



**“LIGHT GUN”**

**QUALITY ASSURANCE PLAN/ACCEPTANCE TEST  
PROCEDURE**

**OF**

**Item: ROD PISTON RECOIL MECHANISM**

**Part No. IFL 8610 / DESIGN NO. CQA/WPN-1931**

**GUN CARRIAGE FACTORY**

**A GOVT. OF INDIA ENTERPRISES, MINISTRY OF DEFENCE**

**(A UNIT OF ADVANCED WEAPONS AND EQUIPMENT INDIA LTD)**

**QAP/ATP**

This quality assurance plan is a general guide to meet the quality requirements of product. It consists of applicable procedures (describing production processes, inspection & testing instructions), applicable workmanship standards, the measurement tolerances applicable, the description of material standards and so forth. It also mentions the list of documents, test certificates that will be submitted by firm to GCF along with finished component.

**1. Nomenclature & Drawing No.:**

ROD PISTON RECOIL MECHANISM TO PART NO. IFL-8610 / DESIGN NO. CQA/WPN-1931

**2. Dimension & Tolerance:**

As per relevant IS/BS/BIS standard etc. mention in drawing of item/component. In case of assembly or subassembly drawings the type of fit should be follow as per relevant drawings. Angular or linear attachment or fitting at any location should be as per drawings.

**3. Material & Heat Treatment Condition:**

As mentioned in Part No. IFL-8610 / DESIGN NO. CQA/WPN-1931.

**3.1 Test/Checks and Acceptance criteria for Material.**

SL. NO	TEST/CHECK	PARAMETER	ACCEPTANCE/AS PER APPLICABLE SPECIFICATION
1	Chemical composition	Composition	As per Standard/Specification mentioned in drawings
2	Mechanical properties	Tensile Strength	As per Standard/Specification mentioned in drawings
		Yield Stress	As per Standard/Specification mentioned in drawings
		% Elongation	As per Standard/Specification mentioned in drawings
		Hardness	As per Standard/Specification mentioned in drawings
		Impact strength	As per Standard/Specification mentioned in drawings
		Load Test	As per Standard/Specification mentioned in drawings

3	Environmental impact test	Corrosion test, Oil /grease résistance, Water Resistance test, etc.	As per Standard/Specification mentioned in drawings
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**3.2** Manufacturer has to supply one test piece from bulk of material used for manufacturing along with item/component etc. supplied to GCF for testing as per specification. (Factory may check chemical/ mechanical and other properties whenever required)

**4. Method of manufacture \*:**

**4.1** Manufacturer has to strictly follow the Scope of Design and Manufacturing if given in the drawing.

**4.2** Item/component made by casting/machining/forging /welding etc. should meet the dimension, tolerances, surface finish, surface treatment etc. as specified in drawing. If there is any ambiguity in relation to drawing of items/components/specification, then he has to consult the GCF factory before mass production of item/component.

**4.3** Manufacturer has to specify the method of manufacturing of items/components/assembly/subassembly like Casting/Forging/Machining/Welding etc. other operations used so that final outcome has specified chemical and mechanical properties. During and after machining, all dimensions and surface finish should be maintained as per specified drawing/standards.

**5.0 Inspection:** Following methodology is to be followed for inspection.

**5.1 Mode of Inspection & Sample Size/Selection:**

**5.1.1 At Firm Premises:** A team from GCF end will be deputed for Inspection of material/components/items at firm premises. Sample from bulk quantity will be selected by the team and will be send for inspection at NABL/GOVT laboratory for testing's as per specification. The bulk quantity before dispatch will be sealed and sign by the team and Firm representative. The manufacturer will also provide 100% pre inspection report of item /components/material along with the lot of material supplied As per input material inspection SOP.

**5.1.2 At Receipt End:** Inspection at GCF end will be done by Material inspection department as per sampling plan specified in IS standard 2500 part-II, 1965. Selected sample from bulk will be tested in GCF laboratory or any other NABL/GOVT lab to ensure the quality as applicable. Firm has to provide sample of raw material used for manufacturing along with each lot supplied. As per AWEIL input material inspection SOP.

## 5.2 Visual Inspection

S.NO.	DETAILS OF FEATURE	ACCEPTANCE CRITERIA
A	All Sharp Edges & Burrs	To be rounded off/chamfered and burrs to be removed
B	Surface finish.	Rust /pit marks not allowed and coating & plating is to be applied as per standard in drg.

The visual condition of item supplied by vendor should be in acceptable condition and free from corrosion, rust and other environmental impact. The item /component surface or subsurface supplied should be free from pits, cracks, flaws and other defects which may affect its functionality in future.

## 5.3 Dimensional Inspection:

All dimensions (critical, major & minor in nature) & geometrical features of drawings are to be covered in check sheet and should be duly inspected by concerned quality control section. Components, having dimensions as per drawing, should only be accepted by inspectorate.

No deviation in dimension or in geometrical feature is permitted. Latest and calibrated measuring instrument with high accuracy as possible to be used for measurement.

If computerized measuring machine like coordinate measuring machine etc. are used for measurement their details along with tolerance and least count to be provided along with the report or mentioned in report.

## 6. Other Test on Semi-finished/finished Component.

6.1 Details of tests /check on Semi-finished/ finished items and acceptance criteria:

S No.	TEST / CHECK	SAMPLE SIZE	ACCEPTANCE CRITERIA
A	Hardness Test (In process Inspection)	100%	If applicable, Hardness Within Specified hardness Range as per Standard.
B	Surface Treatment /Coatings	100%	As per standard if applicable
C	Environmental /Corrosion test	As applicable	If applicable as per standard specified

6.2 It is to be ensured by vendor that item/component /material supplied having homogeneous chemical/mechanical/physical properties and having uniform surface coating/ treatment /hardness throughout the cross section as mentioned in relevant drawing/standard or specification.

6.3 Surface treatment as per drawing, specification to mentioned in Part No. IFL 8610 / DESIGN NO. CQA/WPN-1931.

## **7. List of Documents:**

**(To be submitted by firm along with finished component during factory end inspection)**

- (1) Pre inspection report of material/component/item as per specification and standard mentioned in drawing.
- (2) Certificate of conformity by supplier if applicable.
- (3) Vendor should submit dimensional report of material/item/component along with details of instrument and their tolerances as applicable as per Para 4.3 (sample 100%)
- (4) In material test report Heat treatment process and condition should be clearly mentioned and as per specification mentioned in drawing,
- (5) Material Chemical/Mechanical/Physical/ Microstructure/Load test report as per relevant standard and specification mentioned in drawings of supply order from authorized GOVT/NABL /DGQA Laboratory.
- (6) Vendor should ensure at least 90% reliability of item/component.
- (7) Guarantee/ Warranty certificate as per relevant supply order.
- (8) Life testing/Reliability report for items like bearings etc. as applicable for items which are specially designed or developed for GCF factory.

## **8. Important Note:**

- (1) Hardware items of best trade Quality to be used.
- (2) Final authority of acceptance is based on the Fit for Trial (FFT) report of item/material/component.
- (3) Use rust preventative after integration, location specified as per drawings specification; if applicable.
- (4) If any query arises pertaining to dimensions, standards (viz. mechanical properties, chemical composition, Heat treatment etc.) or any other aspects which are mentioned in QAP but the same is mismatched with actual drawings/standards, then the firm should intimate GCF with details explanation. The commencement of bulk production only be initiated after the proper clarification received from GCF Jabalpur.

**Date: -12/06/2023**

*JWK*  
*15/06/2023*  
**Prepared By**  
**JWM/SC**

  
**Approved By**  
**Quality Controlling Officer**

PART No. / DS CAT No.

5315-005000

DRG. CONVENTIONS CONFORM TO IS : 696  
DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

TOLERANCES FOR UNTOLERANCED LINEAR DIMNS.

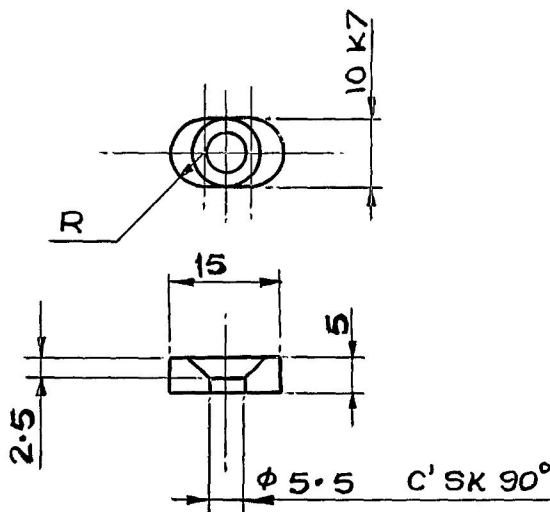
ABOVE	-	6	30	120	315	1000	2000	4000
UPTO	6	30	120	315	1000	2000	4000	-
TOL.	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3

NOM SIZE & FIT      DEVIATION

10 k 7      +0.001  
                 +0.016

UNTOLERANCED HOLE +0.2 mm

UNTOLERANCED ANGLES GIVEN IN DEGREE ONLY ± 30 MINUTES.



DESIGN AHSP  
*14/3/87*  
F/MDRG  
*FOR O.I/C 23/3/87*  
GUN DEV. TEAM

09-2-17	19574-W		MATL AMENDED		
3-1-04	18844-W		PROV. SEALING CANCELLED & DRG. SEALED.		
13-12-93	17827-W		DRG. SEALED PROV.		
9-12-85			CL. NEG. PREPARED		
DATE	AUTHORITY	ZONE	NATURE	SIG AHSP	SIG DO

CQA(W) JABALPUR

DRN.-      CHD- *PHANAJ*

TCD- *R/S Sharma*      CHD- *...*

C/D MAN      D.O.

AMENDMENTS  
DRG SEALED DC No. 18844-W  
DT. 03-1-04 *...* DO CQA(W)

AHSP *...* CQA(W)

SCALE: 1:1      ESTD MASS      DATE: 22-2-78

DESIGN No.      ASSY DRG  
ILG-272      ILG-262 SA

MATL: IS: 5517-1993, GRADE 40 Ni6 Cr 4 Mo 3, LRS-63

PART No.  
IFL 8257



ASSY DRG.  
1015-003246  
KEY, SECURING FIXED VALVE

DS CAT No.  
5315-005000

4

3

2

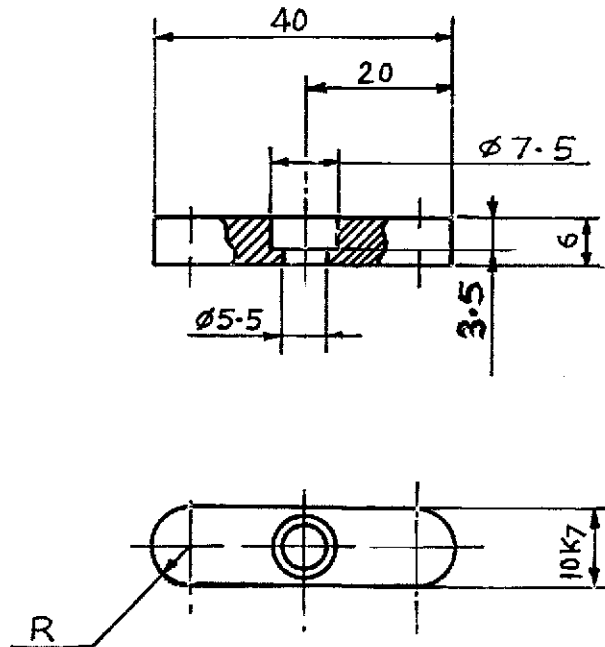
1

PART No  
5315-049584  
~~IFL-8608~~

DRG CONVENTIONS CONFORM TO IS. 696  
DIMENSIONS ARE IN mm  
TOLS FOR UNTOLERANCED LINEAR DIMNS FOLLOW IS:2102 (MED CL)

NOM SIZE & FIT	DEVIATION
10 k7	+0.001 +0.016


UNTOLERANCED HOLE +0.2 mm



1993, GRADE

MATL - IS: 5517 A 40 Ni 6 Cr 4 Mo 3 (RS-63) ~~1978~~

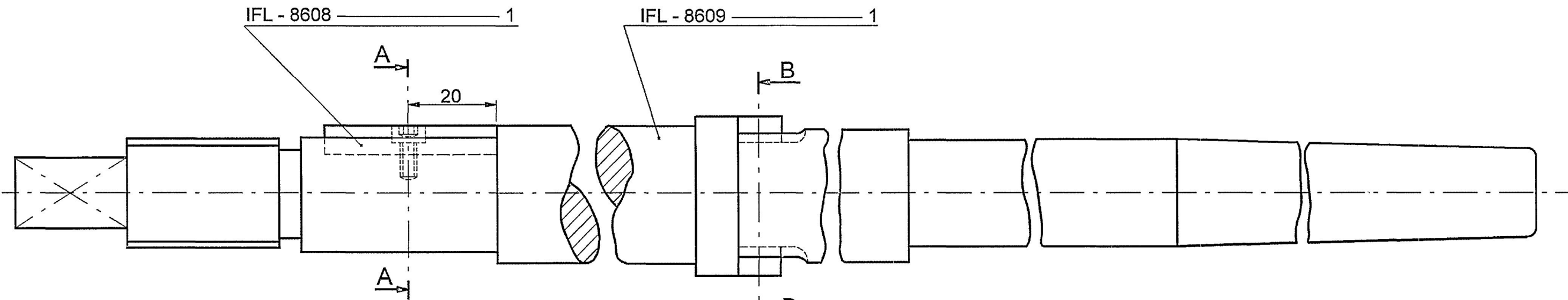
TCD	CHD	DATE
Sanyou	G.P. Sanyou	10-12-96
03-1-04/1884-W	PROV. SEALING CANCELLED & DRG SEALED	
03-12-96/18316-W	DRG SEALED PROV	
09.02.17/19574-W	MALL, D S CAT AMENDED	

<i>Prasad</i> C/D MAN	ASSY DRG	CQA(W) JABALPUR
<i>dm</i> DO	IFL-8610	
AHSP <i>dm</i> FOR CQA(W)	ESTD mass	DESIGN No CQA/WPN/1929
DRG SEALED 18314-W <i>dm</i> DT-03-1-04 DO CQA(W)	DATE -	PART No IFL-8608
	SCALE - 1.1	D S CAT No. 5315-049584
	DRN - MLS	
	CHD - MRR	

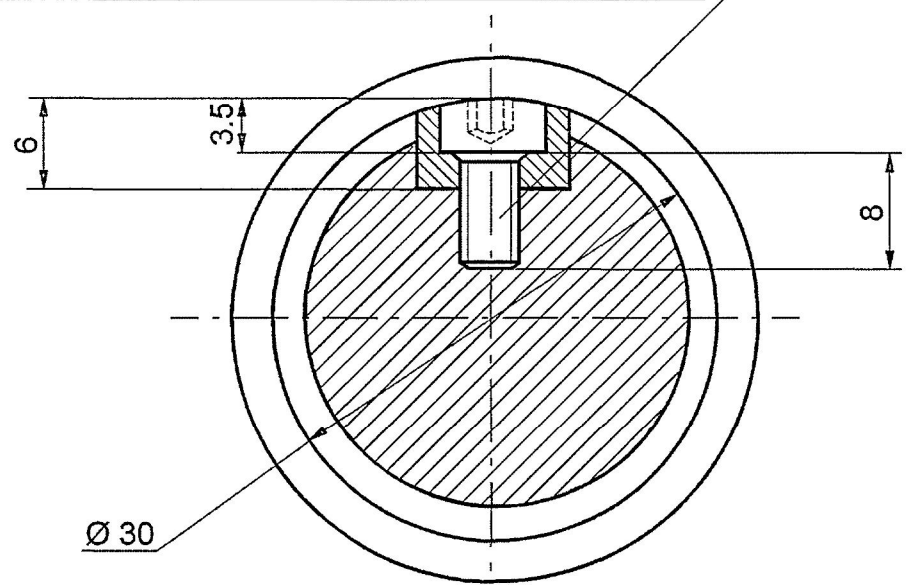
KEY, MACHINE

8 7 6 5 4 3 2 1

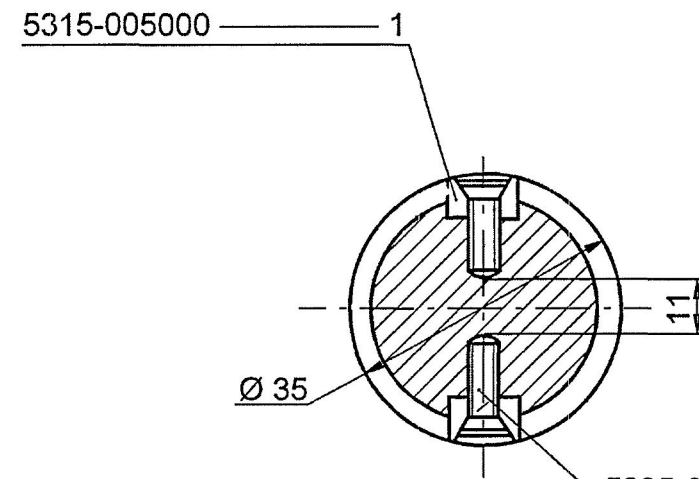
PART No **IFL 8610**  
 DRG CONVENTIONS CONFORM TO IS : 696  
 DIMNS ARE IN mm  
 TOLS FOR UNTOLERANCED LINEAR DIMNS FOLLOW IS:2102 (MED CL)



IFL 8611 (DRILLED & TAPPED)  
 HEAD TO BE MACHINED FLUSH AFTER ASSY &  
 BREECHED TO PREVENT LOOSENING OF SCREW



SECTION A — A  
 SCALE 2 1



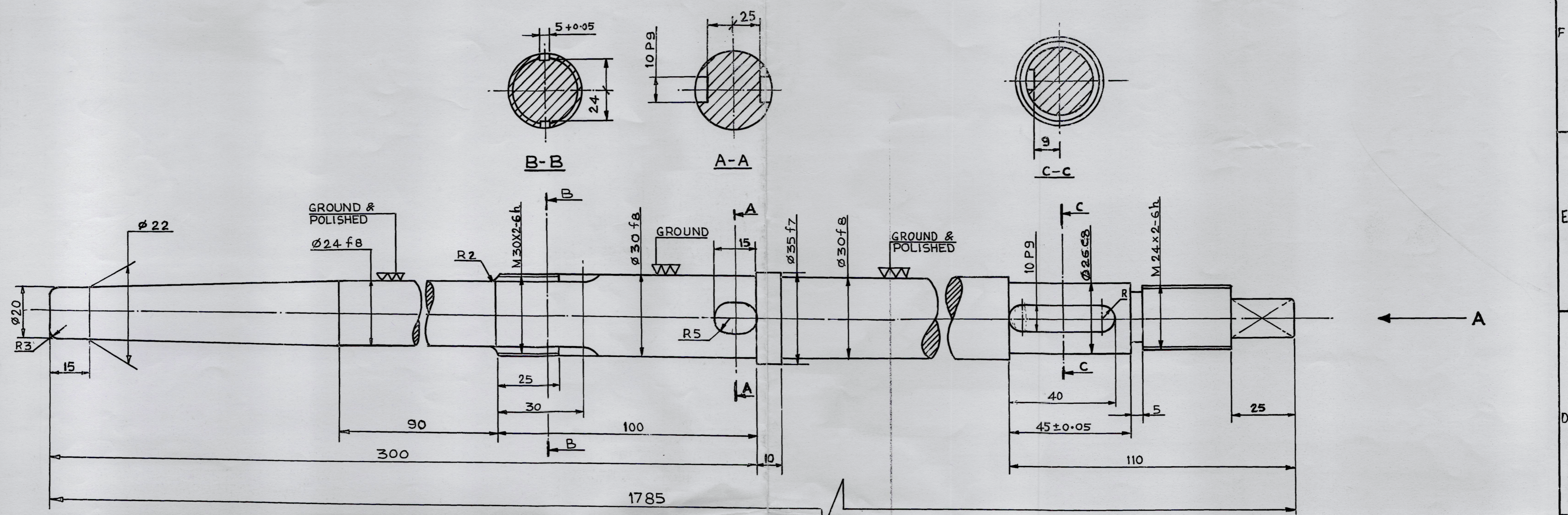
SECTION B — B  
 5305-003152 — 2  
 SCREW MACHINED C'SK HD M 5 x 12 (IS:1365)  
 (DRILLED & TAPPED)

19-5-17			SCANNED & PRINTED WITHOUT CHANGE		
DATE	AUTHORITY	ZONE	AMENDMENTS	SIG. AHSP	SIG. DO
PREV DC Nos:- 18825-W,18316-W & 18844-W DT 03-01-04			DO CQA(W)		
DRG SEALED :- 18844-W DT 03-01-04					

DRAWN.-	CHD.-	ASSY DRG.- IFL 985 SA
SCANNED - PKA	CHD:- <i>RBS</i>	DATE:-
H O S	AHSP	SCALE - 1 : 1
DO	FOR CQA(W)	ESTD mass.-
MATERIAL -		
PROTECTIVE FINISH -		
<b>ROD PISTON RECOIL MECHANISM</b>		
राड पिस्टन रिकवायल मैकेनिस्म		

<b>CQA(W), JABALPUR</b>	
DESIGN No. <b>CQA/WPN-1931</b>	
PART No. <b>IFL 8610</b>	
DS CAT No.	



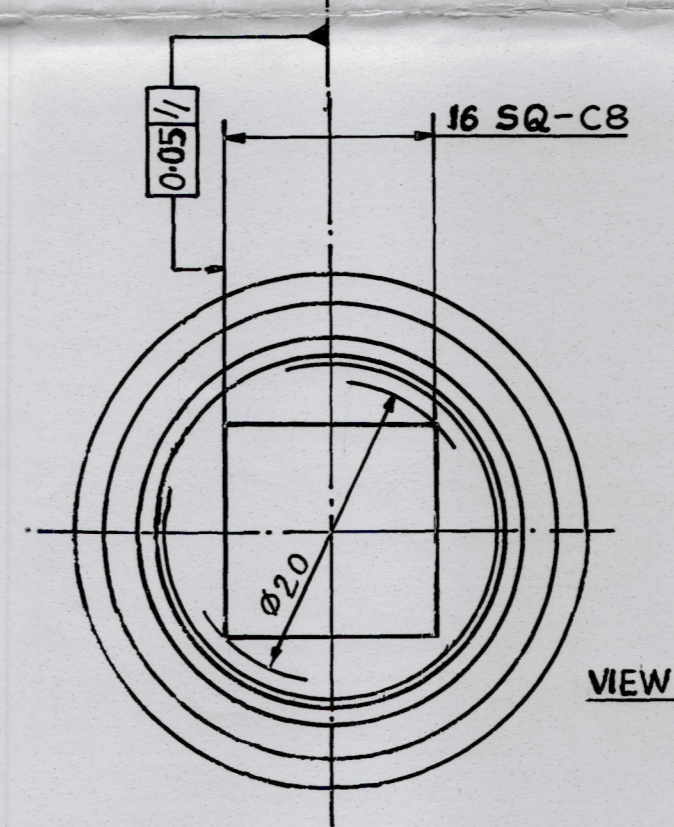


MATL: (a) IS: 5517-1993 GRADE 4DNi6Cr4Mo3 (LRS-63)  
 LFVD WITH CALCIUM SILICIDE TREATMENT.

- (b) i) PERCENTAGE SULPHUR .015 (MAX)  
 PERCENTAGE PHOSPHORUS .030 (MAX)  
 ii) ACCEPTANCE CRITERIA FOR INCLUSION RATING IS AS PER IS: 4163-1982 CHART SECONDARY REFINING STEEL. INCLUSION RATING SHOULD NOT EXCEED THE FOLLOWING:-

	THIN	THICK
SULPHIDE	1.5	1.0
ALUMINA	1.5	1.0
SILICATE	1.5	1.0
GLOBULAR OXIDE	2.0	1.0

THREADS CONFORM TO IS: 4218  
 UNTOLERANCED SHAFTS - 0.2 mm  
 UNTOLERANCED HOLES + 0.2 mm



VIEW IN DIRECTION 'A'  
 SCALE: - 2:1

NOM. SIZE & FIT	DEVIATION
Ø 35 f7	-0.025 -0.050
Ø 30 f8	-0.020 -0.053
Ø 26 e8	-0.040 -0.073
Ø 24 f8	-0.020 -0.053
10 P9	-0.015 -0.051
16 SQ-C8	-0.095 -0.122

9-2-17	19574-W	C/6-8	MATL AMENDED & DS CAT No ADDED		
08-02-05	18894-W	B-C/7-8	MATL. AMENDED & ADDED.		
3-1-04	18844-W		PROV. SEALING CANCELLED & DRG. SEALED.		
3-12-96	18316-W		DRG. SEALED PROV.		
13-12-2001	18656-W		NOTE FOR ALT. DESIGN DRG No. 1015-004393 'DELETED'		
11-12-96			NEW POLY NEGATIVE PREPARED		
DATE	AUTHORITY	ZONE	NATURE	SIG. AHSP	SIG. DO
AMENDMENTS			DRG. SEALED :- D.C.No. 18844-W DT:- 3-1-04		

DRN:-	CHD:-	ASSY DRG:- IFL-8610
TCD:- Sanjay	CHD:- G.P. Shukla	DATE:-
C/D MAN	D.O FOR CQA(W)	ESTD mass
MATERIAL:- AS SHOWN ABOVE		
PROTECTIVE FINISH:-		

**ROD (MODIFIED)**

CQA(W) JABALPUR	
DESIGN No.	CQA/WPN-1930
PART No	IFL-8609
D.S. CAT No.	1015-012565

4	3	2	1																		
PART No. <b>IFL-8611</b>		DRG. CONVENTIONS CONFORM TO IS: 696. DIMENSIONS ARE IN mm. TOLS. FOR UNTOLERANCED LINEAR DIMNS FOLLOW IS:2102(MED.CL)																			
D	<p>A SLIGHT ROUNDING OR COUNTER SUNK AT THE MOUTH OF THE SOCKET IS PERMISSIBLE</p>																				
C																					
B	<p><u>MATL:- IS: 4431-40C, 10S 18 (B) - 1978</u>  <u>PROTECTIVE FINISH :- TO BE PHOSPHATED AS PER</u>  <u>JSS: 0465-01-1988, CLASS-II FINISH (J)</u></p>																				
A	<p><u>THREADS CONFORM TO IS: 4218</u>  <u>UNTOLERANCED SHAFT-0.2 mm</u></p>																				
D	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>NOM SIZE-&amp; FIT</th> <th>DEVIATION</th> </tr> <tr> <td>7h13</td> <td>-0.220</td> </tr> </table>			NOM SIZE-& FIT	DEVIATION	7h13	-0.220														
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B	<b>SCREW, SOCKET HD</b>																				
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