



ENGINE FACTORY, AVADI

PROCESS SCHEDULEDESCRIPTION :- **INCLINED SHAFT**.....COMPT. No :- **308.67-2**.....MFG. SHOP :- **SPS**.....

REV.No-: 00

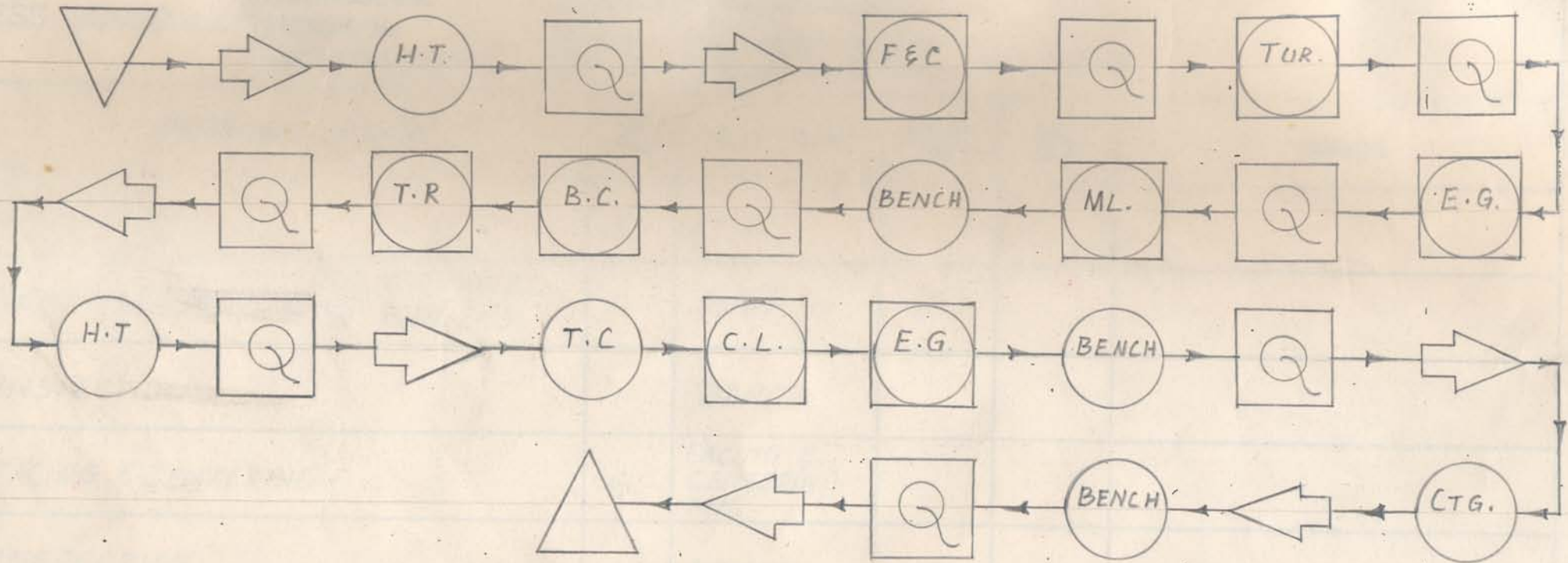
DATE : 30.10.96

FLOW PROCESS CHART

STORE : INCLINED SHAFT

DRG. NO. : 308-67-2

END STORE : V.46. ENGINE ASSEMBLY



H.T. = HEAT TREATMENT	F&C = FACING & CENTERING	TUR. = TURNING	E.G. = EXTERNAL GRIND	ML = MILLING
B.C. = BEVEL CUTTING	TR = TOOTH ROUNDING	T.C. = TOOTH CLEANING	C.L. = CENTRE LAPPING	CTG = COATING
LEGEND		APPROVAL		SECTION
TEMP. STORAGE	▽	TRANSPORTATION	➡	S.P.S.
OPERATION	○	INSPECTION BY QC	Q	NO. OF SHEETS
OPERATION CUM INSPECTION	◻	INSPECTION BY SQAE/CQA(ME) Etc.	I	1.
100 % INSPN. BY MFG. SEC.	□	STORAGE	△	SHEET NO.
				1.
				ENGINE FACTORY, AVADI, MADRAS-54

SIGNATURE & DATE
 PREPARED BY MGF *[Signature]* QC *[Signature]*
 APPROVED BY *[Signature]*
 AUTHORIZED FOR ISSUE *[Signature]* 30/10/96



ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE	: <u>INCLINED SHAFT</u>
	DRAWING No	: <u>308-67-2</u>
	MATL. SPECIFICATION	: <u>STEEL STAMPING - STEEL-18X2H4MA.</u>

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
000	FORGING	5	-			
005	HEAT TREATMENT: RE-NORMALIZE TO BHN 269.	-	H.T.P.			
007	INSPECTION	-	BENCH			
010	FACING & CENTERING	6	FACING & CENTERING MIC.			
015	INSPECTION	-	BENCH			
018	TURNING	7	C/LATHE NH-26/1000 HMT			
020	TURNING	8	CNC-LATHE GDM-65/2A HMT			
030	TURNING	9	CNC-LATHE GDM-65/2A HMT			

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	30/10/96	DATE	30.10.96	DATE	30.10.96	30/10/96						1 OF 22
	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 : <u>308-67-2</u>
	MATL SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
040	INSPECTION	10	BENCH			
050	EXTERNAL GRINDING	11	CYL. GRNDG. MIC - HMT. G-17/1200			
055	INSPECTION	12	BENCH			
060	SPLINE MILLING	-	SPLINE MILL HOBB. MIC - WMW			
070	BENCH WORK : DEBURRING OF SPLINES.	-	BENCH			
080	INSPECTION	13	BENCH			
090	BEVEL GEAR GENERATING	14	BEVEL GEAR GENERATING MIC - WMW			
100	TOOTH ROUNDING	15	BENCH			

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 2 OF 22
DATE	30.10.96	DATE	30.10.96	DATE	30.10.96	30.10.96						
	CMI /PDO		Q/M		/PDO		DO/PDO	PDO REF	ISSUE	DATE	SIGN	



ENGINE FACTORY AVADI

FORM No : EFA/P-038

PROCESS SCHEDULE

NOMENCLATURE :

DRAWING No : 308-67-2

MATL. SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
110	WASHING	-	WASHING PLANT			
120	INSPECTION	16	BENCH			
130	HEAT TREATMENT	17	H.T.P.			
140	INSPECTION	-	BENCH			
145	TOOTH CLEANING	18	BENCH			
150	CENTRE CORRECTION	19	CENTRE HOLE GRNDG. MIC			
160	EXTERNAL GRINDING	20	CYL. GRNDG. MIC. HMT. G-17/1200			
170	EXTERNAL GRINDING	21	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>	<i>[Signature]</i>						3 OF 22
DATE	30/10/96	DATE	30.10.96	DATE	30.10.96							
cm E /PDO		e/mf /PDO		HOS/PDO		DO/PDO		PDO REF	ISSUE	DATE	SIGN	



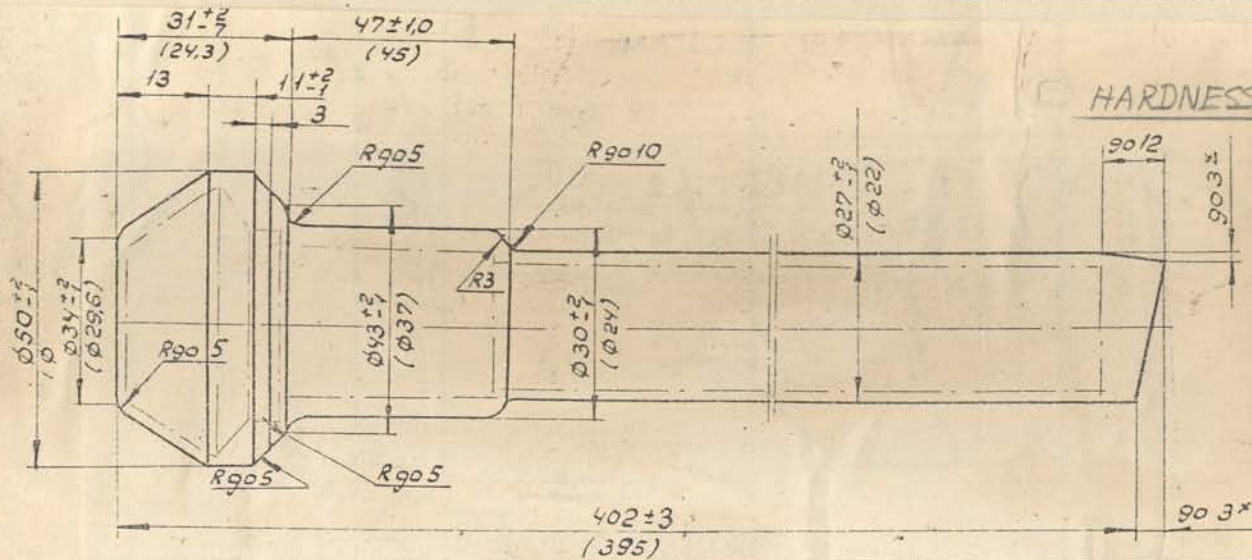
ENGINE FACTORY AVADI

FORM No :EFA/P-038

PROCESS SCHEDULE	NOMENCLATURE :
	DRAWING No : <u>308-67-2</u>
	MATL SPECIFICATION :

OPN No	DESCRIPTION OF OPERATION	SHT No	WORK CENTRE	SET UP TIME	OPN TIME	REMARKS
200	DEBURRING	-	BENCH			
		-				
220	WASHING	-	WASHING PLANT			
230	INSPECTION: CRACK TEST & DEMAGNETIZING	-	MAGNETIC FLAW DETECTOR			
240	WASHING	-	WASHING PLANT			
250	FINAL INSPECTION	22	BENCH			
260	COATING	-				
270	MARKING - MARK PART No.	-	BENCH			
280	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 <u>30/10/96</u>	DATE <u>30.10.96</u>	DATE <u>30.10.96</u>	<u>30/10/96</u>						
<i>[Signature]</i> /PDO	<i>[Signature]</i> /PDO	HOS/PDO	DO/PDO	PDO REF	ISSUE	DATE	SIGN		



MATL : ST 18X2H4MA
HARDNESS : 207 TO 255 BHN.

MACHINE:

BENCH

STD. TOOLS & GAUGES

SPECIAL TOOLS & GAUGES

- TECH. REQ.T.:-
1. MISMATCH OF DIES IS UPTO 1mm.
 2. CURVATURE OF ROD $\phi 30 (\pm 2:8)$ OVER A LENGTH OF 300mm. (WITHOUT TAKING ACCOUNT THE LENGTH OF HEAD) SHOULD NOT EXCEED 1.0mm.
 3. NON-FILLING-IN OF ANGLES IS TO BE WITHIN THE LIMITS OF HALF OF THE TOLERANCE
 4. ELLIPTICITY OF DIAMETERS ARE TO BE WITHIN TOLERANCE LIMITS.
 5. DEPTH OF DEFECTS-UPTO 0.5 OF MACHINING TOLERANCE.
 6. CHAMFER UPTO 3mm. AND ITS SHRINKING UPTO 3mm. OVER A LENGTH OF 12 mm. MAX. IS ALLOWED ON FACE NOT TO BE STAMPED.
 7. DIMENSIONS WITHOUT TOLERANCES ARE FOR CONSTRUCTION.
 8. BURR ALONG THE DIE PARTING LINE MAY BE 1.5 mm. MAX.
 9. DEPTH OF STAMP UPTO 1.0mm.
 10. DIFFERENCE IN BODY THICKNESS OF HEAD WITHIN 1.0mm.
 11. THICKENING OF ROD UNDER HEAD UPTO 2.5mm. OVER A LENGTH ≈ 60 mm. IS ALLOWED.
 12. SHIFT IN THE AXIS OF HEAD IN RELATION TO THE AXIS OF ROD MAY BE 1mm. MAX.
 13. PINCHING OF ROD UPTO $\phi 27 \pm 2$ mm IS ALLOWED.

PRED.	CHD.	APPD

NOMENCLATURE

INCLINED SHAFT

DRAWING No.
308.67.2.

ISSUE

OPN. No.
010

OPERATION
FACING &
CENTRING

Ra10 (d)

MACHINE: FACING & CENTRING
MIC

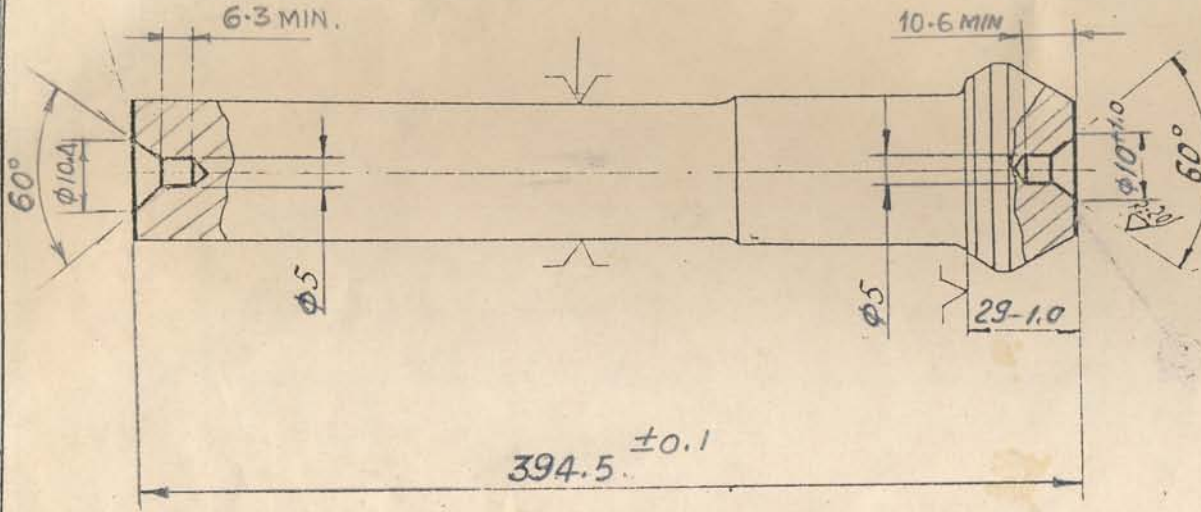
HMT

STD. TOOLS & GAUGES

CENTRE DRILL
A 5X12.5, 15:6708

SIDE & FACE
MILLING CUTTERS

SPECIAL TOOLS & GAUGES



PRED.	CHD.	APPD

PLANNING SHEET-PDO/EFA

NOMENCLATURE

INCLINED SHAFT

308-67-2

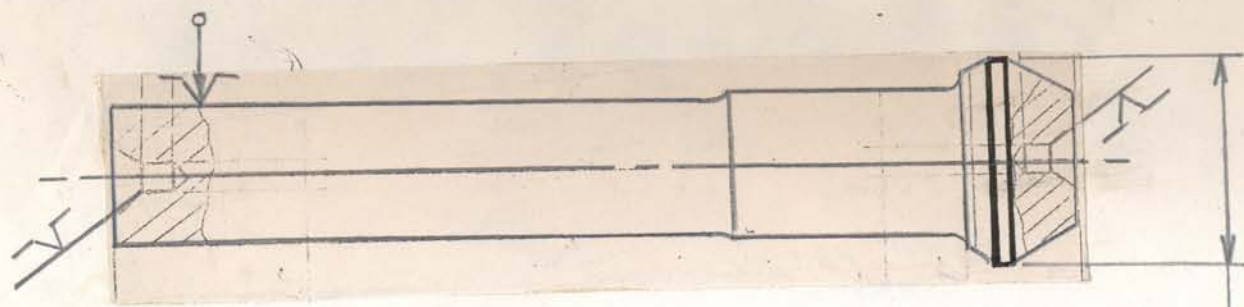
OIB TURNING

MACHINE: CENTRE LATHE
HMT NH26.

STD.TOOLS&GAUGES

FACING & TURNING TOOL	PCLNR 2525 M12
INSERT CNMG	120408

SPL.TOOLS & GAUGES



$\phi 50.8 / \phi 50.5$
IF NO MATL. IN FORG.,
TURN TO $\phi 48 \pm 1$

PRED.	CHD.	APPD.

INCLINED SHAFT

DRAWING No.
308.67.2.

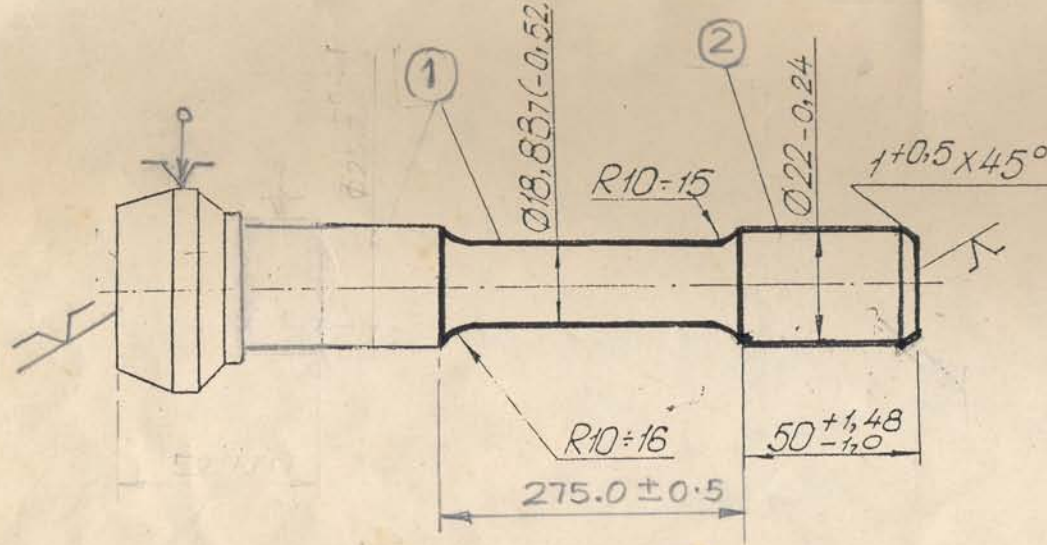
ISSUE

OPN. No.
020

OPERATION
TURNING

Ra10

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



TECH. REQ.:-

RUNOUT OF SURFACES ① & ② IN RELATION TO THE AXIS OF CENTRES SHOULD NOT EXCEED 0.2 mm.

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

STD. TOOLS & GAUGES

COPY TURNING	} SPJBR
TOOL HOLDERS & INSERTS ROUGH	
INSERT (FINISH)	CGMC
	16T308
	16T304

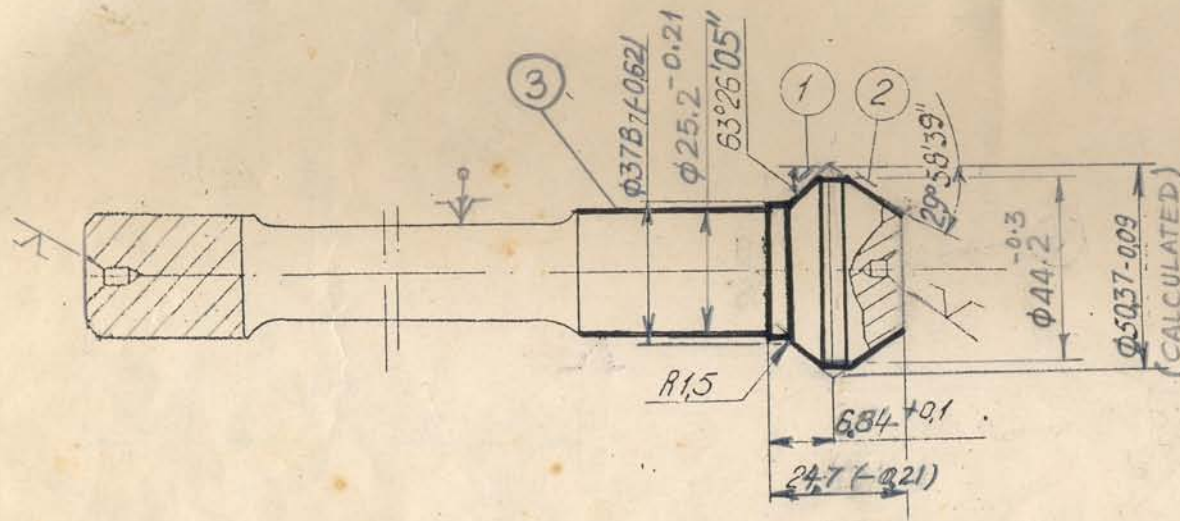
SPECIAL TOOLS & GAUGES

SNAP GAUGES	
i) $\phi 22.0^{-0.24}$	025/02/115
ii) $\phi 25.2^{-0.21}$	025/03/48

PRED.	CHD.	APPD

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

Ra 5/

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

TECH. REQ'T:—

1. RUNOUT OF SURFACE ② IN RELATION TO THE AXIS OF CENTRES SHOULD NOT EXCEED 0.06 mm.
2. RUNOUT OF SURFACE ① IN RELATION TO THE AXIS OF CENTRES SHOULD NOT EXCEED 0.12 mm.
3. RUNOUT OF SURFACE ③ IN RELATION TO THE AXIS OF CENTRES SHOULD NOT EXCEED 0.2 mm.

STD. TOOLS & GAUGES

COPY TURNING TOOL	SPJBR 2525 M16
INSERT (ROUGH)	CGMC 16T 308
INSERT (FINISH)	CGMC 16T 304

SPECIAL TOOLS & GAUGES

SOFT JAWS.	200536
GAUGES FOR 'GO' & 'NO GO'	403358 (GO) 403359 (NO GO)
i) $6.84^{+0.1}$	
ii) $50.37^{0.09}$	403052 403053
SNAP GAUGE $\phi 25.2^{0.21}$	025/03/48
SNAP GAUGE FOR DIM. $24.7 - 0.21$	025/02/116

PRED.	CHD.	APPD

