULUM LEVER (1147155)
30.	1147157	LEVER	-	-do-
31.	6360801	HOUSING	-	-do-
32.	6360802	HUB	-	-do-
33.	4081535	BEAM	-	LEVER (1147158)
34.	5176547	SHAFT	-	-do-
35.	5176548	BEAM	-	-do-
36.	6348615	PLATE	-	-do-
37.	5160509	PLATE	-	-do-
38.	6360799	HOUSING	-	-do-
39.	4081536	BEAM	-	LEVER (1147159)
40.	5176546	SHAFT	JV-674	-do-
41.	5176549	BEAM	-	-do-
42.	5161867	PLATE	-	-do-
43.	6360800	BRACKET	-	-do-

SER No	Article No./ Drg No.	Designation	Fixture/ Templates for plates	Part used in
44.	3054508	PLATE	-	COVER (1148884)
45.	4082489	PLATE	-	-do-
46.	6358801	GROMMET STRAP	-	COVER (1148885)
47.	1147155	PENDULUM LEVER	-	LOADING PENDULUM (1145142)
48.	1147158	LEVER	JP-3409, JP-3456 & JF-5961	-do-
49.	1147159	LEVER	JP-3410, JP-3456 & JF-5961	-do-
50.	1148884	COVER	-	-do-
51.	1148885	COVER	-	-do-
52.	5169908	BAR	-	-do-
53.	5169911	BOLT	-	-do-
54.	5169912	BOLT	-	-do-
55.	5176544	LEVER	-	-do-
56.	5176545	LEVER	JV-674	-do-
57.	5177362	LOCKING NUT TYPE MID-GRIP M16	-	-do-
58.	6339977	LINK BEARING	-	-do-
59.	6298987	SPHERICAL BEARING	-	-do-
	6361057	WASHER	-	-do-
54.	6361058	WASHER	-	-do-
55.	6361060	BRACKET	-	-do-
56.	6361085	DISTANCE PIECE	-	-do-
63.	6361086	BRACKET	-	-do-
64.	6361087	PIN	-	-do-
65.	6361089	MARKING SET DRWG	-	-do-
66.	6362704	PLATE	-	-do-

2.2 STANDARD PARTS

SER No	Article No./ Drg No.	Designation	Part used in
1.	10648366	HEXAGON SCREW N2-140-6X12	LOADING PENDULUM (1145142)
2.	10650325	HEXAGON SCREW N2-140-5X10	-do-
3.	10650364	HEXAGON SCREW N2-142-6X10	-do-
4.	10651629	STOP SCREW N2-143-16X45	-do-
5.	10994366	HEX SOCK SCREW N2-240-6X12	-do-
6.	10310934	HEXAGON NUT N3-56-16	-do-
7.	10359190	HEXAGON NUT N3-114-16	-do-
8.	10264197	SPLIT PIN N4-8-4X25	-do-
9.	10287185	WASHER N5-1-17X30	-do-

SER No	Article No./ Drg No.	Designation	Part used in
10.	10288185	WASHER N5-1-17X34	LOADING PENDULUM (1145142)
11.	10351882	BUSHING N5-74-24X15	-do-
12.	10351898	BUSHING N5-74-40X40	-do-
13.	10351915	BUSHING N5-74-90X90	-do-
14.	10322945	DISTANCE N5-44-6X40-8	-do-
15.	10351977	THRUST WASHER N5-75-26X44	-do-
16.	10470772	BUSHING N5-9001-24X30	-do-
17.	10314701	THRUST WASHER N5-9003-WC40CU	-do-
18.	10302168	LUBRICATOR N12-6-1	-do-
19.	12002019	WIRE S18-1-02-1.5	-do-

2.3 LIST OF SPECIFICATION

SER No.	Specification No.	Details of Specification
1	A-3025, A-3026 & A-3028	Welding Specification Class C
2	Y4-26-10-600 & Y4-27-10-600	Painting
3	Y3-6-1, Y3-11 & Y3-13	Surface Treatment
4	W11-217	Inside Treatment
5	Stress Relieving $570^0 \pm 20^0$ C	Heat Treatment after Welding
6	W14-33	Assembly Grease
7	V8-31	Gluing

2.4 LIST OF FIXTURES

SER No.	Fixture	Used in
1.	JP-3428	LEVER (1147156)
2.	JP-3450	PENDULUM LEVER (1147155)
3.	JP-3409, JP-3456 & JF-5961	LEVER (1147158)
4.	JP-3410, JP-3456 & JF-5961	LEVER (1147158)

2.4 MARKING/IDENTIFICATION OF DETAILS.

The following information shall be reflected on store:-

- Serial No. :
- Manufacture Name :
- Year of Manufacture :
- Acceptance Mark :

2.5 CONDITION OF USE

- (a) **Climatic Requirement** The Loading Pendulum should be capable of working in temperature range-20° to 60° at relative humidity up to 100%.
- (b) The Component should be preserved so that corrosion and deterioration are reduced to minimum. Olive green paint to IS 8993-1978 (Specification Y4-26-10-600 & Y4-26-10-600) is to be applied on outer surface of Loading Pendulum as per Specification Y4-35.

3.0 BILL OF MATERIAL

Subsequent to change of input material (Ex trade) inspection responsibility from DGQA to OFB, the input store i.e. material / items pertaining to armament store have been divided into following categories with reference to para (e) of department of Defence production order dated 15 June 2005 received vide DGQA letter No. S/209/QA Policy / DGQA /DQA (A)/TC, dated 17 June 2005.

- (a) Critical Material
- (b) Critical Item
- (c) Non Critical Material
- (d) Non Critical Item

3.1 Critical Material/Item:-

Critical Material / Items are those stores whose malfunction will degrade the effective performance of the equipment. The item will be selected jointly by DGQA & GCF Rep based on their designed role in the subject equipment. The list of critical items would be reviewed once in two years.

GCF would submit critical material & item duly sentenced by them for Quality Audit & Surveillance to this Establishment along with relevant documents i.e. Chemical, mechanical, dimensional and other test reports such as UT, MPI, Radiography etc (NABL accredited) as per drawing & specifications. QA Rep would select samples randomly from the accepted lot of GCF for dimensional check as per DEF 131. If necessary, other test and fitment functional trials as applicable will also be carried out at shop level & in case of any anomaly or any doubt the material / item will be sent for analysis / testing to CQA(MET), Ichapur, QAE (ME) Khamaria, VFJ Jabalpur or any other government approved NABL Lab.

If the material /item is found non confirming to drawing /specifications the same would be rejected.

Critical item procured from OEM (Imported/Proprietary Item) are Quality Audited on the basis of visual inspection and supporting documents

3.2 Non Critical Material/Item: -

Material / Items other than Critical are classified as non critical items. It is the responsibility of GCF to procure and carry out necessary inspection / testing on material and store as per drawing and specification and maintain the record at their end.

Bond Wise Quality Audit of such store would be done by respective QA Shop floor section.

3.3 LIST OF CRITICAL STORE/MATERIAL

A. STORE / ITEMS : NIL

B. MATERIAL : NIL

4.0 ACCEPTANCE/PERFORMANCE TESTS : Not Applicable

5.0 QUALITY AUDIT POINTS/CHECKS METHODOLOGY/ INCLUDING REAL TIME/ ON LINE AUDIT ACTIVITIES

5.1 QC /QA Plan FOR 155 mm / 45 Cal Loading Pendulum to Article No. 1172041 being manufactured at GCF Jabalpur.

QC Plan Appended below:-

QC PLAN

<u>Ser.No.</u>	<u>Activity</u>	<u>Responsibility</u>
----------------	-----------------	-----------------------

1. Material

- | | | |
|--|--|-----|
| | (a) Bonding of material/stores | MID |
| | (b) MIS/Material I/note and test certificate | MID |

2. Loading Pendulum Assy. (1172041)

- | | | |
|--|--|---------|
| | (a) Material collection and Machining | Shop |
| | (b) UT Inspection of components/Plates | Met Lab |
| | (c) Radiography of Forging/casting | Met Lab |
| | (d) Dimensional Inspection of components | QC |
| | (e) Fabrication of Five Sub Assemblies on welding fixture | Shop |
| | (f) MPI testing of sub assy after fabrication (KI-75050) | Met Lab |
| | (g) Radiography of Loading Pendulum Rt & Lt part (KI-75050) | Met Lab |
| | (h) Stress Relieving of Complete Loading pendulum | HT |
| | (i) Complete final machining | Shop |
| | (j) Complete Final Inspection after final machining (KI-75060) | QC |
| | (k) Release for Assembly | Shop/QC |

5.2 QA Check Sheets are appended below:- .

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER FABRICATION)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 01

Nomenclature of store : **PENDULUM LEVER (Welding & Machining Drawing)**
 Drawing No. : **2025954**
 I/Note No. and date :
 Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) MPI acceptance I/Note
- (v) HT acceptance I/Note

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- | | | | |
|---|-----------|--------------------------------|--|
| (i) \varnothing 44H7 (+0.025) mm Dia. (02 nos) | C15 & C12 | F11 & F15 | |
| (ii) \varnothing 27H7 (+0.021) mm Dia. (02 nos) | A15 & A12 | B15 & B12 | |
| (iii) 32(+0.5) mm Dia. (02 nos) | C15 & C13 | D15 & D12 | |
| (iv) \varnothing 95H7 (+0.035) mm Dia. | G10 | G10 | |
| (v) 96(-0.2) mm Length | E10 | H10 | |
| (vi) \varnothing 17H8 (+0.027) mm & 86 mm Width | C9 & E9 | H9 & G9 G9 & H9 | |
| (vii) \varnothing 17H8 (+0.027) mm & 47.5 mm Width | C4 & E9 | F3 & G3 | |
| (viii) 10 mm height of \varnothing 95H7 face to \varnothing 17H8 face | E9 | H9 | |
| (ix) M6-6H holes (4 nos) | F15 | J14 | |
| (x) 31 mm & 26 mm distance | E15 | J14 & J15 | |
| (xi) M5-6H holes (2 nos) | F15 | L15 | |
| (xii) 186 mm & 235 mm distance | E14 & E13 | H14 & H13 | |
| (xiii) 118 mm dist. \varnothing 44 & \varnothing 27 C/L to Rear face | F14 | J14 | |
| (xiv) 93 mm distance | F11 | J11 | |
| (xv) 500 (\pm 0.5) mm distance | F13 | J13 | |
| (xvi) 765 (\pm 0.3) mm C/dist. from \varnothing 95 to \varnothing 44 | F12 | J12 | |
| (xvii) 460 (\pm 0.2) mm C/dist. from \varnothing 17 to \varnothing 44 & \varnothing 27 C/L | F13 | J13 | |
| (xviii) 9 mm C/dist. \varnothing 44 to \varnothing 27 C/L for 3 ⁰ 27' | F12 | J11 | |
| (xix) 191 (+ 0.2) mm \varnothing 44 center face C/L to C16 & C14 | | | |

Ø27 outer face (front & rear)

(xv) 123 (± 0.2) mm Ø44 outer face C/L to C16 & C13

015

Ø32 inner face (front & rear)

(xvi) 12 mm height Ø95 C/L to Ø44 face H12

L12

(xvii) 186 (± 0.2) mm distance G15

L15

(xviii) Surface Roughness as specified on drawing

(xix) Visual inspection/general remarks

Sentence

Checked by (Tech)

Counter Checked for feature
and found

T. No.
I/C Group / JE (QA).....

HOS/DO

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER MACHINING)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 02

Nomenclature of store : **SHAFT**
Drawing No. : **5176546**
I/Note No. and date :
Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) HT acceptance I/Note

3. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- | | | |
|------------------------------------|----|----|
| (i) 50 mm Dist. | B5 | B5 |
| (ii) 64 mm Dia. | C6 | C6 |
| (iii) 193 (-0.2) mm | B3 | |
| (iv) 121 mm Dist. | C4 | |
| (v) 56 mm Dist. | C3 | |
| (vi) Ø 28.24 (-0.06) mm | A6 | |
| (vii) Ø 25.40 mm | A6 | |
| (viii) 15 mm Dist. | D4 | |
| (ix) 44.5 (± 0.1) mm dist. | C5 | |
| (x) Ø 40h8 (-0.039) mm | C5 | |
| (xi) 72 mm distance | D4 | |
| (xii) 35 mm distance | D2 | |
| (xiii) Ø 24f7 (-0.020/-0.041) mm | C1 | |
| (xiv) 225 mm distance | D4 | |
| (xv) 220 mm distance | D4 | |
| (xvi) M10 x 1-6H mm (tapped hole) | C5 | |
| (xvii) Ø 38 mm | C4 | |
| (xviii) 10 mm distance | D5 | |
| (xix) Pitch x no. of teeth 16 x 17 | A4 | |
| (xx) Pitch Circle Ø 26.988 mm | A4 | |

(xxi) Tooth thickness (Circular) 2.494 (+0.013 to -0.006) A4

(xx) Pin Ø 3.048 mm A5

(xxi) Dimn. Between Pin dia. 31.547 (-0.057) mm A4

(xxii) Surface Roughness as specified on drawing

(xxiii) Visual inspection/general remarks

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature
and found

HOS/DO

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER MACHINING)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 03

Nomenclature of store : **SHAFT**
 Drawing No. : **5176547**
 I/Note No. and date :
 Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) HT acceptance I/Note

4. CONTROL POINT DIMENSION OBSERVED VALUE SENTENCE

(i) 50 mm Dist.	B5	C5
(ii) 64 mm Dia.	C6	C1
(iii) 193 (-0.2) mm	B3	D5
(iv) 121 mm Dist.	C4	D4
(v) 50 mm Dist.	C3	D3
(vi) \varnothing 34.6 (-0.06) mm	A6	F1
(vii) \varnothing 31.75 mm	A6	F1
(viii) 44.5 (\pm 0.1) mm dist.	C5	C4
(ix) \varnothing 40h8 (-0.039) mm	C5	C2
(x) 72 mm distance	D4	A3
(xi) 35 mm distance	D2	B6
(xii) \varnothing 24f7 (-0.020/-0.041) mm	C1	C2
(xiii) 225 mm distance	D4	A4
(xiv) 220 mm distance	D4	A4
(xv) \varnothing 30 mm	C3	C4
(xvi) M10 x 1-6H mm (tapped hole)	C5	C2
(xvii) \varnothing 38 mm	C4	B4

- (xviii) 10 mm distance D5 B₂
- (xix) Pitch x no. of teeth 16 x 21 A4 F₃
- (xx) Pitch Circle Ø 33.338 mm A4 F₃
- (xxi) Tooth thickness (Circular) 2.494 (+0.013 to -0.006) A4 F₃.
- (xx) Pin Ø 3.048 mm A5 F₃
- (xxi) Dimn. Between Pin Ø 37.943 (-0.058) mm A4 F₃.
- (xxii) Surface Roughness as specified on drawing
- (xxiii) Visual inspection/general remarks

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature
and found

HOS/DO

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER FABRICATION)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM /04

Nomenclature of store : **LEVER, Welding & Machining Drawing**
 Drawing No. : **4081532**
 I/Note No. and date :
 Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) MPI acceptance I/Note
- (v) HT acceptance I/Note

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- | | | |
|---|-------------|--|
| (i) 430 mm Dist. | D6 | |
| (ii) 360 (± 0.3) mm height | D5 | |
| (iii) M5-6H (3 nos. Tapped holes) | A6, C7 & D8 | |
| (iv) 10 mm (thread depth) | C6 | |
| (v) M10 x 1-6H | B7 | |
| (vi) M6-6H (2 nos. Tapped holes) | E3 | |
| (vii) 235 (± 0.3) mm height | F6 | |
| (viii) 70 mm distance | C8 | |
| (ix) 85 mm distance | D8 | |
| (x) Ø 27H7 (+0.021) mm | B6 | |
| (xi) Ø 44H11 (+0.160) mm | A7 | |
| (xii) 40 (-0.1) mm Dia. | B7 | |
| (xiii) Surface Roughness as specified on drg. | | |
| (xiv) Visual inspection/general remarks | | |

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature
and found

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER FABRICATION)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 05

Nomenclature of store : LEVER, Welding & Machining Drawing
Drawing No. : 4081533
I/Note No. and date :
Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) MPI acceptance I/Note
- (v) HT acceptance I/Note

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- (i) 405 mm Dist. D7
- (ii) 360 (± 0.3) mm height D6
- (iii) M5-6H (2 nos. Tapped holes) A6
- (iv) Ø 16H8 (+0.027) mm B6
- (vii) 185.5 (± 0.3) mm height F7
- (xiii) Surface Roughness as specified on drawing
- (xiv) Visual inspection/general remarks

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature and found

HOS/DO

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER MACHINING)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 06

Nomenclature of store : **LEVER**
Drawing No. : **5176544**
I/Note No. and date :
Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) X-Ray acceptance I/Note

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- X (i) 48 (±0.2) mm height
- ✓ (ii) Ø 29H8 (+0.033) mm *A2*
- ✓ (iii) Ø 43 mm *D2*
- ✓ (iv) Ø28.58 (+0.25) mm *D2*
- ✓ (v) Ø25.73 (+0.06) mm *C2*
- ✓ (vi) 36 mm height *D5*
- ✓ (vii) 14 (+0.1/+0.3) mm distance *D5*
- ✓ (viii) Ø 17H8 (+0.027) mm *B4*
- ✓ (ix) 80 mm C/Dist. from Ø25.73 to Ø17H8 mm *F3*
- ✓ (xxii) Surface Roughness as specified on drawing
- (xxiii) Visual inspection/general remarks

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature and found

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
QA CHECK SHEET (AFTER MACHINING)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 07

Nomenclature of store : **LEVER**
Drawing No. : **5176545**
I/Note No. and date :
Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note with check sheet (QC) No.
- (iv) X-Ray acceptance I/Note

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- ✓ (i) Ø34.93 (+0.25) mm *A2*
- ✓ (ii) Ø 32.03 (+0.06) mm *A2*
- ✓ (iii) Ø 50 mm *C2*
- ✓ (iv) 48 (±0.2) mm height *B1*
- ✓ (v) 80 (±0.1) mm C/Dist. *D3*
- ✓ (vi) Ø 17H8 (+0.027) mm *A4*
- ✓ (vii) Ø 30 mm *C4*
- ✓ (viii) 61 mm height *B5*
- ✓ (ix) Surface Roughness as specified on drawing
- (x) Visual inspection/general remarks

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature and found

SQAE(A), GCF POST JABALPUR-482011
QUALITY ASSURANCE PROFORMA
IQA CHECK SHEET (AFTER MACHINING)

QA CHECK SHEET NO.155mmDHANUSH/ LOADING PENDULUM / 08

Nomenclature of store : **LOADING PENDULUM**
Drawing No. : **2025942**
I/Note No. and date :
Serial No. :

1. VERIFICATION OF DOCUMENTS

- (i) Material Acceptance I/Note No & Date
- (ii) Bond No. / MIS No. & Date (MID)
- (iii) Dimensional acceptance I/Note
with check sheet (QC) No.

2. CONTROL POINT DIMENSION

OBSERVED VALUE

SENTENCE

- (i) 360 mm dist. C15
- (ii) 52 mm dist. B15
- (iii) 235 mm dist. E12
- (iv) 450.5 mm dist. E11
- (v) Visual inspection specified as per drawing

Sentence

Checked by (Tech)

T. No.

I/C Group / JE (QA).....

Counter Checked for feature
and found

HOS/DO

5.3 Generalized Surveillance Performa is appended below:-

SURVEILLANCE AUDIT PROGRAMME

Audit Programme List No.

Process Schedule No

NOMENCLATURE :-

FACTORY MANUFACTURED ITEM :-

DRG NO :-

PRODUCTION SECTION:-

MAIN EQUIPMENT :-

QA SECTION :-

SR.NO	FEATURE	OBSERVATION	FREQUENCY

CHECKED BY

CROSS CHECKED BY HS

AQAO

OIC

QAO/SQAO

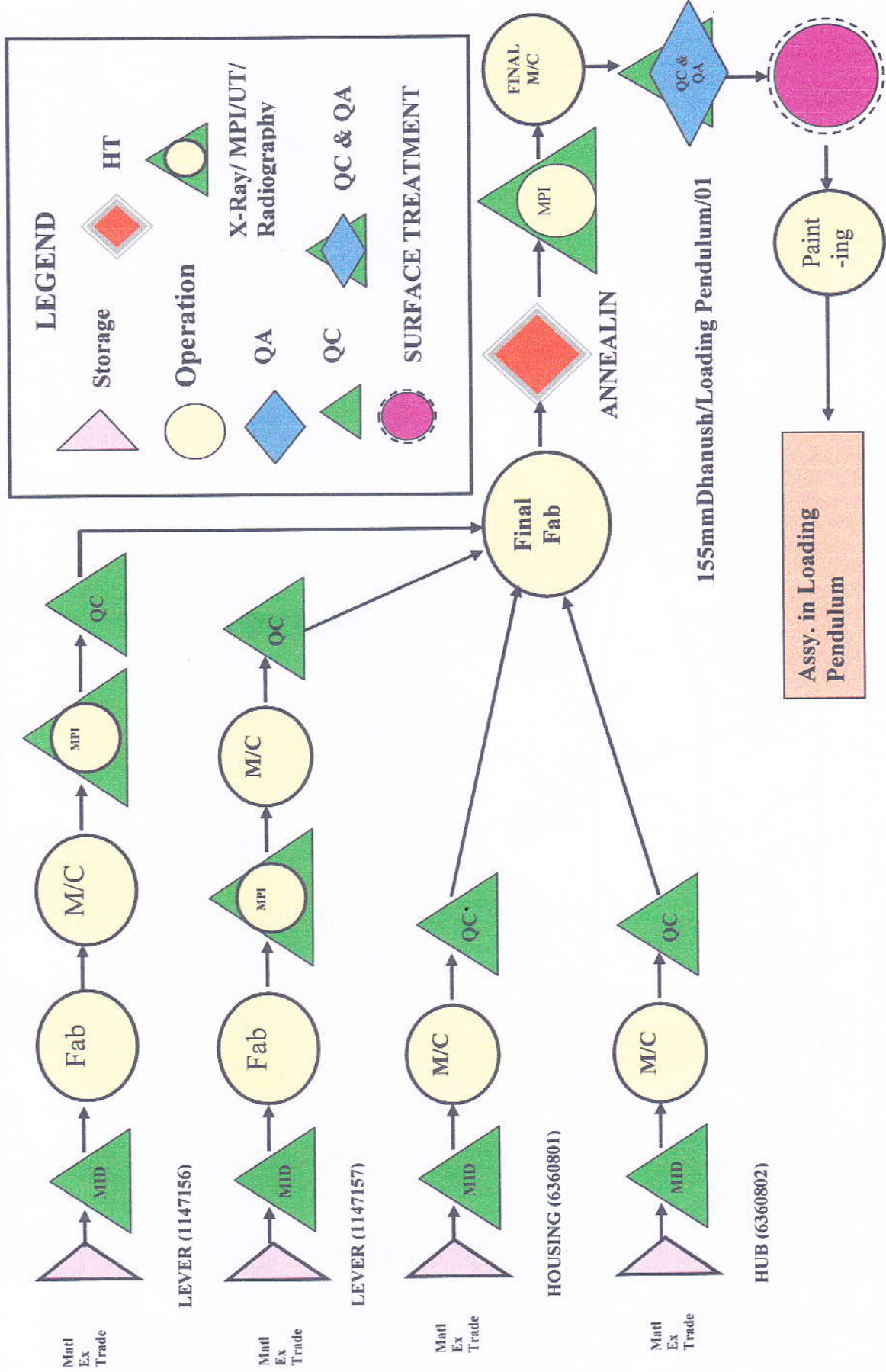
5.4 DISPOSAL OF NON-CONFORMING MATERIAL STORE/COMPONENTS

- (i) **Critical Material & Items** : The material and items when does not conform to specification/ drawing, assembly or test is rejected.
- (ii) **Components:-** The components at QA point for not conforming to specification/ drawing, assembly or test is rejected.

6.0 QUALITY AUDIT FLOW CHART/ DATA LOGGING/ PROCESS MONITORING POINTS

Flow Chart for Control Point components & assembly is as below-

QA/QC FLOW PROCESS CHART
FLOW CHART : QA ACTIVITIES OF EQUIPMENT 155/45 MM DHANUSH FOR PENDULUM LEVER (Drawing No 1147155)



Note 1: Surveillance inspection is carried out bond wise on non-critical input material/store
 2: During manufacturing at GCF, surveillance is done as per relevant QA Plan.

Scope of flowchart: - Raw material to final issue

