

PLANNING SHEET FOR FMS COMPONENTS

POSITION : 4
 PALLET : 20 RH
 21 LH

PROGRAM
 No: 1020 & 1021
 FMS / MC : 3

COMPONENT: VTD-20 CYLINDER HEAD RH/LH
 DRAWING NO: 20-06-16-5 RH / 20-06-34-5 LH

OPN NR	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
160/1	F	-	ROUGH & SEMI-FINISH B MILL EXHAUST FACE LEAVING D.S MACHINING ALLOWANCE		019	FACE MILL $\phi 250$		
160/2	-	521	DRILL ONE HOLE $\phi 25.3$ X 21 DEEP		224	TWIST DRILL $\phi 25.3 / \phi 27$		
160/3	-	521	ENLARGE ONE HOLE TO $\phi 30$ X 21 DEEP.		035	END MILL $\phi 30 / \phi 43$		
160/4	-	521	C/BORE $\phi 31.43$ X 21 DEEP & $\phi 33.7$ X 3.2 + 0.5 DEEP.		414	C/BORING CUTTER $\phi 31.43 / \phi 33.7$		
160/5	-	519 520	BORE THRU 2 HOLES $\phi 31.43$ AND C/BORE $\phi 36.8$ X 4.0 + 0.75 DEEP.		414	C/BORING CUTTER $\phi 31.43 / \phi 36.8$		
160/6	-	524	DRILL ONE HOLE $\phi 10$ 20 DEEP & C/BORE $\phi 12.2$ 8.5 ± 0.2 DEEP. CHAMFER 0.5 X 45° IN $\phi 10$		243	TWIST DRILL $\phi 10 / \phi 12.2$		
160/6	-	524	C/BORE $\phi 23$ X 2.3 + 0.25 DEEP		036	END MILL $\phi 23$		
160/7	-	525 To 527	BORE 3 BORES TO $\phi 67.5$ WITH R1.5 X 12 + 1 DEEP. CHAMFER 1.5 - 0.5 X 30°		116	BORING BAR $\phi 67.5$ WITH CHAMF. TIP		

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PLANNING SHEET FOR FMS COMPONENTS

POSITION : 4
PROGRAM : 20 RH
NO: 1020 V101 PALLET
FMS M/G : 3 21 LH

COMPONENT : UTD-20 CYLINDER HEAD RH/LH
DRAWING NO: 20-06-16-5 RH / 20-06-34-5 LH

OPN NR	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
160/8	-	501 TO 511	DRILL 11 HOLES $\phi 8.35$ B X 21 DEEP AND CHAMFER TO $\phi 10 \times 90^\circ$		244	TWIST DRILL $\phi 8.35 / \phi 12$		
160/9	-	512	DRILL 1 HOLE $\phi 8.35$ B X 25.5 +1 DEEP AND CHAMFER TO $\phi 10 \times 90^\circ$		245	TWIST DRILL $\phi 8.35 / \phi 12$		
160/10	-	27 30 33	MAKE 3 HOLES $\phi 6.0$ A AT 40° TO 18 +1 DEEP		044	END MILL $\phi 6$		
160/11	-	513 TO 518	DRILL THRU 6 HOLES B $\phi 3$		236	END MILL $\phi 3$		
160/12	-	501 TO 512	TAP 12 HOLES M10X 1.5 TO X 21 MIN. DEPTH		605	TAP M10X1.5 TO	SCREW PLUG GAUGE 203285	
160/13	-	519 520 521	TAP 3 HOLES M33X1.5-B 5HG X 18 DEEP.		606	TAP M33X1.5- 5HG	SCREW PLUG GAUGE FOR M33X1.5-5HG.	
160/14	-	522 523	DRILL 2 HOLES $\phi 4.9$ X B 12 ± 0.35 DEEP AND CHAMFER 1 $\pm 0.5 \times 45^\circ$		207	TWIST DRILL $\phi 4.9 / \phi 9$		
160/15	-	522 523	TAP 2 HOLES M6 TO X B 10 DEEP		631	TAP M6 TO	SCREW PLUG GAUGE M6 TO 203282	
160/16	-	525 TO 527	FINISH BORE $\phi 68.00$ ± 0.06 WITH R1.5 ± 0.5 X 12 +1.0 DEEP. Ra2.5		148	BORING BAR $\phi 68 \pm 0.06$	PLUG GAUGE $\phi 68.0 \pm 0.06$	

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PLANNING SHEET FOR FMS COMPONENTS

COMPONENT : UTD-20 CYLINDER HEAD RH/LH
 DRAWING NO : 20-06-16-5 RH / 20-06-34-5 LH
 PROGRAM NO: 1020 W1021
 FMS M/C : 3
 POSITION : 4
 PALLET : 20 RH
 21 LH

OPN No	DESIGNATION FACE HOLE	DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL No	DESCRIPTION OF TOOL	GAUGES	REMARKS
160/17	F	FINISH MILL EXHAUST FACE. R220 TECH. REQTS. 1) FLATNESS 0.2 2) DISPLACEMENT OF SURFACE RELATIVE TO ANCHOR STUD HOLES SHOULD NOT EXCEED 0.5	B	018	FACE MILL $\phi 250$		

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PLANNING SHEET FOR FMS COMPONENTS

COMPONENT: UTD-20 CYLINDER HEAD RH/LH
 DRAWING NO: 20-06-16-5 RH / 20-06-34-5 LH

PROGRAM NO: 1020 V1021

POSITION: 5
 PALLET: 20RH
 FMSM/C: 3 21LH

OPN NO.	DESIGNATION FACE HOLE	DESCRIPTION OF OPN.	SKETCH	CYCLE TIME MTS	TOOL NO.	DESCRIPTION OF TOOL	GAUGES	REMARKS
200/1	E -	ROUGH & SEMI-FINISH MILL INLET FACE LEAVING 0.5 MACHINING ALLOWANCE	D		019	FACE MILL $\phi 250$		
200/2	- 425 426	BORE THRU 2 HOLES $\phi 31.43$ AND C/BORE $\phi 36.8 \times 4.0$ TO ± 0.75 DEEP	D		415	C/BORING CUTTER $\phi 31.43/\phi 36.8$		
200/3	- 413 TO 415	DRILL 3 HOLES $\phi 22.43 \times 15$ TO ± 0.43 DEEP. C/BORE $\phi 24 \times 2$ TO ± 0.5 DEEP & $\phi 30 \times 1$ TO ± 0.4 DEEP	D		045	ENDMILL $\phi 22.43/\phi 24/\phi 30$		
200/4	- 413 TO 415	TAP 3 HOLES M24 X 1.5 CP TO 9 MIN. DEEP. TECH. REQ: PERPENDICULARITY OF C/BORE $\phi 30$ FACE W.R.T. THREAD AXIS IS TO BE WITHIN 0.05 MM	D		607	TAP M24 X 1.5 CP	SCREW PLUG GAUGE 2032 90 GAUGE TO CHECK I	
200/5	- 401 TO 412	DRILL 12 HOLES $\phi 6.63 \times 13.5$ DEEP & CHAMFER $1 \times 45^\circ$	D		220	TWIST DRILL $\phi 6.63/\phi 9$		
200/6	- 419 TO 424	DRILL 6 HOLES $\phi 3$ (TO OPEN OUT THREADED HOLE FROM SIDE)	D		236	TWIST DRILL $\phi 3$		

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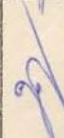
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PLANNING SHEET FOR FMS COMPONENTS

COMPONENT: UTD-20 CYLINDER HEAD RH/LH
 DRAWING NO: 20-06-16-5 RH/20-06-34-5 LH

PROGRAM NO: 1020 X1021
 POSITION: S
 PALLET: 20 RH
 FMSM/C: 3 21 LH

OPN NO	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NO	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
200/7	-	401 TO 412	TAP 12 HOLES M8 TO X 12 MIN. DEEP	D	632	TAP M8 TO	SCREW PLUG GAUGE 203283	
200/8	-	425 426	TAP 2 HOLES M3X 1.5-5HG. H. TECH. REQ: PERPENDICULARITY OF C/BORE ϕ 36.8 FACE W.R.T THREAD AXIS IS TO BE WITHIN 0.05MM UPTO ϕ 36	D	606	TAP M3X1.5-5HG	SCREW PLUG GAUGE FOR M3X1.5-5HG	
200/9	E	-	FINISH MILL INLET SIDE D MAINTAINING DIMN. 220 ON BOTTOM FACE AND 205.8 ON TOP FACE. R220. TECH. REQ: 1) FLATNESS 0.2 MM. 2) DISPLACEMENT OF SURFACE RELATIVE TO ANCHOR STUD HOLES SHOULD NOT EXCEED 0.5		018	FACE MILL ϕ 250		

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NOMENCLATURE

CYLINDER HEAD ASST RH/LH

DRAWING No.
SB 20.06.01-5 RH
SB 20.06.02-5 LH

ISSUE

OPN. No.
240

OPERATION
BORING & FACING

MACHINE:
HORI. BORER
HMT AZ-11

STD. TOOLS & GAUGES

ALLEN KEYS.
VERNIER CALIPER

SPECIAL TOOLS & GAUGES

FIXTURE

201436

CHUCK

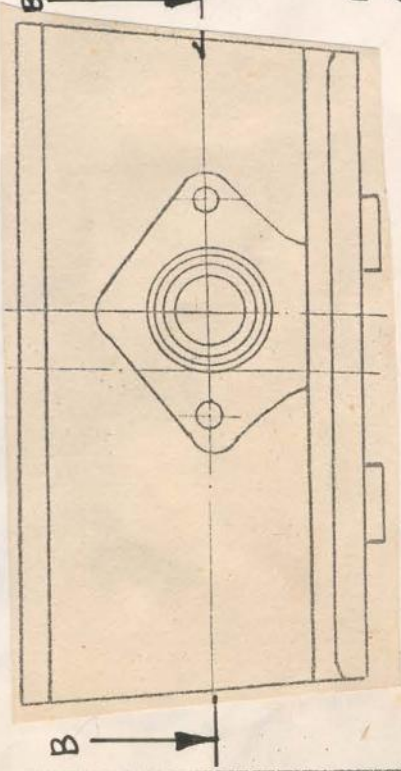
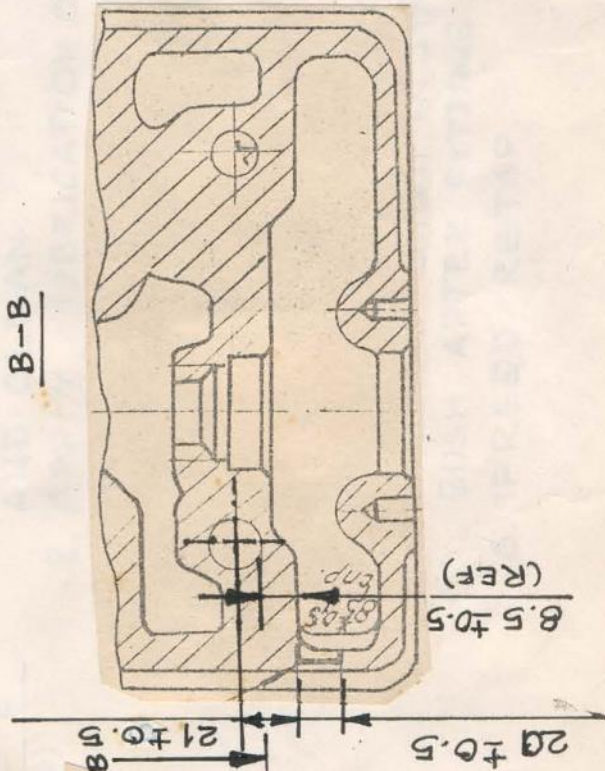
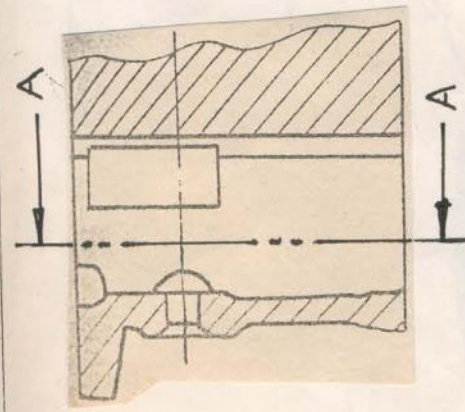
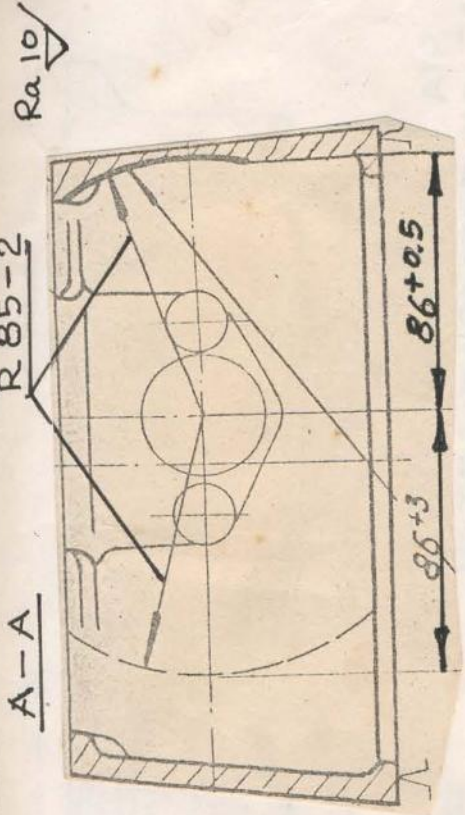
201627

FACING TOOL

202354

HOLDING ARBOR

201651



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NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

DRAWING No.
SB 20.06.01-5 RH
SB 20.06.02-5 LH

ISSUE

OPN. No.
260

OPERATION
FITTING

MACHINE:

BENCH.

STD. TOOLS&GAUGES

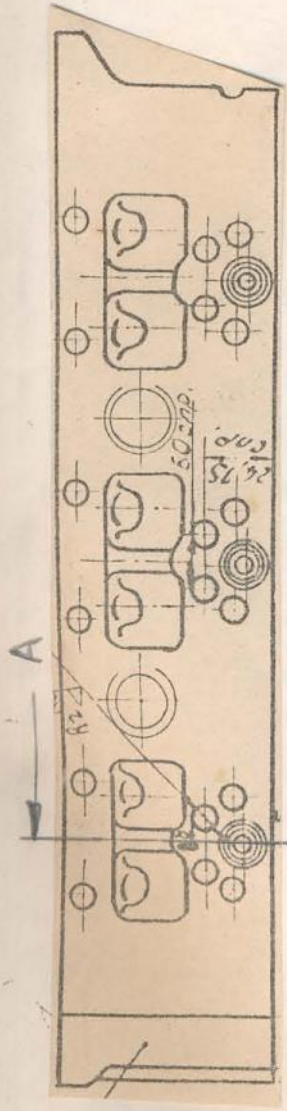
CAN WITH LUBRICATION OIL.
TAP & SCREW PLUG GAUGE FOR M18X1.5-SHGH
TAP WRENCH.

SPECIAL TOOLS&GAUGES

MANDREL

400649

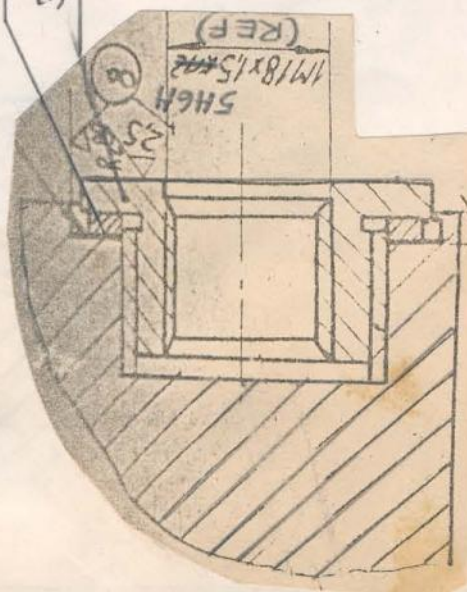
SHEET 320F



A-A

20-55-10E
(3 NOS)
306-19-2
(3 NOS)

1. BLOW COMPRESSED AIR IN THE THREADED HOLES AND CLEAN.
2. APPLY LUBRICATION OIL ON OUTER THREADS OF BUSH 306-19-2.
3. PLACE RING 20-55-10E ON BUSH.
4. DRIVE IN 3 BUSHES.
5. CHECK INTERNAL THREAD M18X1.5-SHGH IN THE BUSH AFTER FITTING.
6. IF REQD RETAP.



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NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

DRAWING NO

SB 20.06.01-5 RH
SB 20.06.02-5 LH

ISSUE

OPN. NO
270

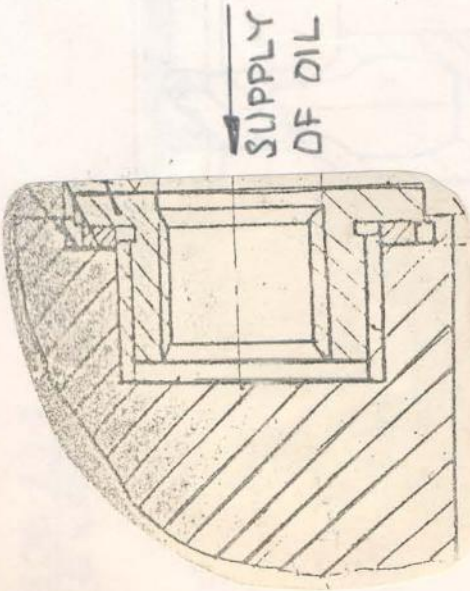
OPERATION
PRESSURE TESTING

1. FIX THE COMPONENT ON FIXTURE.

2. CONNECT PT EQUIPMENT TO THE COMPONENT.

3. CARRY OUT PRESSURE TESTING IN 3 BUSHES 306-19-2 WITH DIESEL OIL AT A PRESSURE OF 100 Kg_f/cm² FOR 2 MINUTES.

4. LEAKAGE IS NOT ALLOWED.
5. CARRY OUT PRESSURE TESTING IN ALL THE ASSTS.



MACHINE:

BENCH

STD. TOOLS & GAUGES

DIESEL OIL
PRESSURE TESTING EQUIPMENT
SPANNER 22 & 27

SPL. TOOLS & GAUGES

PRESSURE TESTING FIXTURE }
401464

PRED. CHD. APPD. P&TE REF ISSUE DATE

NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

DRAWING No.
SB 20.06.01-5 RH
SB 20.06.02-5 LH

ISSUE

OPN. No.

290 PRESSING

OPERATION

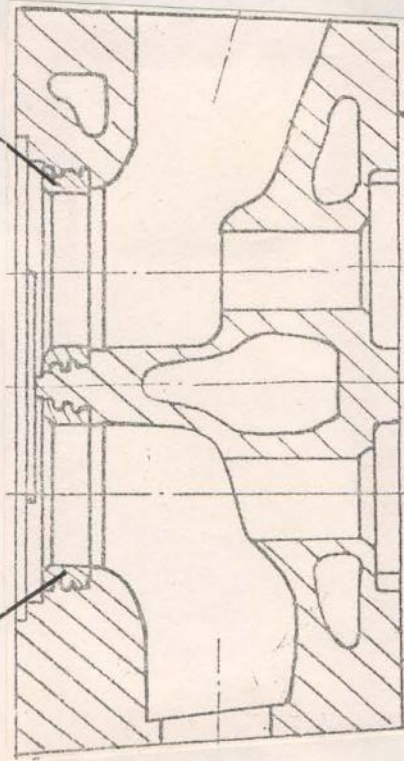
MACHINE:

HYDRAULIC PRESS

306-23-1
(6 Nos)

306-22-1
(6 Nos)

EXHAUST
SIDE



STD. TOOLS & GAUGES

HAMMER

STEEL RULE 1 M

FEELEER GAUGE SET

TECH. REQTS.

1. CLEARANCE BETWEEN BOTTOM FACE OF SEAT 306-22-1 & 306-23-1 AND TOP FACE OF TAPER PCKET IN CYL. HEAD SHOULD BE FROM 0.7 TO 1.15 MM BEFORE PRESSING IN. THERE SHOULD NOT BE CLEARANCE AFTER PRESSING.
2. BUCKLING OF TOP SURFACE SHOULD NOT EXCEED 0.1 MM OVER FULL LENGTH OF COMPONENT AFTER PRESSING VALVE SEATS.

1. CLEAN TAPER PCKETS.
2. SEECT VALVE SEATS AS PER TR.1.
3. PRESS 12 SEATS.

SPECIAL TOOLS & GAUGES

PRESSING TOOL

202305
202306

SPL. FEELER

403348/01

GAUGE

403348/02

PREP	CHK	APPD	P&TE	ISSUE	DATE

NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

DRAWING No.
SB 20-06-01-5 RH
SB 20-06-02-5 LH

ISSUE

OPN. No.
300

OPERATION
FITTING

MACHINE:

BENCH

STD. TOOLS & GAUGES

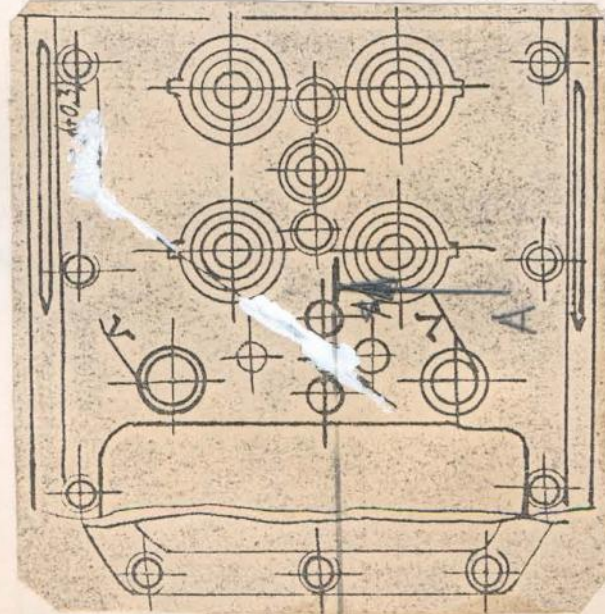
CAN WITH LUBRICATION OIL

SPECIAL TOOLS & GAUGES

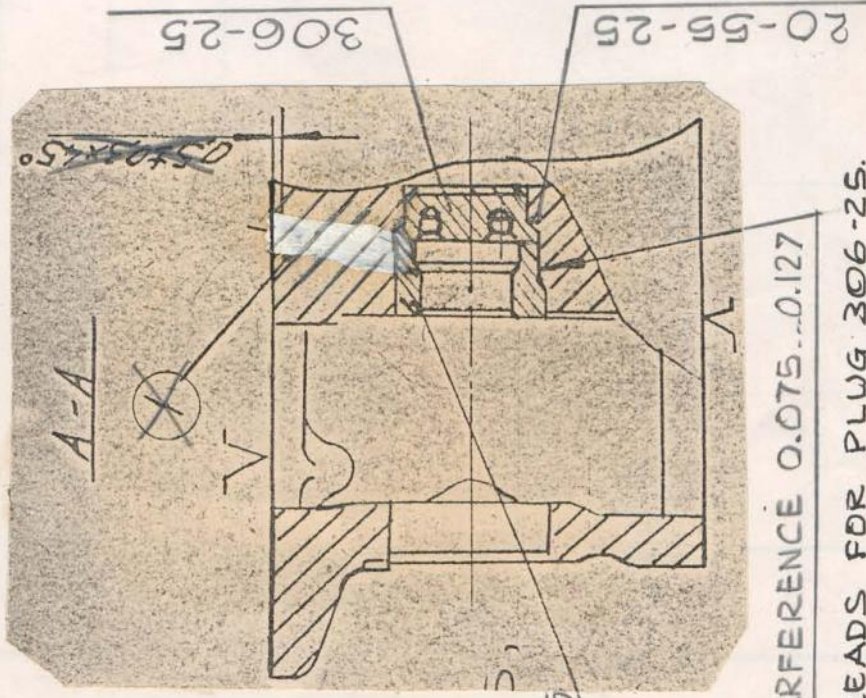
PEG SPANNER 200698
200699

FIXTURE:

SHEET 39 OF



20-06-68-5
(ONE NO)



INTERFERENCE 0.075...0.127

1. BLOW COMPRESSED AIR & CLEAN THREADS FOR PLUG 306-25.
2. PLACE RING 20-55-25 AND APPLY LUBRICATION OIL OVER THREADS OF PLUG 306-25.
3. INSERT PLUG 306-25.
4. PRESS IN BUSH 20-06-68-5.

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		ISSUE	DATE

PLANNING SHEET FOR FMS COMPONENTS

POSITION : 6
 PALLET : 22
 M/C NO 3

COMPONENT : UTD-20 CYLINDER HEAD RH/LH PROGRAM
 DRAWING NO : 20-06-16-5 RH / 20-06-34-5 LH NO. 1022

OPN NR.	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR.	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
330/1	-	180	MAKE CENTRE FOR HOLE $\phi 5$		212	TWIST DRILL $\phi 16 \times 90^\circ$		
330/2	-	160	DRILL THRU ONE HOLE $\phi 5$		073	END MILL $\phi 5$ WITH HEAD.		
330/3	B	-	FINISH MILL TOP FACE. Ra 1.6 FLATNESS 0.05		018	FACE MILL $\phi 250$		

107
10
102

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SYMBOLIC NOMENCLATURE

CYL. HEAD ASSY RH/LH

DRAWING No. SB 20-06-01-5 RH
 58 20-06-02-5 LH

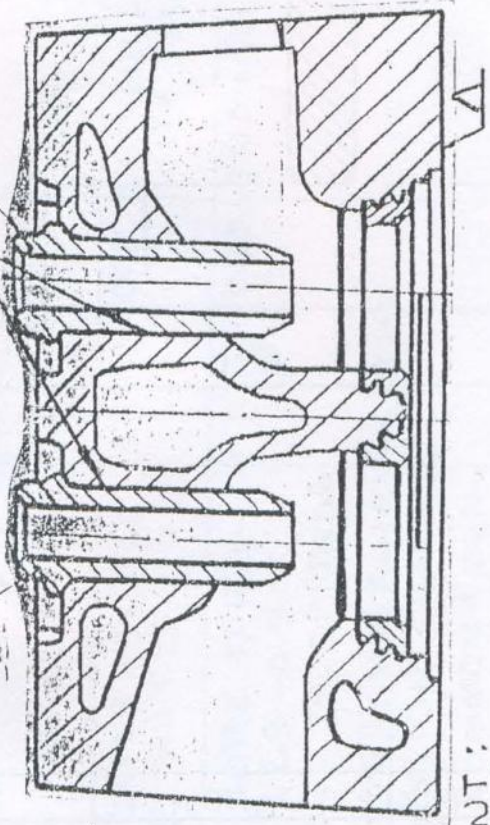
ISSUE

OPN. No. 370

OPERATION FITTING

MACHINE: BENCH

20-06-17-1 INTERFERENCE 0.037-0.074



TECH. REQUIREMENT:

1. CLEARANCE BETWEEN VALVE GUIDE BUSH AND SEATING FACE OF HEAD SHOULD BE 0.2 TO 1MM.
2. SAG OF PLANE ON VALVE GUIDE DRESSING SIDE SHOULD NOT EXCEED 0.1MM OVER FULL LENGTH
3. AFTER PRESSING CHIPPINGS AND CRACKS ARE NOT ALLOWED ON BUSHES.
4. NON-SQUARENESS OF VALVE GUIDE BUSH AXLS W.R.T PLANE A/100MM LENGTH:
 - a) IN LONGITUDINAL DIRECTION 0.08 MAX, FOR 50 MM LENGTH -0.04 MM.
 - b) IN TRANSVERSE DIRECTION 0.14 MAX, FOR 50 MM LENGTH -0.07 MM.

OPERATION:

1. PUT CLEAN AND WASHED VALVE GUIDE BUSHES IN LIQUID NITROGEN CONTAINER AND ALLOW TO COOL FOR 3-5 MIN.
2. MOUNT COOLED BUSHES ONE AFTER ANOTHER IN HEAD AND PRESS THEM AS PER TR-1

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STD. TOOLS&GAUGES

FEELER GAUGE SET
 STEEL RULE 1M

SPECIAL TOOLS&GAUGES

GAUGE FOR CHECKING NON-SQUARENESS 200700
 SPL. FEELER GAUGE 403326

PLANNING SHEET FOR FMS COMPONENTS

POSITION : 7
 PALLET : 22
 FMS MC NO. : 3

COMPONENT : VTD-20 CYLINDER HEAD ASSY RH/LH PROGRAM
 DRAWING NO. : SB 20-06-01-5 RH / SB 20-06-02-5 LH NO. 1022

OPN NR.	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR.	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
400/1	-	1 TO 3	ROUGH MILL TO $\phi 59$ WITH 150° MAINTAINING DIMN. 1.5	A	050	END MILL $\phi 50$ WITH 150°		
400/2	-	1 TO 3	FORM TAPER $135^\circ \times 1.8$ DEPTH. Ra 1.25	A	067	END MILL $\phi 40$ WITH 135°		
400/3	-	1 TO 3	FORM BORE $\phi 14.6$ WITH R 2.5 - 0.5 X 5.0 ± 0.1 DEEP. Ra 1.6 TECH. REQ. : MISALIGNMENT OF COMBUSTION CHAMBERS FROM COMMON VERTI- CAL PLANE SHOULD NOT EXCEED 0.1 MM.	A	052	END MILL $\phi 60$		
400/4	-	10 TO 15	FINISH BORE 6 BORES $\phi 60 \pm 0.2 \times 7.25 \pm 0.05$ -0.15 DEEP MAINTAINING R 0.5	A	123	BORING BAR $\phi 60$		
400/5	-	4 TO 9	FINISH BORE 6 BORES $\phi 64 \pm 0.2$ TO 7.25 ± 0.05 / - 0.15 DEPTH MAINTAINING R 0.5	A	124	BORING BAR $\phi 64$		

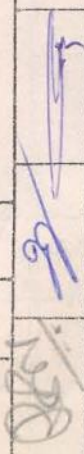
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PLANNING SHEET FOR FMS COMPONENTS

COMPONENT: UTD-20 CYLINDER HEAD ASSY RH/LH PROGRAM POSITION: 7
 DRAWING NO: SB20-06-01-5 RH & SB 20-06-02-5 RH NO: 1022 PALLET: 22
 FMSM/C: 5

OPN NR	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
400/6	-	47 TO 49	MAKE CENTRE FOR 3 HOLES	A	212	TWIST DRILL φ16 X 90°		
400/7	-	47 TO 49	DRILL 3 HOLE φ7.7 X 12 DEPTH	A	265	TWIST DRILL φ7.7		
400/8	A	-	FINISH MILL BOTTOM A FACE 'A'. SURFACE FINISH Ra1.6 PARALLELISM BETWEEN SURFACE 'A' AND 'B' IS TO BE WITHIN 0.05. FLATNESS IS TO BE 0.03	A	018	FACE MILL φ250		
400/9	-	1 TO 3	FINISH BORE 3 BORES 'A' φ159 +0.08 X 3.8 +0.2 DEEP. CORNER RADIO 0.5 ±0.2 Ra 2.5 TECH. REQ: MIS-ALIGN- MENT OF COMBUSTION CHAMBERS FROM COM- MON VERTICAL PLANE SHOULD NOT EXCEED 0.1 mm.	A	126	BORING BAR φ159 WITH CHAMF. TIP		


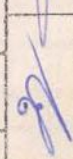
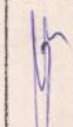
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MC
PLANNING SHEET FOR FMS COMPONENTS

COMPONENT: UTD-20 CYLINDER HEAD ASSY RH/LH PROGRAM POSITION: 7
 DRAWING NR: SB20-06-01-5 RH/20-06-02-5 LH NO: 1022 PALLET: 22
 FMSM/c: 13

OPN NR	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
400/10	-	1 TO 3	FINISH MILL TO $\phi 60$ A WITH 150° MAINTAIN- ING DIMN. 2.0. Ra 1.25 ON FACE & TAPER SURFACE		051	END MILL $\phi 50$ WITH 150°		
400/11	-	1 TO 3	FORM GROOVES ON A FACE $R0.4 \times 0.4 \pm 0.2$ / -0.1 DEEP AT $\phi 164 \pm 0.2$, $\phi 167$, $\phi 170$ & $\phi 173$ Rz 80.		127	BORING BAR WITH GROOVING TOOL TO $\phi 164$, $\phi 167$, $\phi 170$ & $\phi 173$		
400/12	-	20 TO 34	FORM GROOVES ON A FACE IN 15 HOLES $R0.4 \times 0.4 \pm 0.2 / -0.1$ DEEP AT $\phi 16$ & $\phi 19$		120	BORING BAR WITH GROOVING TOOL AT $\phi 16$ / $\phi 19$.		
400/13	-	50	FORM GROOVE ON A FACE $R0.4 \times 0.4 \pm 0.2$ / -0.1 DEEP AT $\phi 24$		147	BORING BAR WITH GROOVING TOOL AT $\phi 24$		
400/14	-	47 48 49	REAM 3 HOLES TO A $\phi 8.0 \pm 0.085 / +0.035$ X 12 DEEP.		513	REAMER $\phi 8.0$ $+0.085 / +0.035$	PLUG GAUGE $\phi 8.0 \pm 0.085$ / $+0.035$	

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SHT 40

PLANNING SHEET FOR FMS COMPONENTS

COMPONENT: UTD-20 CYLINDER HEAD ASSY RH/LH PROGRAM POSITION : 8
 DRAWING NR : SB 20-06-01-5 RH/SB 20-06-02-5 LH NO: 1022 FMSM/C : 3
 PALLET : 22

OPN NR	DESIGNATION		DESCRIPTION OF OPN.	CYCLE TIME MTS	TOOL NR	DESCRIPTION OF TOOL	GAUGES	REMARKS
	FACE	HOLE						
440/1	-	101 TO 103	DRILL THRU 3 HOLES ϕ 14.8 & ϕ 25.8 WITH R 1.5 \pm 0.2 MAINTAINING DIMN. 14.8 \pm 0.1 / -0.2		053	END MILL ϕ 14.8 / ϕ 25.8		
440/2	-	101 TO 103	REAM 3 HOLES ϕ 15.2 \pm 0.035 AND ϕ 26.0 \pm 0.05 / \pm 0.02 X 80 MIN. DEPTH Ra 2.5 TECH. REQ: ALIGN - MENT OF HOLE ϕ 15.2 IS TO BE WITHIN 0.03 MM W.R.T ϕ 26 & WITHIN 0.1 MM W.R.T ϕ 25.8.		517	REAMER ϕ 15.2 / ϕ 26.0 PLUG GAUGE ϕ 15.2 \pm 0.035 ϕ 26.0 \pm 0.05 / \pm 0.02 ALIGNMENT GAUGES 203329 203330		
440/3	-	212	MAKE CENTRE FOR 3 HOLES		212	TWIST DRILL ϕ 16 X 90°		
440/4	-	237	DRILL THRU 3 HOLES ϕ 6 AT ANGLE 15°		237	TWIST DRILL ϕ 6		
440/5	-	033	DRILL THRU 3 HOLES ϕ 7 AT ANGLE 15°		033	END MILL ϕ 33		

PREPARED: 

CHECKED APPROVED AUTH'D PRG REF ISSUE DATE

NOMENCLATURE

CYLINDER HEAD ASSY. RH/LH

DRAWING No.

SB20-06-01/02-5

ISSUE

OPN. No.

480 OPERATION DRILLING

MACHINE:

BENCH

STD. TOOLS&GAUGES

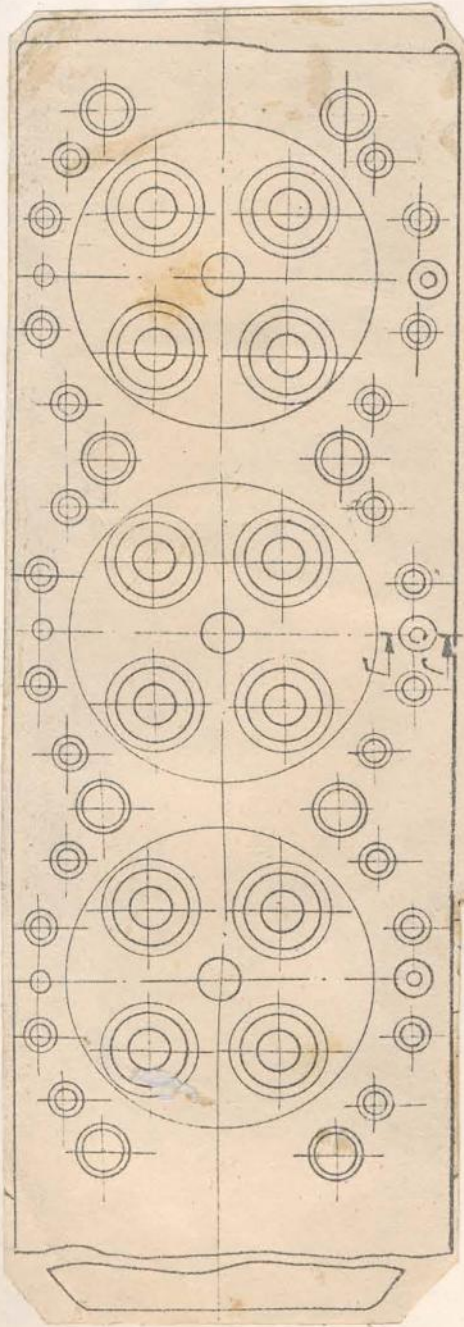
PNEUMATIC HAND DRILLING M/C

HSS PARALLEL SHANK TWIST DRILL $\phi 6$.

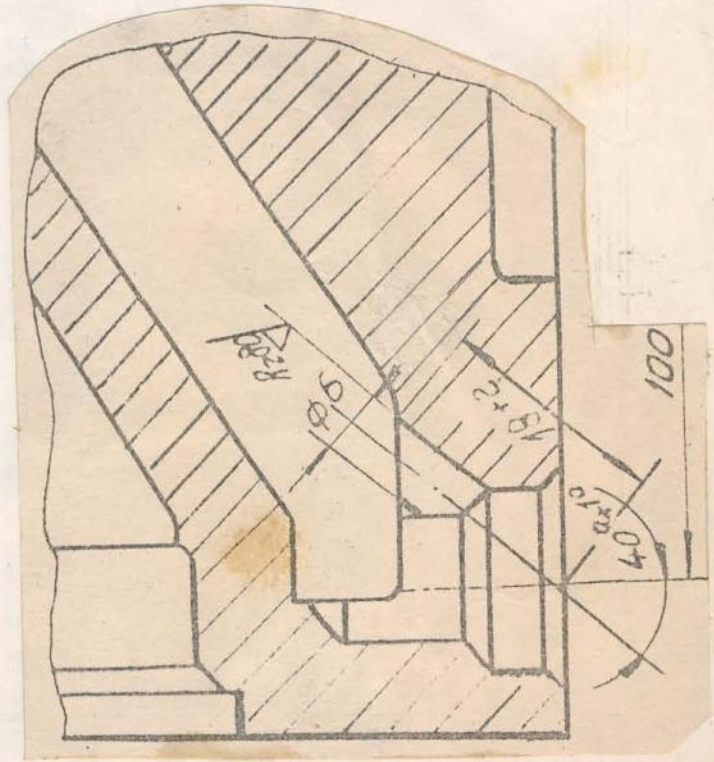
ROUND FILE

SPECIAL TOOLS&GAUGES

SHEET 420F



OPERATION: (1) IN CASE WATER JACKET HOLE NOT OPENED, DRILL 3 HOLES $\phi 6$ TILL WATER JACKET GETS OPENED.
 (2) DRESS THE HOLES



PREP	CHK	APPD	P&TE REF	ISSUE	DATE

MACHINE: VALVE SEAT GENERATING M/S SPM BFW

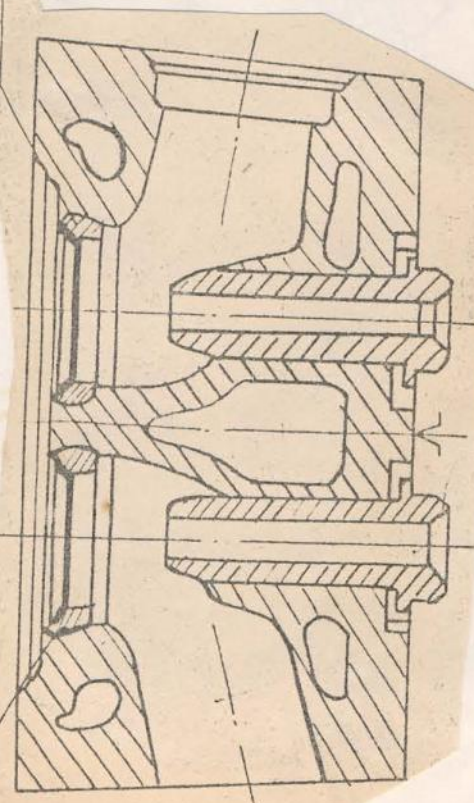
STD. TOOLS&GAUGES

CARBIDE INSERT
CCMT 0602 04 TG (W)
PRUSSION BLUE

SPECIAL TOOLS&GAUGES

PROFILE GAUGE 203302
STD. INLET VALVE 203007/01000
STD. EXHAUST VALVE 203006/01000
SPL. CARTRIDGE HOLDER } 401716
CARTRIDGES } 401717
CARTRIDGE } 402302
402303
402304

306-22-1



TECH. REQUIREMENT:

1. CHECK TAPER SURFACE WITH GAUGE BY BLUEING. THE PRINT SHOULD BE 60% MIN.
2. IT IS ALLOWED TO MILL SEAT CHAMFERS BY HAND IF RE-QUIRED.

OPERATION :

1. GENERATE VALVE SEAT TAPER IN 6 HOLES OF EXHAUST VALVES.
2. GENERATE VALVE SEAT TAPER IN 6 HOLES OF INLET VALVES.
3. CLEAN WITH COMPRESSED AIR.
4. CHECK DIMENSION 5.5 ± 0.2 , SURFACE FINISH, ABSENCE OF TOOL MARKS, BURRS, BLACK SPOTS, AND CRACKS.

$\phi 49.6 \pm 0.6$
FOR REF.



$\phi 52 \pm 0.6$
FOR REF.



PRED	CHD	APPD	P&T REF	ISSUE	DATE
			092	1	21.7.99

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NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

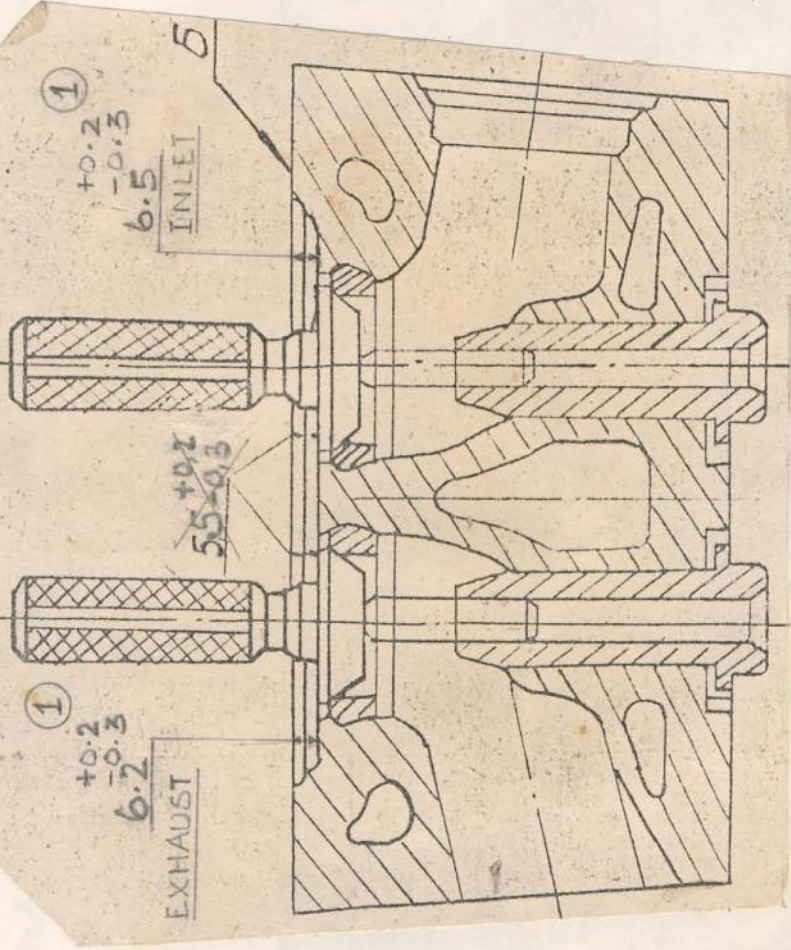
DRAWING No.
SB 20-06-01-5 RH
SB 20-06-02-5 LH

ISSUE

OPN. No.
490

OPERATION-VALVE
SEAT GENERATION

MACHINE:
SPM



STD. TOOLS & GAUGES

SPECIAL TOOLS & GAUGES

PREP	CHD	APPD	P&TE REF	092	1	21-7-99
					ISSUE	DATE

OPN. No.
510

ISSUE

DRAWING No.
SB 20-06-01-5 RH
SB 20-06-02-5 LH

OPERATION
FITTING

MACHINE:
BENCH

STANDARD TOOLS & GAUGES

LOCK TIGHT
SPANNER - 41

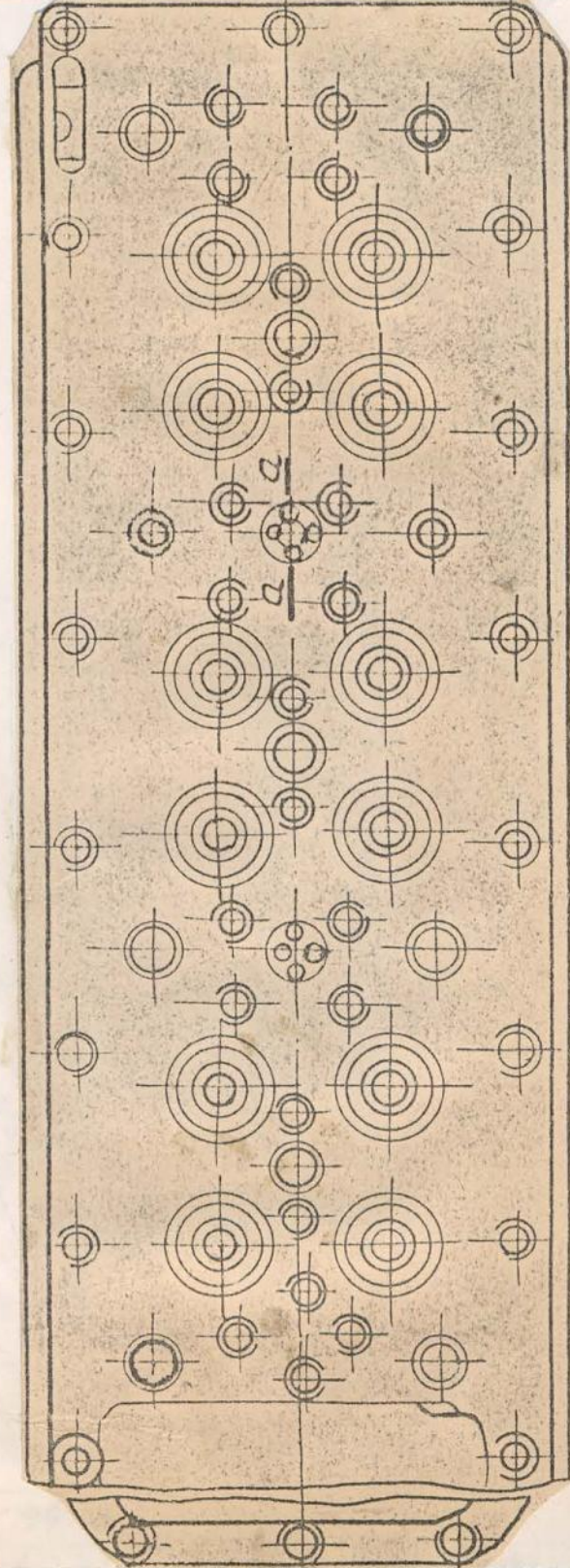
SPECIAL TOOLS & GAUGES
PEG SPANNER 200698
— DO — 200699

SHEET 45 OF

CYLINDER HEAD RH/LH

NOTES:

1. USE 306.25 OF BRASS ONLY.
2. USE FOLLOWING PARTS:
 - a) 306.25 - 7 NOS.
 - b) 20-55-25 - 7 NOS
 - c) 20-06-56-1 - 1 NO.
 - d) 20-55-23 - 1 NO.



OPERATION: 1. INSERT PACKING RING 20-55-25 ON STOPPER AND APPLY LOCK TIGHT ON STOPPER THREADS. SCREW-IN 2 STOPPERS ON COVER SEATING SIDE, 2 STOPPERS ON SUCTION SIDE, 2 STOPPERS ON EXHAUST SIDE, 1 STOPPER ON REAR SIDE.
2. APPLY LOCK TIGHT ON UNION THREAD AND SCREW-IN WITH PACKING RING.

PRED	CHD	APPD	P&T E-REF	ISSUE	DATE

NOMENCLATURE

CYLINDER HEAD ASSY RH/LH

DRAWING No.
SB 20-06-01-5 RH
SB 20-06-02-5 LH

ISSUE

OPN. No.
510

OPERATION
FITTING

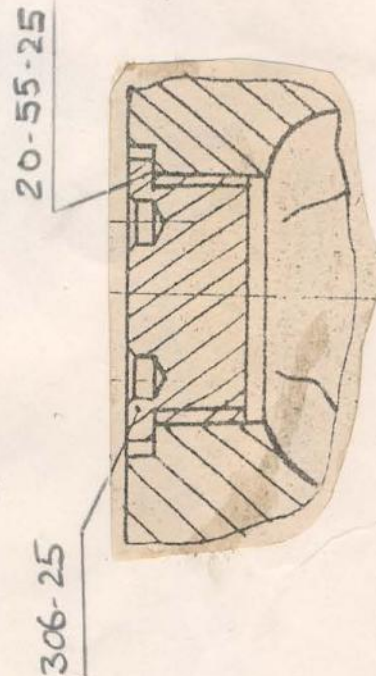
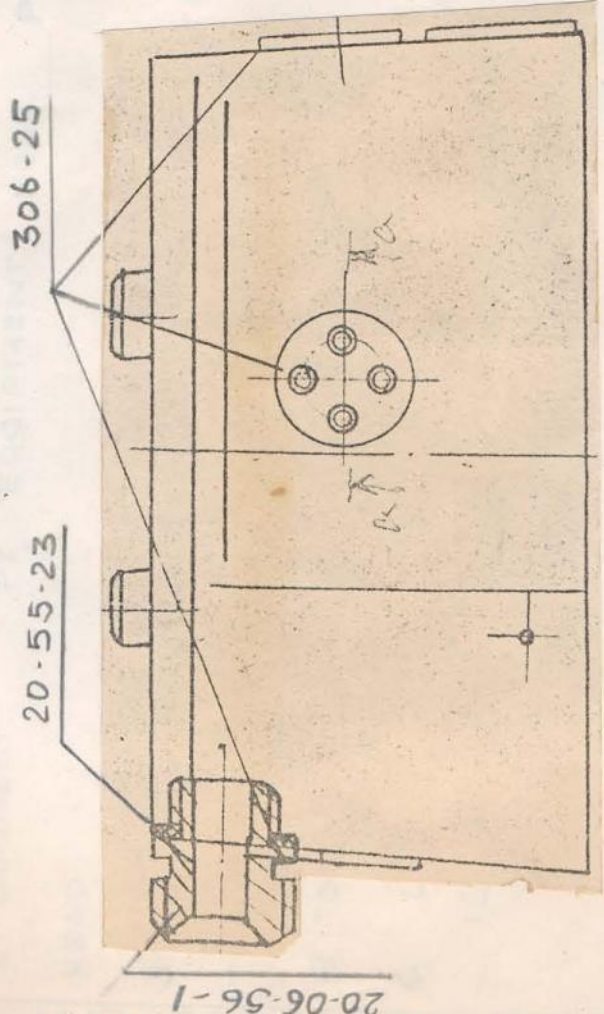
MACHINE:

BENCH

STD. TOOLS & GAUGES

SPECIAL TOOLS & GAUGES

SHEET 46 OF



PRED	CHD	APPD	P&TE REF	ISSUE	DATE

TEMPERATURE

CYLINDER HEAD AOSLY RH/LH

DRAWING No. SB 20-01/02-5

ISSUE

UPN. No. 520

OPERATION PRESSURE TEST

MACHINE: BENCH

OPERATION: 1. MOUNT THE COMPONENT IN FIXTURE.

2. CONNECT PT EQUIPMENT HOSE PIPE TO THE CYLINDER HEAD.

3. CARRY OUT PRESSURE TESTING WITH HOT WATER 60-70°C TEMPARATURE AT A PRESSURE OF $4 \pm 0.5 \text{ KG F/CM}^2$ FOR 5 TO 6 MINUTES.

4. LEAKAGE OR SWEATING THROUGH HEAD WALLS OR STOPPERS IS NOT ALLOWED.

STD. TOOLS & GAUGES

PRESSURE TESTING EQUIPMENT SPANNERS

SPECIAL TOOLS & GAUGES

PRESSURE TESTING FIXTURE

2014-14

PREP	CHD	APPD	P&TE REF	ISSUE	DATE

NOMENCLATURE

CYLINDER HEAD ASSY RAILH

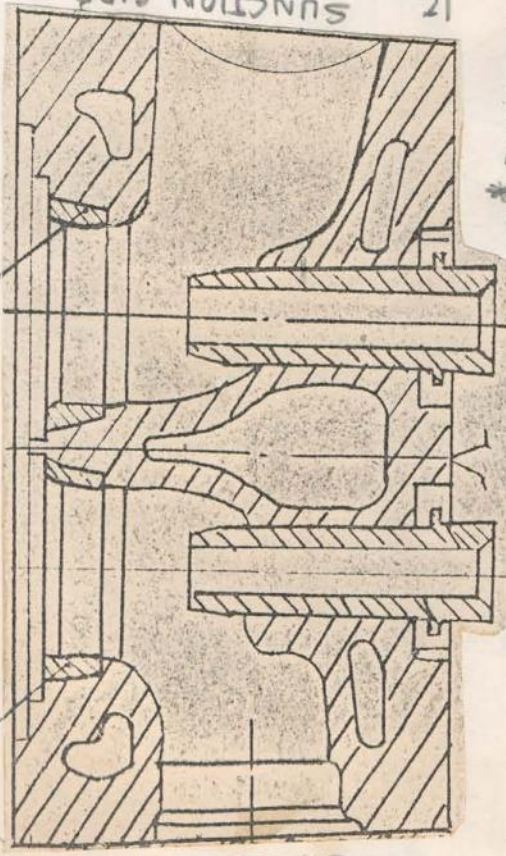
DRAWING No. SB 20-06-01/02-5

ISSUE

OPN. No. 530
OPERATION CAULKING

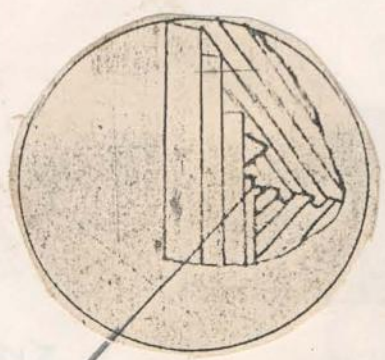
306-23-1

306-22-1



PLACES TO BE FILLED WITH METAL

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NOTE: 1. DENTS, HOLLWS NOT ALLOWED AT CAULKING AREAS.
 2. DIMENSIONS ARE PROVIDED IN CUTTING TOOL
 3. ** DIMENSIONS ARE ENSURED TECHNOLOGICALLY.

R 0.6-0.3**

R 0.6-0.3**

R 28.5*

R 30.5*

60°

60°

306-23-1

0.3...0.6** DEPTH OF CAULKING

306-22-1

0.3...0.6** DEPTH OF CAULKING

OPERATION:

- 1. CAULKIN 12 SEATS IN HEAD AS PER SKETCH.
- 2. DRESS BURRS.

PRED	CHD	APPD	P&TE REF	ISSUE DATE

STD. TOOLS & GAUGES

HAMMER
SCRAPPER

SPECIAL TOOLS & GAUGES

CAULKING TOOL 202343
- " - 202344