



ENGINE FACTORY, AVADI

# PROCESS SCHEDULE

DESCRIPTION :- ..... **GEAR** .....

COMPT. No :- ..... **20-05-126-4** .....

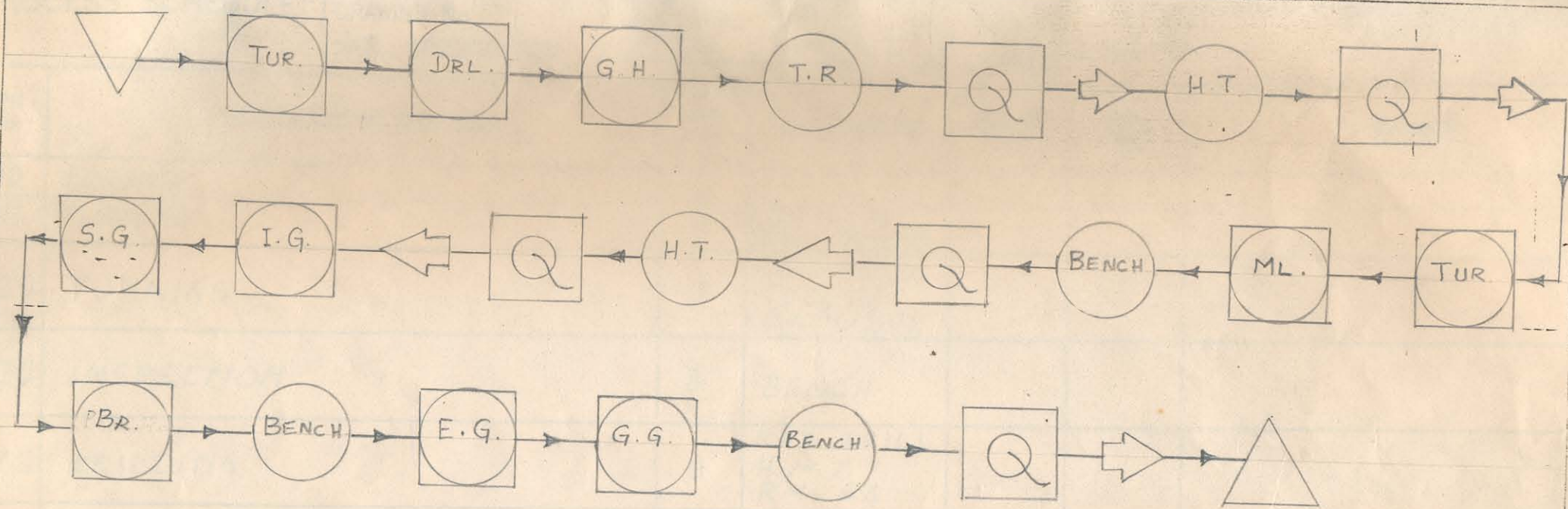
MFG. SHOP :- ..... **SPS** .....

# FLOW PROCESS CHART

STORE : GEAR

DRG. NO.: 20-05-126-4

END STORE: U.T.D. ENGINE ASSEMBLY.



TUR. = TURNING	G.H. = GEAR HOBGING	H.T. = HEAT TREATMENT	I.G. = INTERNAL GRINDING	BR. = BROACHING	G.G. = GEAR GRIND
DRL = DRILLING	T.R. = TOOTH ROUNDING	ML. = MILLING	S.G. = SURFACE GRINDING	E.G. = EXTERNAL GRINDING	

LEGEND

TEMP. STORAGE	▽	TRANSPORTATION	⇒	APPROVAL		SECTION	S.P.S.
OPERATION	○	INSPECTION BY QC	Q	SIGNATURE & DATE		NO. OF SHEETS	1.
OPERATION CUM INSPECTION	◻	INSPECTION BY SQAE/CQA(ME) Etc.	I	PREPARED BY	MGR. <i>[Signature]</i> / QC	SHEET NO.	1.
100% INSPN. BY MFG. SEC.	◻	STORAGE	△	APPROVED BY	<i>[Signature]</i>	ENGINE FACTORY, AVADI, MADRAS-54	
				AUTHORISED FOR ISSUE	<i>[Signature]</i> 20/10/96		



# ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE : GEAR
	DRAWING No : 20-05-126-4
	MATL SPECIFICATION : STEEL STAMPING - ST. 18X2H4MA

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
000	FORGING	5	-			
010	TURNING	6	CNC-LATHE 1212U-BATLIBOI			
020	TURNING	7	CNC-LATHE 1212-U BATLIBOI			
030	INSPECTION	8	BENCH			
040	DRILLING	9	RAD. DRILL H.M.T. RM-63			
050	INSPECTION	-	BENCH			
060	GEAR HOBGING	10	GEAR HOB. M/C - H.M.T. H-400			
070	TOOTH ROUNDING	11	TOOTH RNDG. M/C - PENTAGON			
090	WASHING	-	WASHING PLANT			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						
SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>[Signature]</i>						SHT. No
DATE	26.10.96	DATE	26.10.96	DATE	26.10.96	26.10.96						1 OF 27
CMI /PDO		CMI /PDO		HOS/PDO		DO/PDO		PDO REF	ISSUE	DATE	SIGN	



# ENGINE FACTORY AVADI

FORM No :EFA/P-038

## PROCESS SCHEDULE

NOMENCLATURE : .....

DRAWING No : 20-05-126-4

MATL SPECIFICATION : .....

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
100	INSPECTION	12	BENCH			
110	HEAT TREATMENT-CARBURIZING.	13	H.T.P.			
120	INSPECTION	-	BENCH			
130	TURNING	14	CNC-LATHE HMT SB-CNC.			
140	INSPECTION	-	BENCH			
150	MILLING & DRILLING	15	VMC HMT-VTC			
155	MILLING	16	VMC HMT-VTC			
160	DEBURRING	-	BENCH			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No
SIGN	<i>Romany</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>					2 OF 27
DATE	22-10-96	DATE	26-10-96	DATE	28-10-96	DATE	26/10/96					
CMF /PDO		C/PNT /PDO		HOS/PDO		DO/PDO		PDO REF	ISSUE	DATE	SIGN	



# ENGINE FACTORY AVADI

FORM No :EFA/P-038

## PROCESS SCHEDULE

NOMENCLATURE :  
 DRAWING No : 20.05-126-4  
 MATL SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
170	WASHING	-	BENCH			
180	INSPECTION	17	BENCH			
190	HEAT TREATMENT - HARDENING	18	H.T.P.			
200	INSPECTION	-	BENCH			
210	INTERNAL GRINDING	19	INT. GRND. MIC CINCINNATI/ PARISHUDH.			
220	SURFACE GRINDING	20	S. GRND MIC PRAGA / ELB.			
230	BROACHING (KEY WAY)	21	VERTICAL BROACHING MIC - H.M.T.			
240	DEBURRING & MARKING	22	BENCH			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No
SIGN	<i>Sonam</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>[Signature]</i>						3 OF 27
DATE	22.10.96	DATE	26.10.96	DATE	26.10.96	26/10/96						
CME /PDO		CME /PDO		HOS/PDO		DO/PDO		PDO REF	ISSUE	DATE	SIGN	



# ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE	:	.....
	DRAWING No	:	20-05-126-4
	MATL SPECIFICATION	:	.....

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
250	GRINDING	23	CYL. GRND. MIC G-17/1200			
260	GEAR GRINDING	24	GEAR GRND: MIC REISHAUER			
270	DRESSING	25	BENCH			
280	WASHING		WASHING PLANT			
290	INSPECTION: CRACK TEST & DE-MAGNETIZE		MAGNETIC FLAW DETECTOR			
300	FINAL INSPECTION	26 & 27	BENCH			
310	PRESERVATION					
320	MARKING-MARK THE PART NO.					
330	INSPECTION					

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No 4 OF 27
SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>[Signature]</i>						
DATE	22.10.96	DATE	26.10.96	DATE	26.10.96	26.10.96						
	CMF /PDO		CMF /PDO		HOS/PDO	DO/PDO		PDO REF	ISSUE	DATE	SIGN	



PLANNING SHEET - PDO/EFA

FORM No: EFA/P-039

NOMENCLATURE

GEAR

DRAWING No.  
20.05.126-4

ISSUE

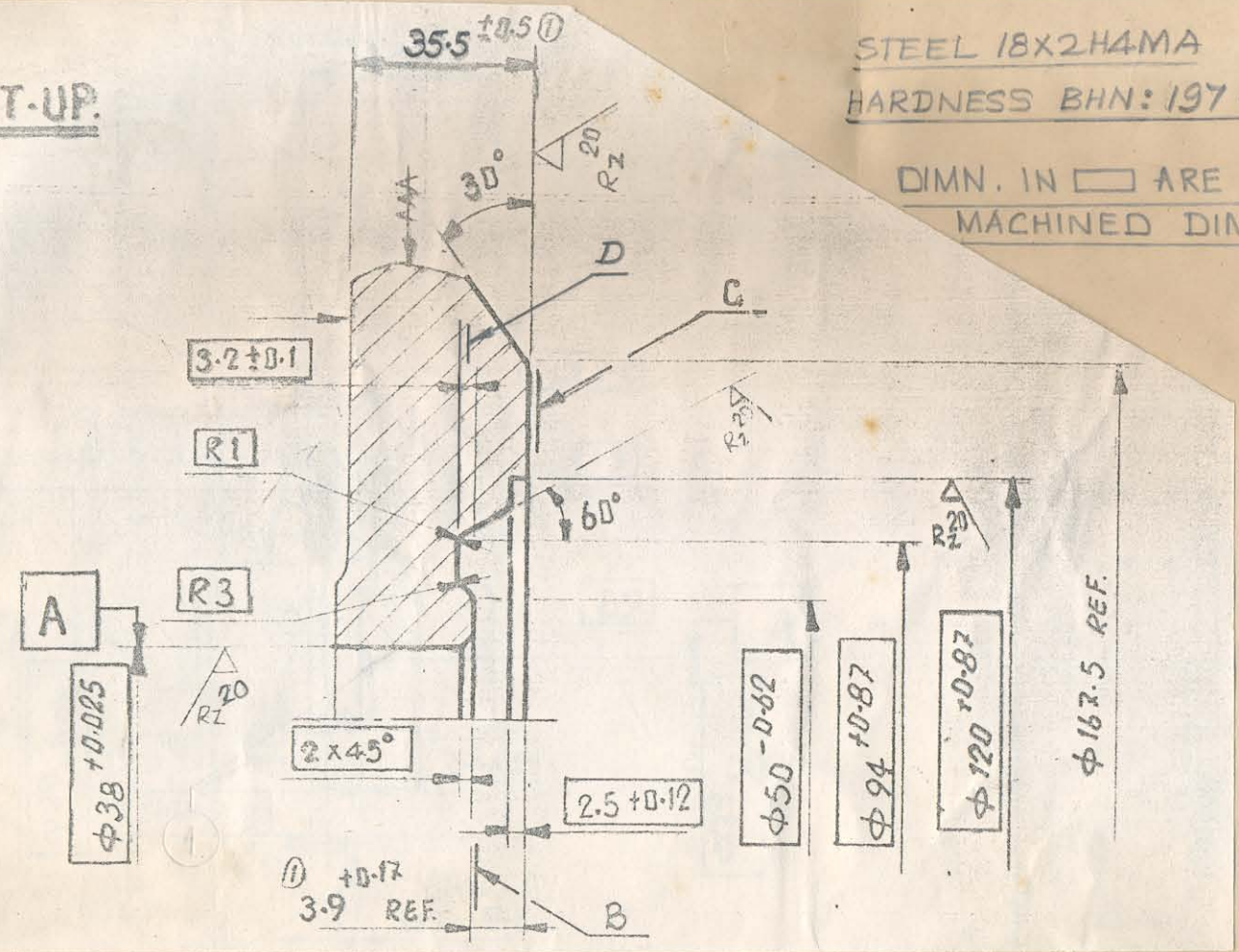
OPN. No. 010  
OPERATION TURNING

MACHINE: CNC - LATHE  
CINCINNATI BATLIBOI

STEEL 18X2H4MA Ra10/  
HARDNESS BHN: 197-269

DIMN. IN    ARE FINAL MACHINED DIMN.

I SET-UP.



TECH. REQT.

1. RUN OUT OF SURFACE (B) & (C) W.R.T. SURFACE (A) SHOULD NOT EXCEED 0.05mm.
2. CUTTING TOOL TRACE IS ALLOWED SURFACE (D) UPTO  $\phi 60$

STD. TOOLS & GAUGES

OD TOOL HOLDER	PCLNL 25 25 K12 (SANDVIK)
INSERT	CNM 9120412 GC 435
BORING BAR HOLD.	$\phi 32$ AED/SPL
SPL. INT. TOOL HOLD.	T-033/IT SANDVIK
INSERT	DNMG 150608-15 GC435
SANDVIK-U DRILL	R416-1-0350-20-04
WCMX	06 0308 R-SIGC135

SPECIAL TOOLS & GAUGES

BOR. BAR HOLDER	$\phi 25$ S 25 T/PCLN/L12 (SANDVIK)
INSERT	GNMG120408 GC415
BOR. BAR HOLDER	$\phi 20$ S20S SCLC L09 SANDVIK
INSERT	CCMT 09T0308 52 SIP.
HARD JAWS	AED/SPL/ -054/HJ.
PLUG GAUGE	$\phi 38$ +0.025 020/09/43
DEP. GAUGE	3.2 ±0.1 093/5
	2.5 ±0.12 030/116
INSP. MANDREL	081/3

PRED.	CHD.	APPD.
[Signature]	[Signature]	[Signature]

PLANNING SHEET - PDO/EFA

FORM No: EFA/P-038

ENCLOSURE

# GEAR

DRAWING No.  
20.05.126-4

ISSUE

OPN. No.  
020

OPERATION  
TURNING

*Ra5*

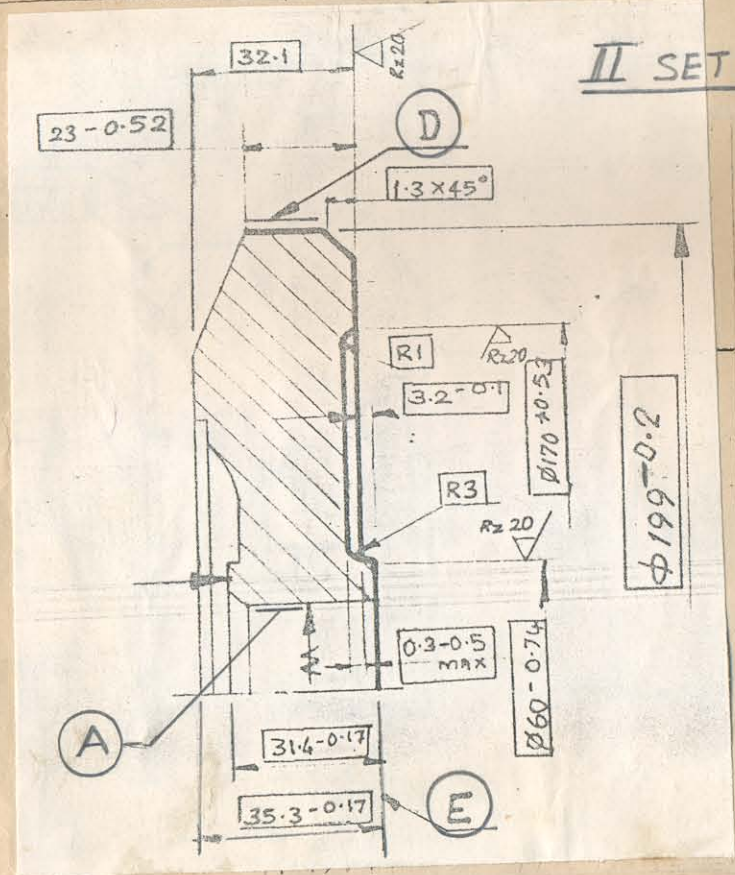
MACHINE: CNC-LATHE  
CINCINNTI BATLIBOI.

STD. TOOLS & GAUGES

- OD TOOL HOLDER PCLNL/2525/K12
- INSERT. CNMG-120412 GC 435
- BOR. BAR HOLDER  $\phi 32$
- SPL. INT. TOOL HOLD. [AED/SPL/T-033/IT] SANDVIK
- INSERT- DNMG-15 0608-15.GC435

SPECIAL TOOLS & GAUGES

- END LOCATOR - AED/SPL/T-106/EL
- EXPAND MANDREL WITH ADJ. REST BUTTON } AED/MISC/003
- SPL. SNAP GAUGE 35.3-0.17 024/30
- 31.4-0.17 024/21
- DEP. GAUGE 3.2-0.1 030/115
- GAP GAUGE  $\phi 199$  026/05/5
- INSP. MANDREL 081/3



II SETUP

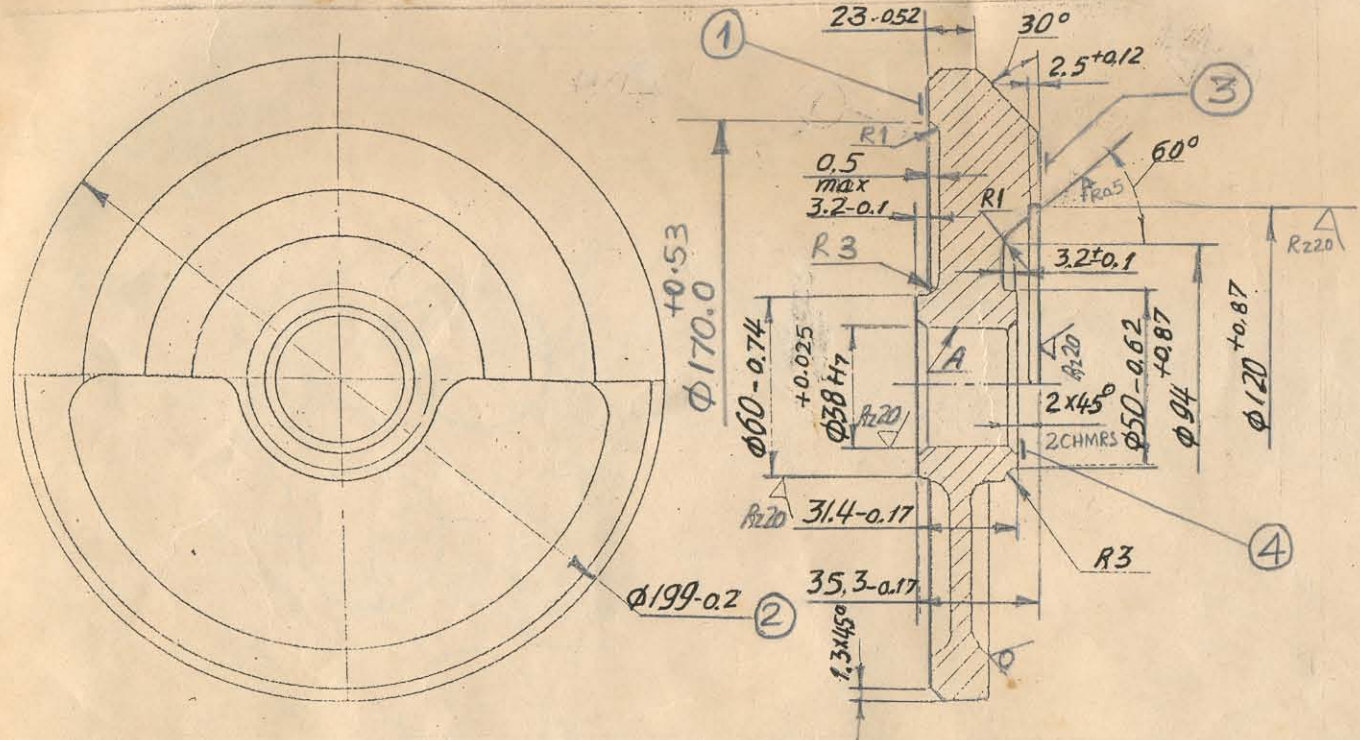
DIMN IN   ARE FINAL MACHINED DIMN.

TECH. REQT:

1. RUN OUT OF SURFACE (E) W.r.t. SURFACE (A) SHOULD NOT EXCEED 0.1 mm.
2. RUNOUT OF SURFACE (D) WITH RESPECT TO SURFACE (A) SHOULD NOT EXCEED 0.1 mm.
3. CUTTING TOOL TRACE IS ALLOWED ON SURFACE 1 UPTO  $\phi 60$ .

<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	
PRED.	CHD.	APPD	DATE

*Ratio (D)*



TECH. REQTS:-

- ① RUNOUT OF SURFACE ① AND ② WITH RESPECT TO AXIS OF SURFACE 'A' SHOULD NOT EXCEED 0.1MM.
- 2) RUNOUT OF SURFACES ③ AND ④ WITH RESPECT TO SURFACE 'A' SHOULD NOT EXCEED 0.05MM.

SPECIAL TOOLS & GAUGES

PLUG GAUGE φ 38.0 +0.025	020/05/43
SPECIAL SNAP GAUGE FOR	
i) 35.3 <sup>-0.17</sup>	024/30
ii) 31.4 <sup>-0.17</sup>	024/21
DEPTH GAUGE	
i) 3.2 ±0.1	093/5
ii) 2.5 +0.12	030/116
iii) 3.2 -0.1	030/115
GAP GAUGE φ 199 - 0.2	026/05/5
INSPECTION MANDREL	081/3

<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	35	21.01
PRED.	CHD.	APPD	REV	DATE

PLANNING SHEET - PDO/EFA FORM No: EFA/P-039

ENCLOSURE

# GEAR

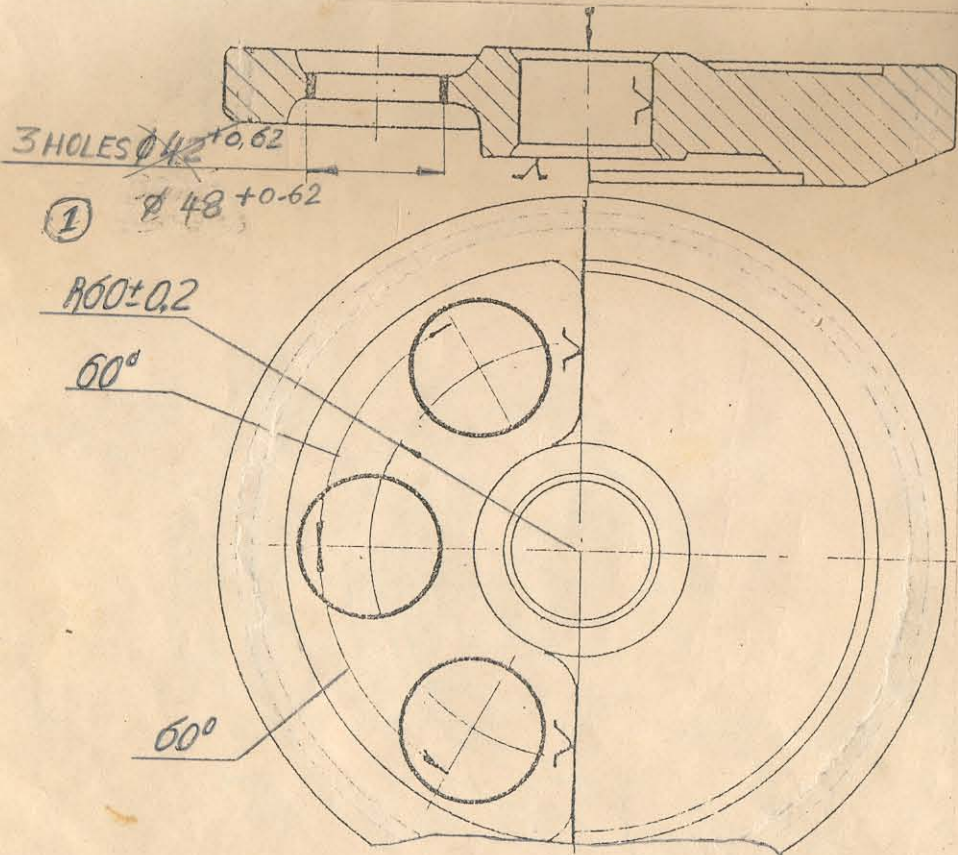
DRAWING No.  
20.05.126-4

ISSUE

OPN. No. 040  
OPERATION DRILLING.

*Ra20/*

MACHINE: RADIAL DRILLING  
RM-63 M/c



STD. TOOLS & GAUGES

- DRILL  $\phi 42.0$
- DRILL  $\phi 20$
- ③ DRILL  $\phi 48$

SPECIAL TOOLS & GAUGES

- DRILL JIG 201034

<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	118	1	27/10/2K	<i>[Signature]</i>
PRED.	CHD.	APPD	PDO-REF	ISSUE	DATE	SIGN.