

ENGINE FACTORY, AVADI

PROCESS SCHEDULE

DESCRIPTION :- **VERTICAL SHAFT**.....

COMPT. No :- **308-63-7**.....

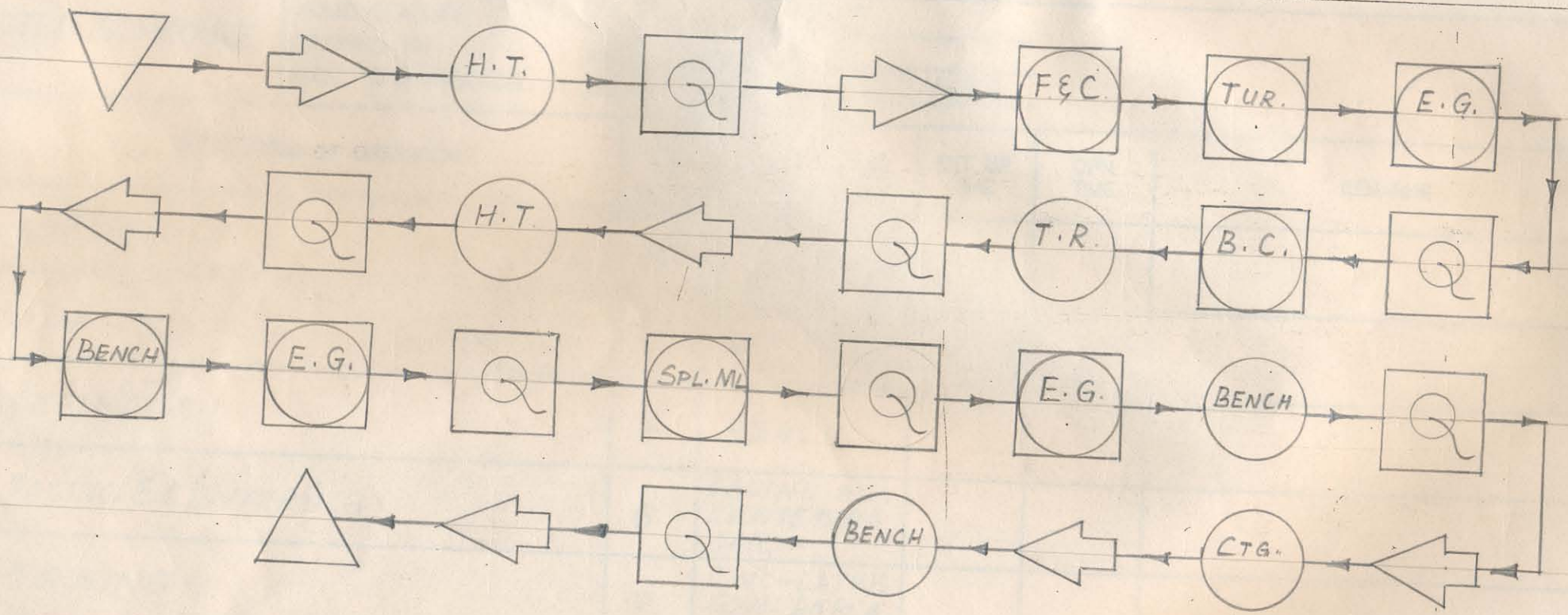
MFG. SHOP :- **SPS**.....

STORE : VERTICAL SHAFT

FLOW PROCESS CHART

DRG. NO.: 308-63-7

END STORE: V. 46. ENGINE ASSEMBLY



H.T. = HEAT TREATMENT	F&C = FACING & CENTERING	TUR. = TURNING	E.G. = EXTERNAL GRINDING
B.C. = BEVEL CUTTING	T.R. = TOOTH ROUNDING	SPL. ML. = SPLINE MILL	CTG. = COATING

LEGEND		APPROVAL		SECTION
TEMP. STORAGE	▽	TRANSPORTATION	➔	S.P.S.
OPERATION	○	INSPECTION BY QC	⊞	NO. OF SHEETS
OPERATION CUM INSPECTION	⊞	INSPECTION BY SQA/E/CQA (ME) Etc.	⊞	SHEET NO.
100% INSPN. BY MFG. SEC.	□	STORAGE	△	ENGINE FACTORY, AVADI, MADRAS-54

SIGNATURE & DATE

PREPARED BY: MCF *[Signature]* QC -

APPROVED BY: *[Signature]*

AUTHORISED FOR ISSUE: *[Signature]* 30/10/96



ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE : <u>VERTICAL SHAFT</u>
	DRAWING No : <u>308-63-7</u>
	MATL. SPECIFICATION : <u>STEEL STAMPING - 18X2H4MA</u>

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
000	FORGING	5	-			
005	HEAT TREATMENT : <u>CONDITION TO BHN 197-269.</u>	-	H.T.P.			
007	INSPECTION	-	BENCH			
010	FACING & CENTERING	6	FACING AND CENTERING MIC			
020	TURNING	7	CNC-LATHE GDM-65/2A HMT			
030	TURNING	8	CNC-LATHE GDM-65/2A HMT			
040	EXTERNAL GRINDING	9	CYL. GRNDG. MIC-HMT - G17/1200			
050	WASHING	-	WASHING PLANT			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No 1 OF 22
SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>[Signature]</i>						
DATE	30.10.96	DATE	30.10.96	DATE	30.10.96	30.10.96						
	CM I /PDO		CM I /PDO		HOS/PDO	DO/PDO		PDO REF	ISSUE	DATE	SIGN	



ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE :
	DRAWING No : <u>308-63-7</u>
	MATL. SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
060	INSPECTION	10	BENCH			
070	BEVEL GEAR GENERATING	11	BEVEL GEAR GENERATING MIL - WMW			
080	WASHING	-	WASHING PLANT			
090	TOOTH ROUNDING	12	BENCH			
100	INSPECTION	13	BENCH			
110	HEAT TREATMENT	14	H.T.P.			
120	INSPECTION	-	BENCH			
130	CENTRE CORRECTION	15	BENCH			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No
SIGN	<i>Suman</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>Make</i>						2 OF 22
DATE	30.10.98	DATE	30.10.98	DATE	30.10.98	<i>20/10/98</i>						
cm I /PDO		e/mr /PDO		HOS/PDO		DO/PDO		PDO REF	ISSUE	DATE	SIGN	



ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE	:
	DRAWING No	:	308-63-7
	MATL SPECIFICATION	:

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
140	EXTERNAL GRINDING	16	CYL. GRNDG. MIC - HMT - G-17/1200			
150	EXTERNAL GRINDING	17	CYL. GRNDG. MIC - HMT - G-17/1200			
155	INSPECTION	-	BENCH			
160	SPLINE MILLING	18	SPLINE MILLING MIC WMW			
170	SPLINE MILLING	19	SPLINE MILLING MIC WMW			
180	WASHING	-	WASHING PLANT			
185	INSPECTION	-	BENCH			
190	EXTERNAL GRINDING	20	CYL. GRNDG. MIC - HMT - G-17/1200			

PREPARED BY	CHECKED BY	APPROVED BY	AUTHORISED BY						SHT. No
SIGN <i>[Signature]</i>	SIGN <i>[Signature]</i>	SIGN <i>[Signature]</i>	SIGN <i>[Signature]</i>						3 OF 22
DATE 30.10.96	DATE 30.10.96	DATE 30.10.96	DATE 30.10.96						
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 : 308-63-7

MATL. SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
200	DRESSING	-	BENCH			
210	WASHING	-	WASHING PLANT			
220	INSPECTION: CRACK TEST & DE-MAGNETIZE	-	MAGNETIC FLAW DETECTOR			
240	WASHING	-	WASHING PLANT			
250	FINAL INSPECTION	21,22	BENCH			
260	ANTI-CORROSION TREATMENT	-	S.P.S.			
270	OXIDATION (SPARES ONLY)	-	H.T.P.			
280	MARKING: MARK THE PART No.	-	BENCH			
290	INSPECTION	-	BENCH			

PREPARED BY		CHECKED BY		APPROVED BY		AUTHORISED BY						SHT. No
SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	SIGN	<i>[Signature]</i>	<i>[Signature]</i>						4 OF 22
DATE	30.10.96	DATE	30.10.96	DATE	30.10.96	30/10/96						
	CM I /PDO		CM I /PDO		HOS/PDO	DO/PDO		PDO REF	ISSUE	DATE	SIGN	

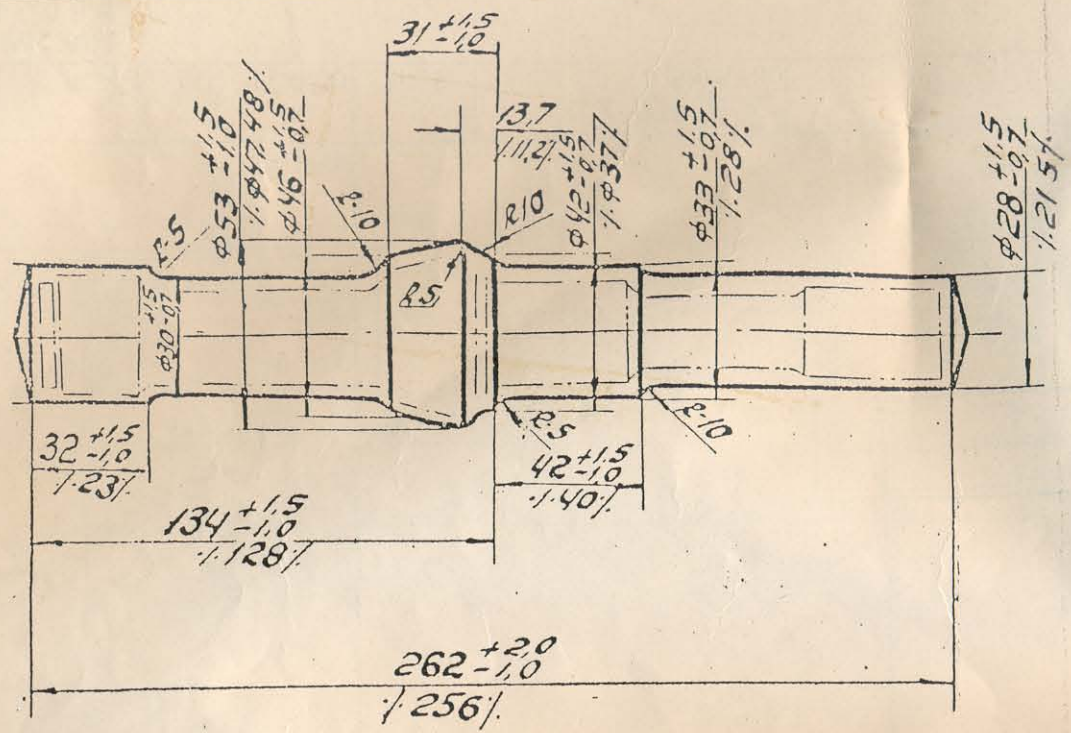
VERTICAL SHAFT

DRAWING NO. 308.6-7

ISSUE NO. 000 OPERATION STEEL STAMPING

STAMPING DRG:
HARDNESS BHN 197 TO 269
STEEL 18X2H4MA.

MACHINE: BENCH



STD. TOOLS & GAUGES

SPECIAL TOOLS & GAUGES

TECH. REQT.

1. DRAFTS 6° .
2. UNSPECIFIED RADII R3.
3. SHIFT (MISMATH) OF DIES.
 - a. LONGITUDINAL UPTO 1.5mm.
 - b. CROSS UPTO 1mm.
4. CURVATURE UPTO 1.0mm.
5. LEFT OUT BURRS MAY BE UPTO 1.5mm. ALONG THE PARTING LINE.
6. DEPTH OF DEFECTS IS ALLOWED UPTO HALF OF MACHINING TOLERANCE
7. STEEL GRADE IS TO BE MARKED.

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

VERTICAL SHAFT

DRAWING NO. 308.6-17

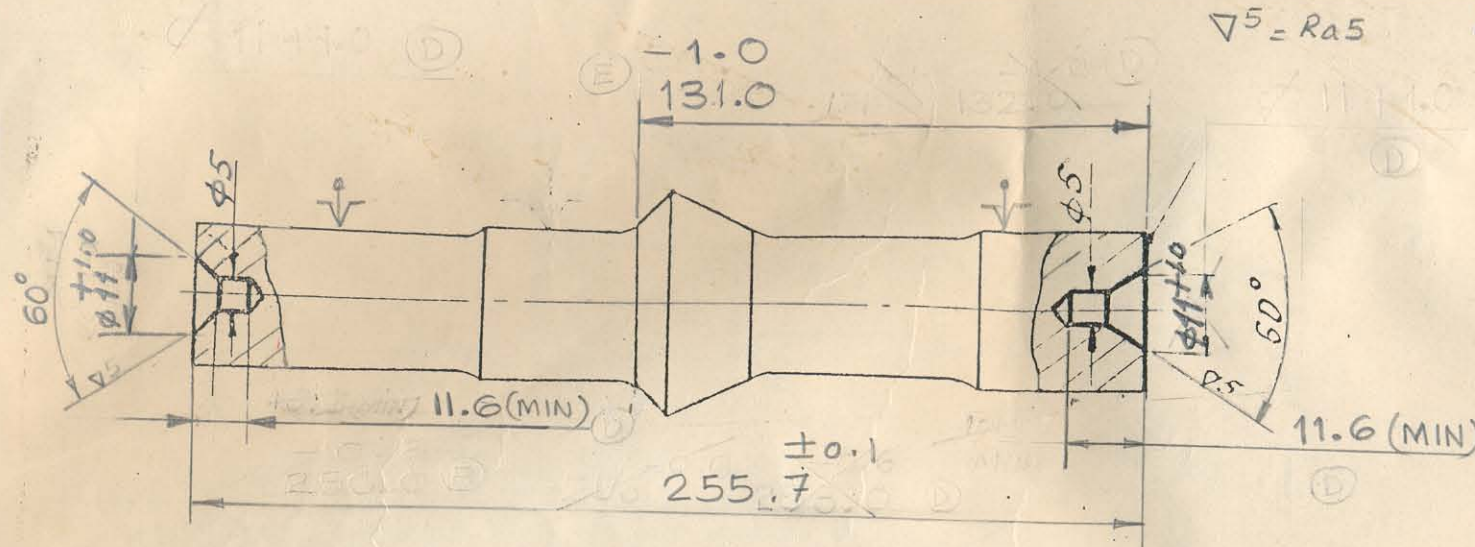
ISSUE

OF N. NO.

OPERATION

010

FACING & CENTRING



$\nabla^5 = Ra5$

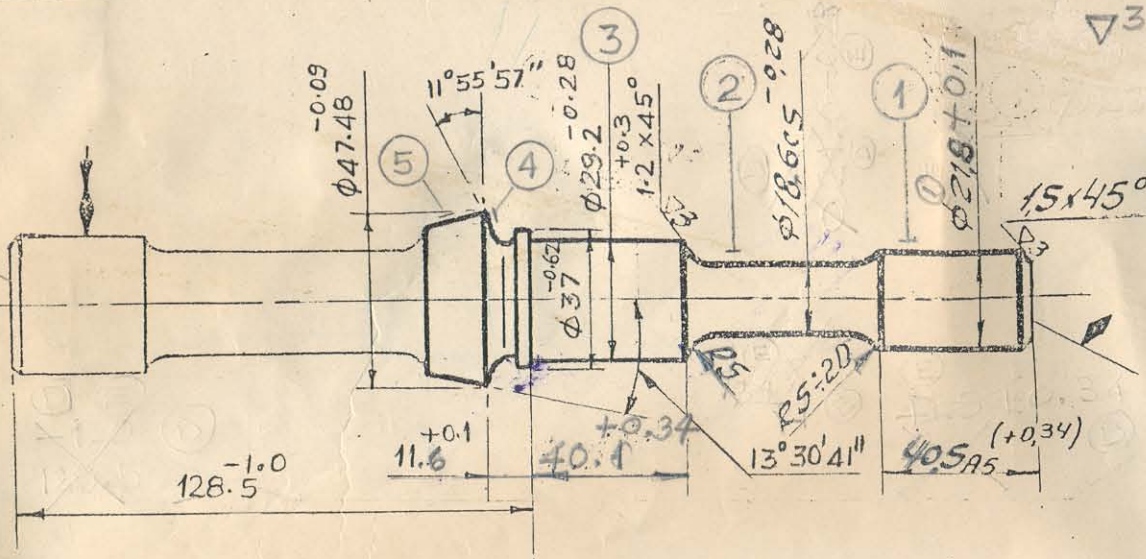
$Ra10$ (A)

MACHINE: FACING & CENTRING
M/C
HMT

STD. TOOLS & GAUGES
FACING MILLING $\phi 160$
CUTTERS. R 262-2.260
CENTRE DRILL
A 5X12.5 IS:6708

SPECIAL TOOLS & GAUGES

PRED.	CHD.	APPD



$\nabla 3 = Ra 20$ $Ra 5$ (∇)

MACHINE: CNC - LATHE
HMT
GDM - 65 - 2A

STD. TOOLS & GAUGES

COPY TURNING TOOL SVJBR
2525M16
INSERT CGMC 16T308
SNAP GAUGE FOR $\phi 21.5 \pm 0.1$

TECH. REQT.

RUNOUT OF THE FOLLOWING SURFACES WITH RESPECT TO CENTRES:

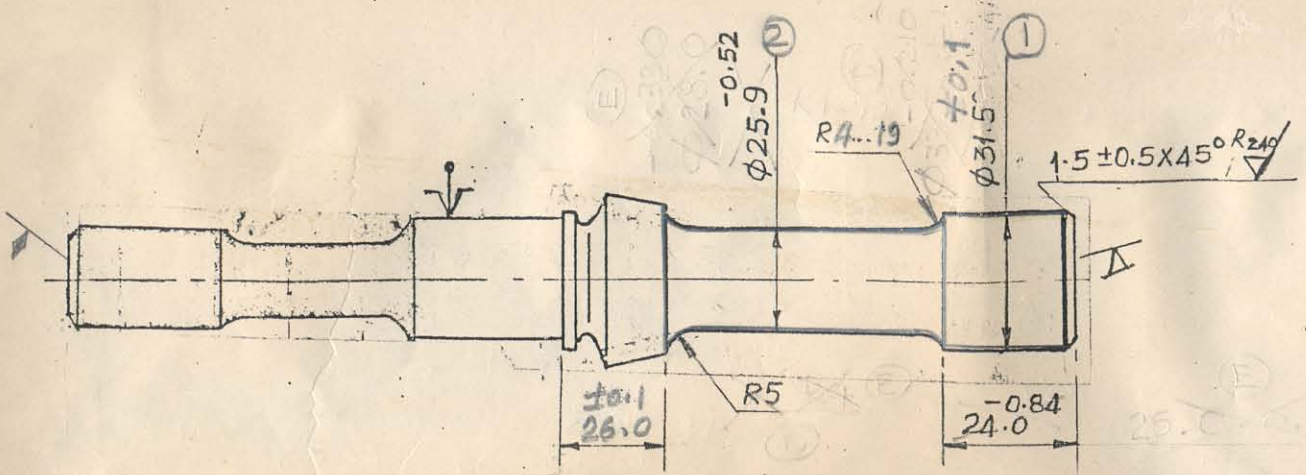
- SURFACE: ① SHOULD NOT EXCEED 0.1mm.
- ② & ③ SHOULD NOT EXCEED 0.2mm.
- ④ & ⑤ SHOULD NOT EXCEED 0.08mm.

NOTE: COMPONENT IS TOOLED UP BY HMT IN CNC LATHE GDM 65/2A.

SPECIAL TOOLS & GAUGES

SNAP GAUGE $\phi 21.5 \pm 0.1$
SPECIAL SNAP (ANN) GAUGES FOR TAPERS
i) 'GO' ϵ } ± 0.1 403300
'NO GO' } ± 0.1 403301
ii) 'GO' ϵ } ± 0.09 403123
'NO GO' } ± 0.09 403124
 $\phi 47.48$

025	1	16.4.97
PDO REF.	ISSUE	DATE



TECH. REQT.

- ① RUNOUT OF SURFACE ① RELATIVE TO AXIS OF CENTRES SHOULD NOT EXCEED 0.1mm
- ② RUNOUT OF SURFACE ② RELATIVE TO AXIS OF CENTRES SHOULD NOT EXCEED 0.2mm.

MACHINE: CNC-LATHE
 HMT
 GDM-65/2A

STD. TOOLS & GAUGES

COPY TURNING TOOL	SPJBR 2525 M16
INSERT CGMC FINISH	16T308 16T304

SPECIAL TOOLS & GAUGES

SNAP GAUGE $\phi 31.5 \pm 0.1$	025/05/15
SPECIAL SNAP GAUGE 26.6 ± 0.28	403120
SPECIAL SOFT JAW	200536

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

542	5	21-12-04
527	D	31-12-04