

BASIC TRAINING

TTC PROGRAMME

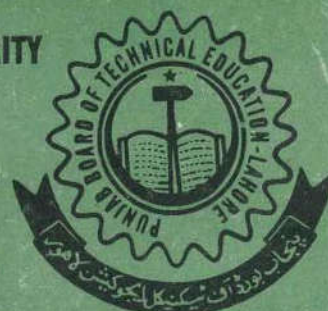
REFRIGERATION AND AIR CONDITIONING



GOVERNMENT OF THE PUNJAB
TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY
PUNJAB BOARD OF TECHNICAL EDUCATION
TRADE TESTING CELL, LAHORE.

T.T.P. Series No.92

Price Rs. 38/-



BASIC TRAINING

1.15.1	FUNDAMENTALS OF METAL (BASIC FITTING)	8 WEEK
1.15.2	SHEET METAL WORK	4 WEEK
1.15.3	PLUMBING (PIPE FITTING)	4 WEEK
1.15.4	ARC WELDING	2 WEEK
1.15.5	GAS WELDING	6 WEEK

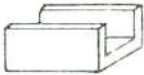
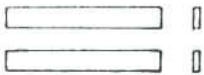
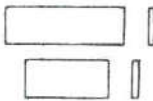
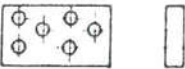
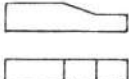
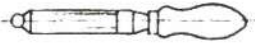
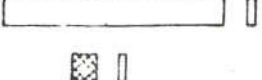
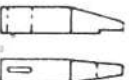
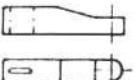
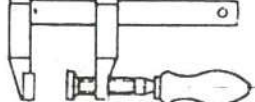
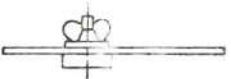
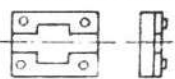
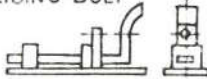
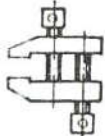
DURING THIS PRACTICAL TRAINING, THE TRAINEE HAS TO ATTEND THEORY CLASSES ONE DAY A WEEK.

AUTHOR

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Prepared and printed by:
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

36-Ata Turk Block, New Garden Town, Lahore

FILING EXERCISE I  Flat filing. 1 → 4	MARKING EXERCISE  Flat filing, marking & centre punching. 2 → 5	STRETCHING EXERCISE  Filing, marking & hammering. 3	FILING EXERCISE II  Flat and square filing. 1 → 4 → 26
SAWING EXERCISE  Sawing, square filing. 2 → 5 → 10	FOR INSIDE CALIPER  Special filing operations. 6 → 15	FOR SHEET-METAL BOX  Marking, shearing, filing. 7 → 15	FOR DRILLING EXERCISE  Smooth filing acc. to given dimensions. 8 → 13
FOR RIVETING EXERCISE  Filing. 9 → 14	CHIPPING EXERCISE  Cross and flat chiselling. 5 → 10 → 12	FIXED JAW  Marking, chiselling, radius filing. 11 → 21	CHIPPING EXERCISE  Groove chiselling, chisel regrinding. 10 → 12
DRILLING EXERCISE  Marking, drilling, drill regrinding. 8 → 13 → 18	RIVETING EXERCISE  Marking, drilling, riveting. 9 → 14	INSIDE CALIPER  Filing acc. to marking lines, assembling. 6 → 15	SHEET-METAL BOX  Sheet-metal bending and folding. 7 → 16
MOVEABLE JAW  Filing. 17 → 22	DRILLING EXERCISE  Counter-boring, reaming, thread cutting. 13 → 18	SPINDLE  External thread cutting, form filing. 19 → 23	SLIDING BAR  Radius filing, stamping, notch filing. 20 → 23
FIXED JAW  Slot filing. 11 → 21 → 23	MOVEABLE JAW  Filing. 17 → 22 → 23	SCREW CLAMP  Assembling. 19, 20 → 23 → 22, 21	SCRAPING EXERCISE  Flat, square and parallel scraping. 24 → 26
MARKING GAUGE  Assembling. 25	FITTING EXERCISE  Fitting. 4, 24 → 26	SLIDING BOLT  Assembling. 27 → 27.1	PARALLEL CLAMP  TEST
BASIC TRAINING	LAY OUT		No. 1.0.1 BASIC FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

MATERIAL REQUIRED

Basic Training

Exercise No (Length given in millimeter)																Length per trainee	Total length for a batch of 16 trainees
1	2	3	6	7	8	9	11	17	19	20	24	25	27	Test			
Fitting No.1.0.1																	
M/S Channel 75 x 38 mm (3' x 1 1/2")	100															100 mm	1,7 meter
M/S Flat 60 x 15 mm (2 1/2' x 5/8")		95				82					82	42	45			360 mm	5,8 meter
M/S Flat 50 x 5mm (2' x 3/16")							410					182	152			750 mm	12 meter
M/S Flat 25 x 6mm (1' x 1/4")										250			175			425 mm	7 meter
M/S Square 20mm (3/4")								103	103						185	395 mm	6,5 meter
M/S Sheet 2,5mm (S.W.G. 12)			25 x 173	25 x 316												25 x 510 mm	1 1/4 meter ²
M/S Sheet 1,0 mm (S.W.G. 19)					132 x 162											132 x 162 mm	1 1/2 meter ²
M/S Round 12 mm (1/2")									190						210	400 mm	6,5 meter



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

MATERIAL REQUIRED

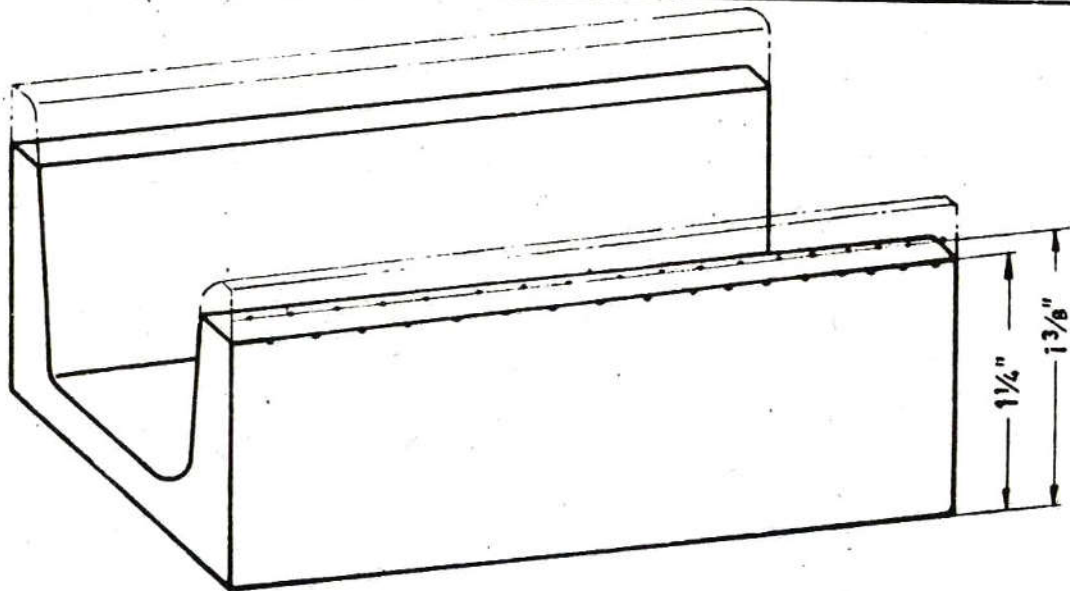
Basic Training

Fitting No. 1.0.1	Exercise No. (Quantity given in Numbers)										Test	Total Nos. per trainee	Total numbers for a batch of 16 trainees
	14	15	16	19	23	25	26						
M/S Rivet (Round head) ø 5 x 21 mm ($3\frac{1}{16}$ x $7\frac{1}{8}$)	8											8	144
M/S Rivet (Round head) ø 5 x 19 mm ($3\frac{1}{16}$ x $3\frac{1}{4}$)	2											2	40
M/S Rivet with Shank (Caliper) ø 6 x 12 x ø 19 mm		1										1	20
M/S Washer ø 19 x 2 mm (bore 6 mm)		1										1	20
M/S Rivet (Round head) ø 3 x 7 mm ($1\frac{1}{8}$ x $1\frac{1}{4}$)			4									4	80
M/S Pins ø 3 x 20 mm				1	2							3	58
Hard wooden handle 4 inch (std. size)				1								1	20
M/S Cheese head screw M 4 x 10 mm (std. size)					2							2	40
M/S Rivet (Round head) ø 5 x 12.5 mm					1							1	20
M/S Wingnut with washer M 10 (std. size)						1						1	18
M/S Cheese head screw M 10 x 26 mm (std. size)						1						1	18
M/S Cheese head screw M 5 x 12 mm (std. size)							4					4	80
M/S Pins ø 4 x 20 mm							4					4	80
M/S Pins ø 4 x 40 mm											2	2	36



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

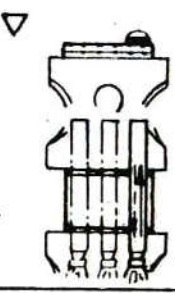
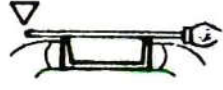
PAK-GERMAN TECHNICAL TRAINING PROGRAMME



CLAMPING SCHEME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		FLAT FILE 300 x 1 STRAIGHT BAR	FLAT FILING UPTO 1st MARKING LINE
2		FLAT FILE 300 x 1 STRAIGHT BAR	FLAT FILING UPTO 2nd MARKING LINE
3		FLAT FILE 300 x 1 STRAIGHT BAR	FLAT FILING OF BASE SURFACE

SCALE 1:1

MAT.: ST. 37 - 1

FILING EXERCISE

NO: - 1.0.1/01

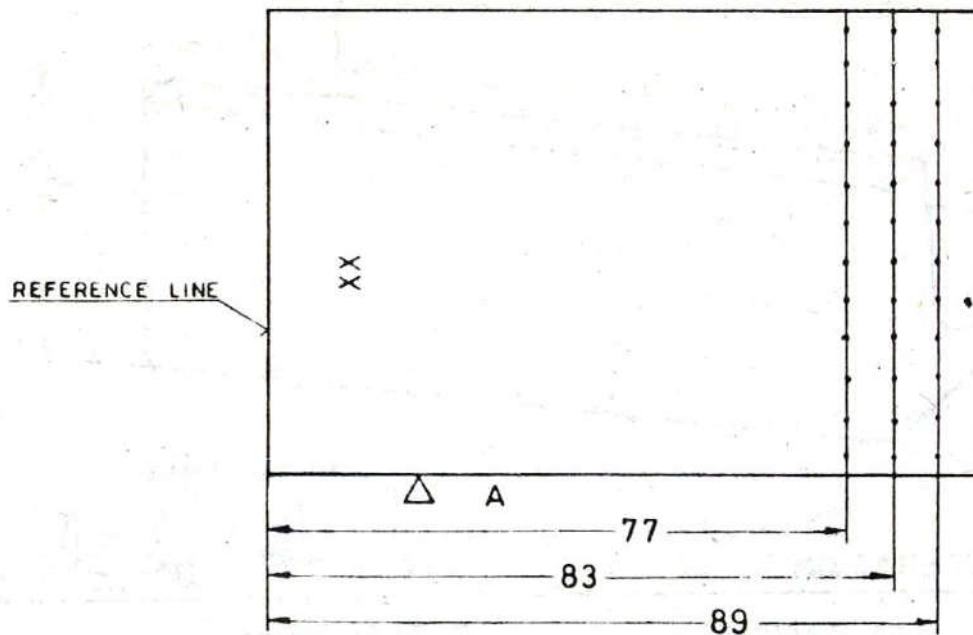
BASIC / FITTING



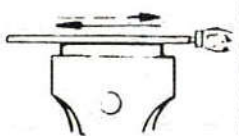
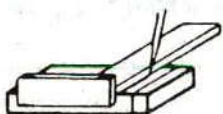
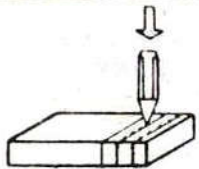
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TOLERANCE +1



SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1		FLAT FILE 250 x 1 STRAIGHT BAR	FLAT FILING OF SURFACE 'A'
2		BACK SQUARE SCRIBER STEEL RULE	MARKING OF 'REFERENCE LINE' MARKING OF 'DISTANCE LINES'
3		CENTRE PUNCH HAND HAMMER 250 g	CENTRE PUNCHING OF DISTANCE LINES

SCALE 1 : 1

MAT: ST. 37-1

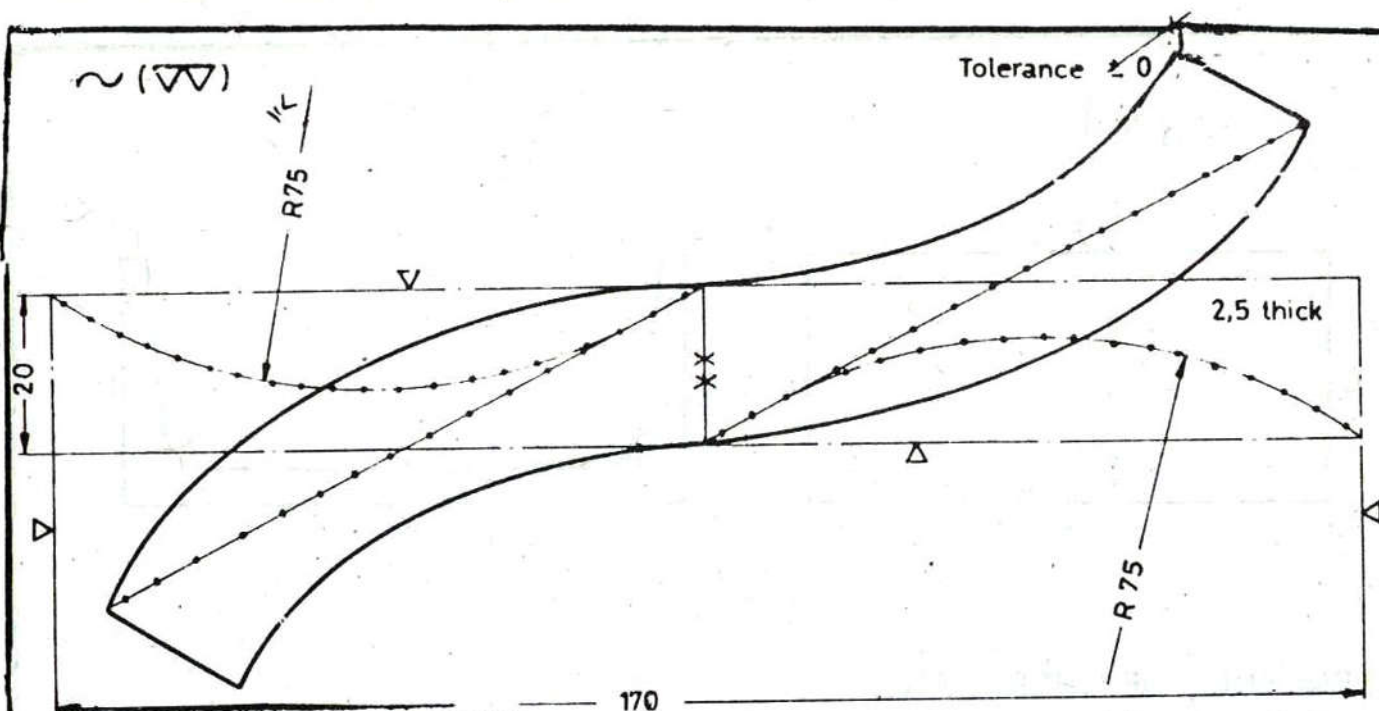
MARKING EXERCISE

NO :- 1.01/02

BASIC/FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FLAT FILE 300 x 1 STRAIGHT BAR	FLAT FILING OF 1st LONGITUDINAL SIDE
2		BACK SQUARE STRAIGHT BAR SCRIBER STEEL RULE	MARKING OF OUTER DIMENSIONS
3		FLAT FILE 300 x 1; 150 x 1	FILING OF OUTER SURFACES ACC. TO MARKING LINES
4		SCRIBER BACK SQUARE DIVIDER WOODEN BOARD	MARKING OF MIDDLE LINE AND RADII
5		CENTRE PUNCH HAND HAMMER 250 g	CENTRE PUNCHING OF RADII
6		HAND HAMMER STRAIGHTENING PLATE STRAIGHT BAR	CURVING OF THE MATERIAL
7	REPEAT OPERATION 6 ON THE 2nd HALF OF THE WORKPIECE. DON'T USE FILES FOR CORRECTION AFTER HAMMERING!		

SCALE 1:1

MAT. MILD STEEL

STRETCHING EXERCISE

No. 1.0.1/03

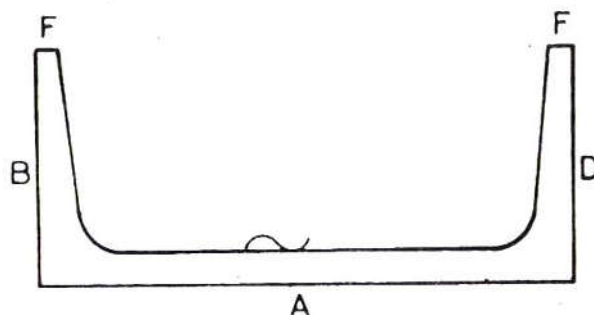
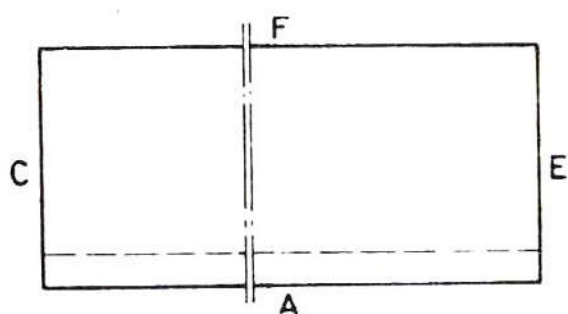
BASIC FITTING



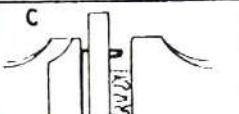
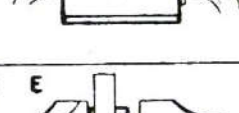
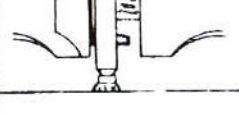
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

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SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1		FLAT FILE 300x1; 250x1 TRY SQUARE	FLAT- AND SQUARE FILING OF 1st FLANGE 'B'. BASE SURFACE 'A' = REFERENCE SURFACE.
2		FLAT FILE 250x1; 200x1 TRY SQUARE WOODEN BLOCK VICE CLAMPS	FLAT- AND SQUARE FILING OF 1st FACE 'C'. REFERENCE SURFACE = A & B.
3		FLAT FILE 300x1; 250x1 TRY SQUARE VICE CLAMPS	FLAT- AND SQUARE FILING OF 2nd FLANGE 'D'.
4		FLAT FILE 250x1; 200x1 TRY SQUARE WOODEN BLOCK VICE CLAMPS	FLAT- AND SQUARE FILING OF 2nd FACE 'E'.
5		FLAT FILE 300x1; 250x1 TRY SQUARE VICE CLAMPS	FLAT- AND SQUARE FILING OF FLANGES 'F'.

SCALE 1:1

MAT of Ex. 01

FILING EXERCISE II

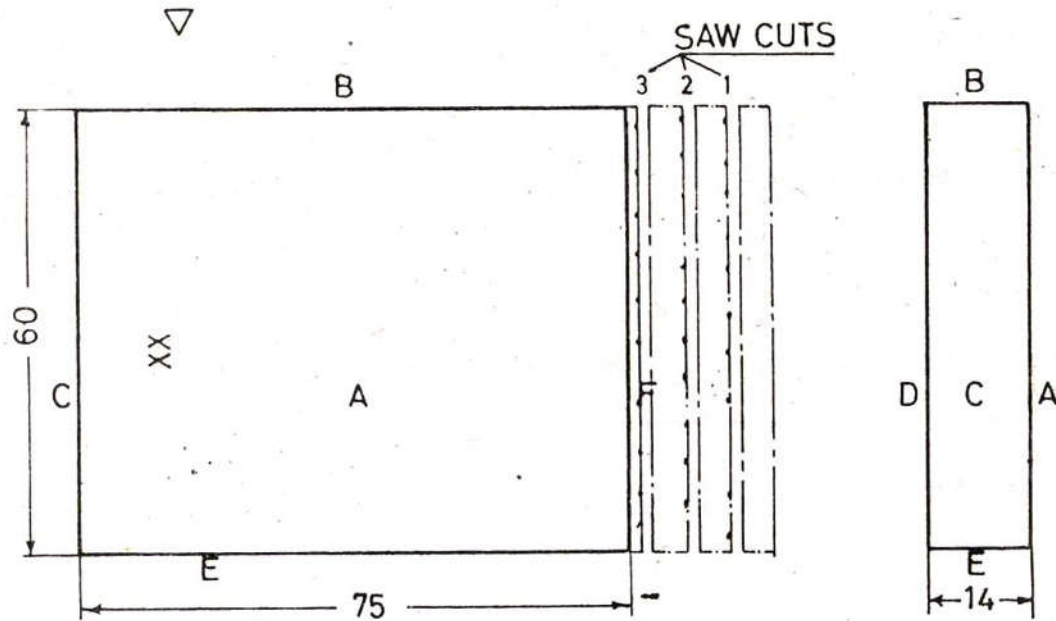
NO:- 10.1/04

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TOLERANCE ± 1 

SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1	1.2	THREE SQUARE FILE 150 x 1 HAND HACK SAW	NOTCH ENDS OF MARKING LINES WITH THREE SQUARE FILE. SAWING OF 1st AND 2nd CUT AS SHOWN.
2	3	THREE SQUARE FILE 150 x 1 HAND HACKSAW	SAWING OF 3rd CUT BY CLAMPING THE WORKPIECE IN HORIZONTAL POSITION.
3	A	FLAT FILES 300x1 ; 200x1 TRY SQUARE	FLAT FILING OF SURFACE 'A'
4	B	FLAT FILES 300x1 ; 200x1 TRY SQUARE	FLAT AND SQUARE FILING OF SURFACE 'B'
5	C	FLAT FILES 300x1 ; 200x1 TRY SQUARE VICE CLAMPS	FLAT AND SQUARE FILING OF SURFACE 'C'
6	REPEAT OPERATION 3, 4 & 5 FOR SURFACE D, E & F. DON'T CHECK WITH TRY SQUARE AND STEEL RULE, WHEN MATERIAL IS CLAMPED IN THE VICE! CHECK DIMENSION WITH OUTSIDE CALIPER AND STEEL RULE.		

SCALE 1:1

SAWING EXERCISE

NO: - 1.0.1/05

MAT. of Ex. 02

BASIC / FITTING

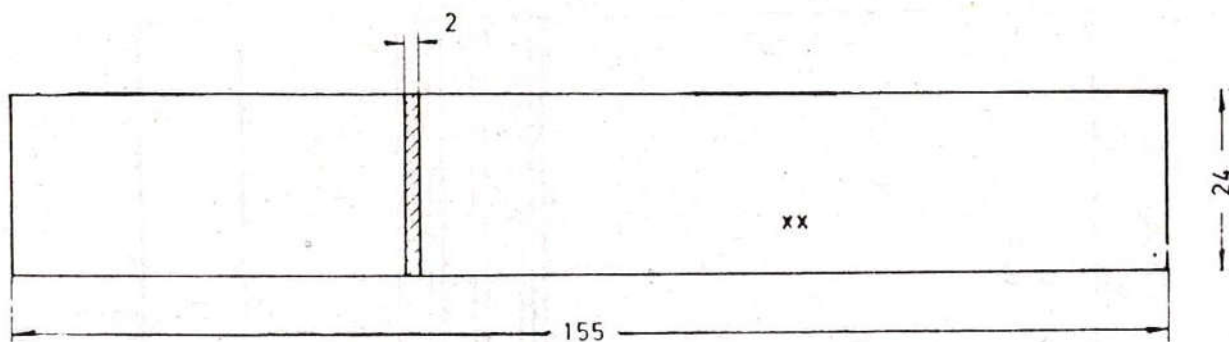


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAKISTAN TECHNICAL TRAINING PROGRAMME



TOLERANCE ± 0.3



Two pieces

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		SMOOTH-CUT FILE	SMOOTHING OPERATIONS. MATERIAL ALLOWANCE FOR SMOOTH FILING 0.1 TO 0.2 MM.
2		FLAT FILES 300x1; 250x3 TRY SQUARE VERNIER CALIPER WOODEN PIECE, NAILS	FLAT FILING OF 1st BROAD SURFACE. HOLD THE WORK ON A WOODEN PIECE.
3		FLAT FILES 300x1; 200x1; 250x3 TRY SQUARE VERNIER CALIPER	FLAT AND SQUARE FILING OF 1st LONGITUDINAL SIDE.
4	COMPLETE THE WORK IN A SEQUENCE OF OPERATIONS AS DONE IN PREVIOUS EXERCISES. MIND SMOOTHING ALLOWANCE. USE VICE CLAMPS.		

SCALE 1:1

MAT. ST. 37-1

INSIDE CALIPER 1

NO.- 101/06

BASIC/FITTING

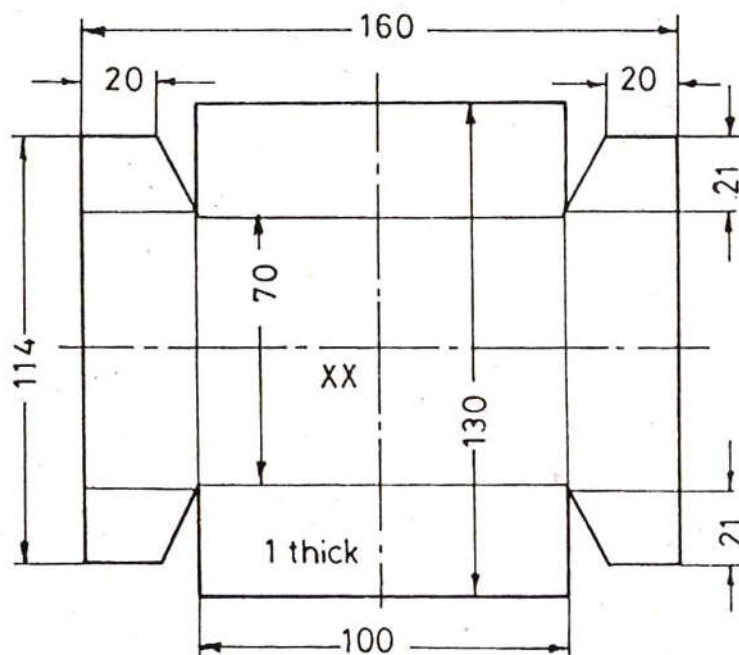


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FOR GERMAN TECHNICAL TRAINING PROGRAMME



TOLERANCE ± 0.3



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FILE FLAT 200x3 TRY SQ. STEEL RULE HANDVICE	FILING OF SIDES 'A' & 'B' IN RIGHT ANGLE.
2		MARKING TOOLS	LENGTH & WIDTH MARKING MARKING OF THE SHAPE OF THE WORK.
3		LEVER SHARING	SHEARING OF LENGTH AND WIDTH. SHEARING OF SHAP OF THE WORK ACCO- DING TO MARKING LINES.
4		TRY SQ., STEEL RULE, HAND VICE FILE 200x3 KEY FILE SET.	COMPLETING THE WORK ACCORDING TO GIVEN DIMENSIONS.
5	WHEN NUMBER PUNCHING USE LIGHT BLOWS. DEBURR THE WORK PROPERLY.		

SCALE 1 : 2.5

MAT : ST 10

SHEET METAL BOX 1

NO. - 1.01/07

BASIC / FITTING

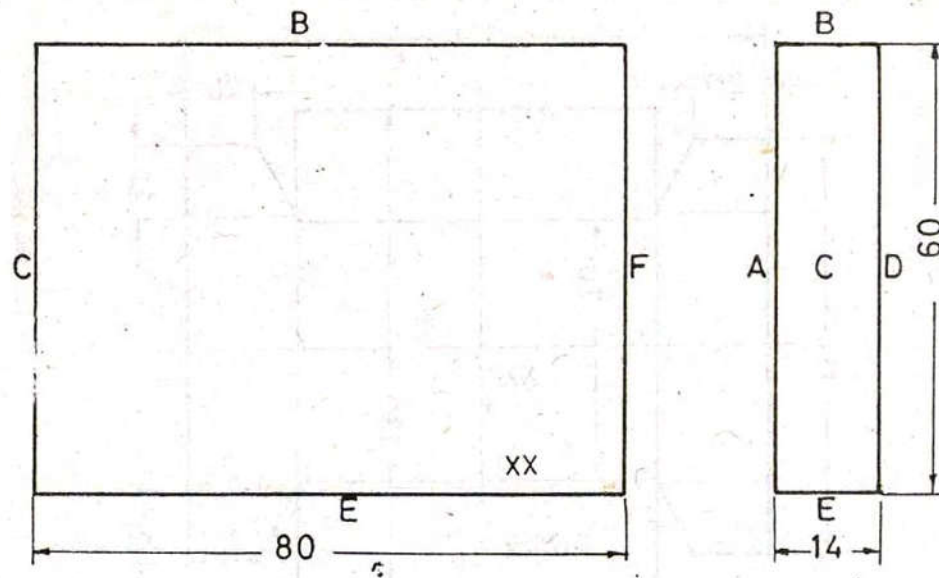


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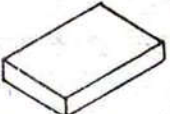
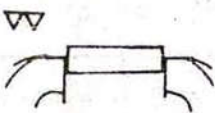
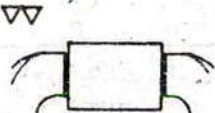
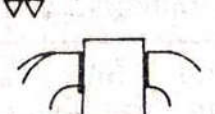
PAK-GERMANY TECHNICAL TRAINING PROGRAMME



TOLERANCE ± 0.2



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FLAT FILES 300x1 200x1 TRY SQ. V. CALPER VICE CLAMPS.	FILING OF THE WORK ALL AROUND IN RIGHT ANGLES. MIND SMOOTHING ALLOWANCE.
2		FLAT FILES 250x3; 150x3 TRY SQ V. CALIPER VICE CLAMPS	FINISHING OF SURFACE 'A' WITH SMOOTH FILES, USE CHALK FOR FINISHING.
3		FLAT FILES 250x3 150x3 TRY SQ V. CALI. V. CLM.	FINISHING OF SURFACE 'B' IN RIGHT ANGLE TO SURFACE 'A'
4		F. FILES 250x3 150x3 TRY SQ. V. CALI. V. CLM.	FINISHING OF SURFACE 'C' IN RIGHT ANGLE TO SURFACE 'A' & 'B'
5	COMPLETE ALL OTHER SURF. CHECK THE DIMENSIONS. WITH THE VERNIER CALIPER. DEBURR THE WORK PROPERLY.		

SCALE 1:1

MAT: ST 37_1

DRILLING EXERCISE 1

NO:- 1.01/08

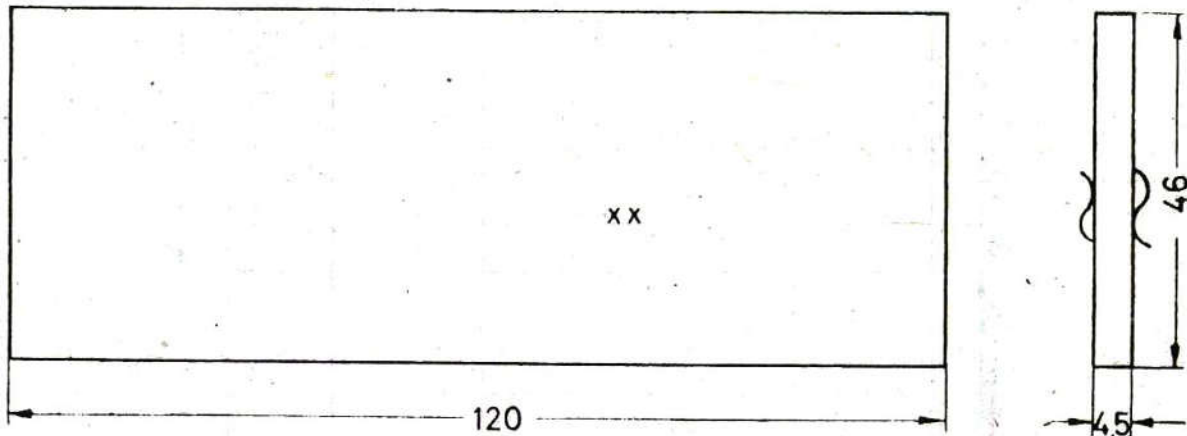
BASIC / FITTING



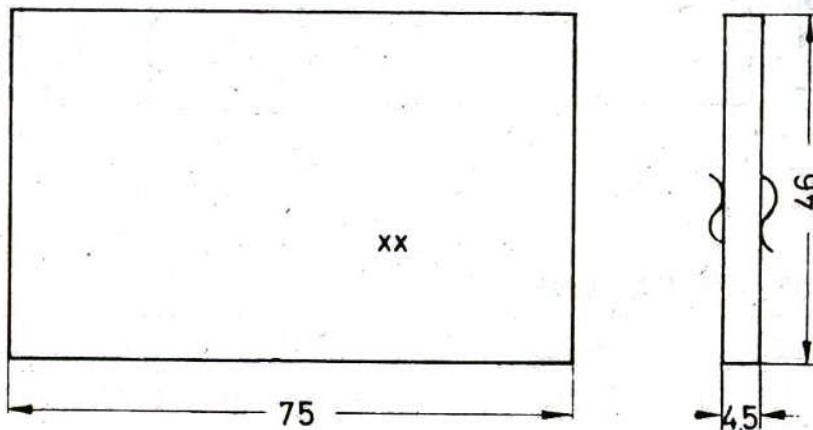
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TOLERANCE ± 0.2

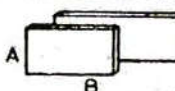
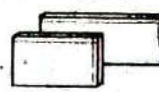


1, 2 $\nabla(\sim)$



Two pieces each.

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FLAT FILES 300x1, 200x1, 250x3, 150x3 TRY SQ., V.-CALIPER	FILING OF SURFACES 'A' & 'B' IN RIGHT ANGLE.
2		MARKING TOOLS	LENGTH AND WIDTH MARKING. USE SURFACES 'A' & 'B' AS REFERENCE SURF.
3		FLAT FILES TRY SQUARE VERNIER CALIPER	FILING OF ALL PIECES ACCORDING TO MARKING LINES.
4	PUNCH BENCH NUMBERS.		

SCALE 1:1

MAT.: ST 37-1

RIVETING EXERCISE 1

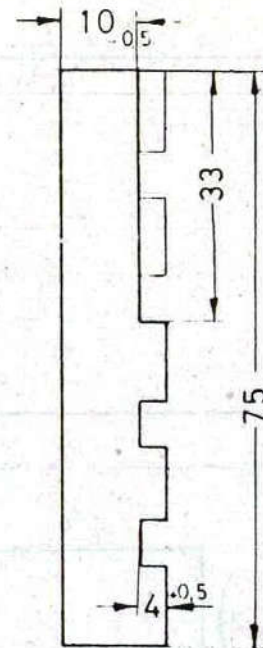
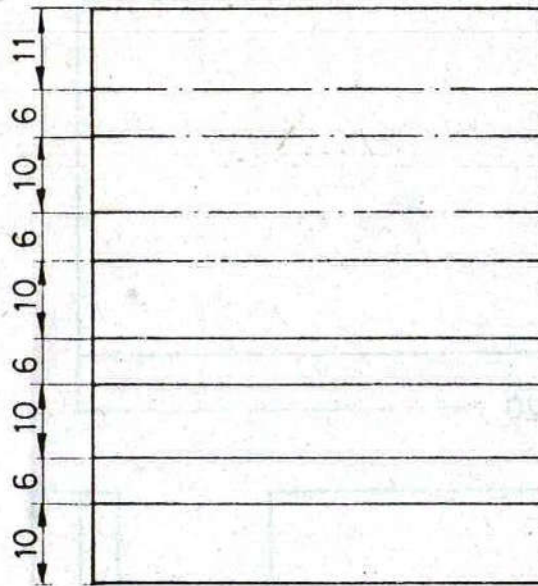
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BASIC/FITTING

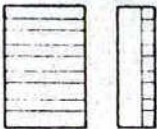
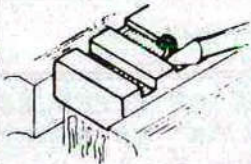
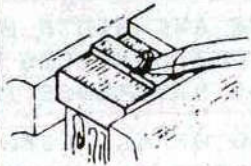


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		MARKING TOOLS	MARKING OF NOTCHES
2		CROSS-CUT CHISEL HAND HAMMER 600 g STEEL RULE WOODEN BLOCK	CHIPPING OF NOTCHES
3		FLAT CHISEL HAND HAMMER 600 g STEEL RULE WOODEN BLOCK	CHIPPING OFF TWO RIBS
4	LOOK AT THE CUTTING POINT WHILE CHISELLING. USE SAFETY SHIELD. USE PACKING BLOCK OF WOOD.		

SCALE 1 : 1

MAT. of Ex. 05

CHIPPING EXERCISE

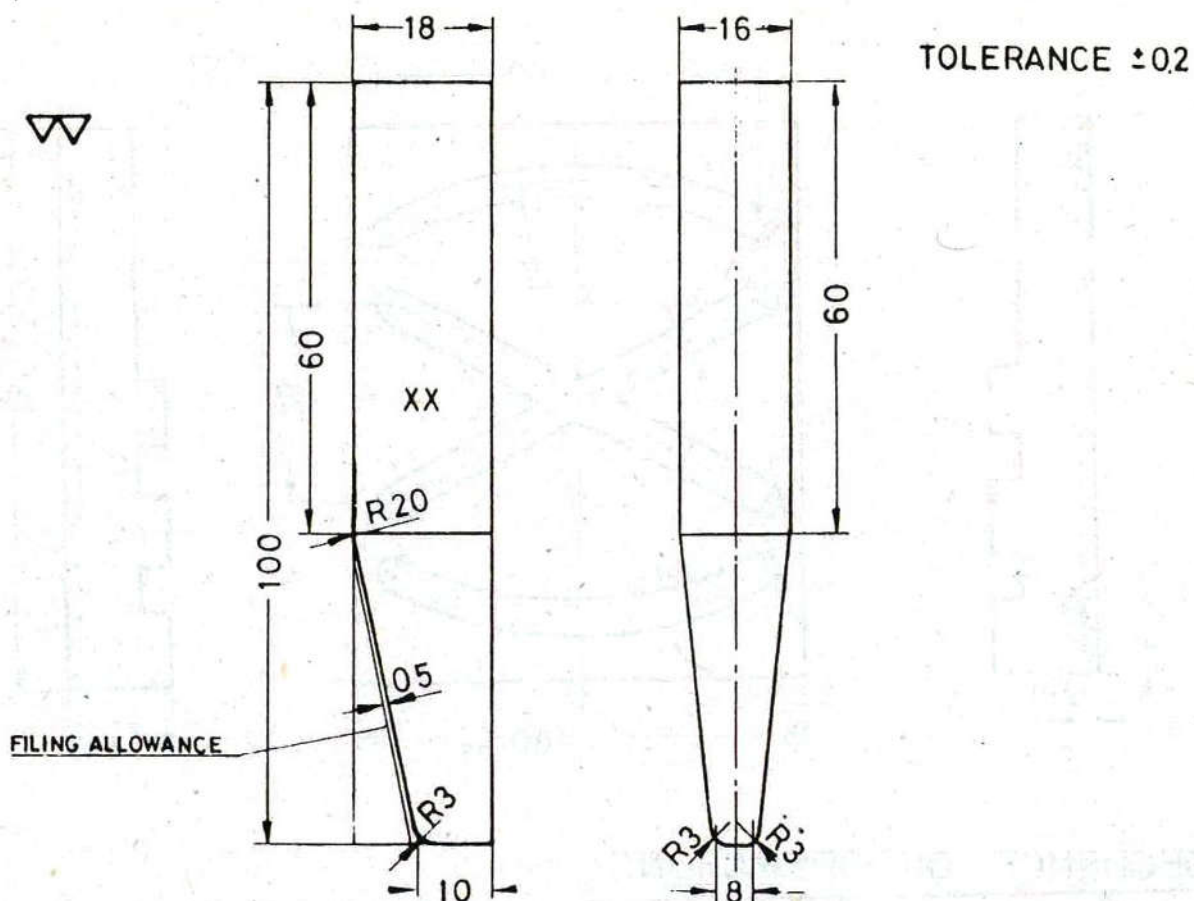
NO :- 101/10

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



No.	Symbol	Tool	Descriptions
1		ROUGH FILES, TRY SQUARE, VERNIER CALIPER	SQUARE FILING. MIND FINISHING ALLOWANCE.
2		MARKING TOOLS	MARKING WORK
3		FLAT CHISEL HAND HAMMER	CHIPPING OF INCLINA- TION UP TO MARKING LINE
4		SMOOTH FILES, VICE CLAMPS, TRY SQUARE, VERNIER CALIPER	SMOOTH AND SQUARE FILING
5		SMOOTH FILES VICE CLAMPS RADIUS GAUGE	RADII FILING
6	NUMBER PUNCHING DEBURRING ETC. FINAL WORK.		

SCALE 1:1

MAT. ST. 37-1

FIXED JAW
for SCREW CLAMP

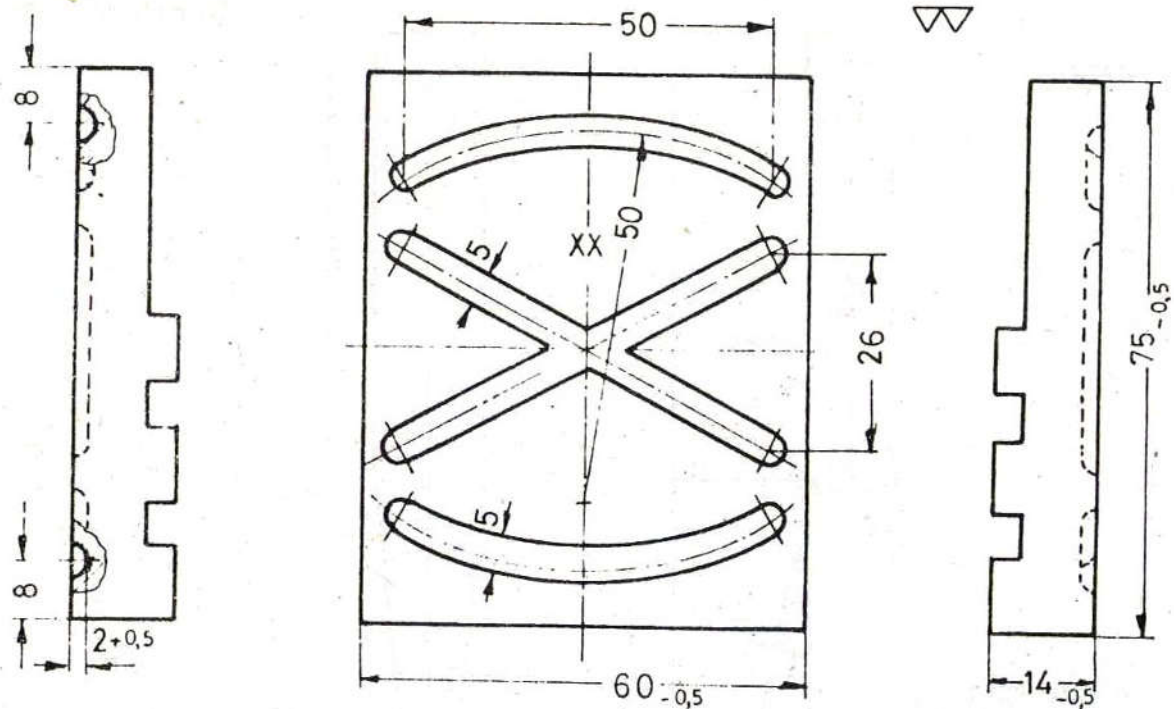
NO :- 1.01 / 11

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		MARKING TOOLS	MARKING OF GROOVES.
2		GROOVE CUT CHISEL HAND HAMMER 600g. STEEL RULE WOODEN BLOCK	CHIPPING OF CROSSED GROOVES.
3		GROOVE CUT CHISEL HAND HAMMER 600g. STEEL RULE WOODEN BLOCK	CHIPPING OF CURVED GROOVES.
4		SMOOTH FILES VERNIER CALIPER TRY SQUARE VICE CLAMPS	SMOOTH AND SQUARE FILING AND AROUND FINAL WORK.

SCALE 1/1

MAT. of Ex. 10

CHIPPING EXERCISE

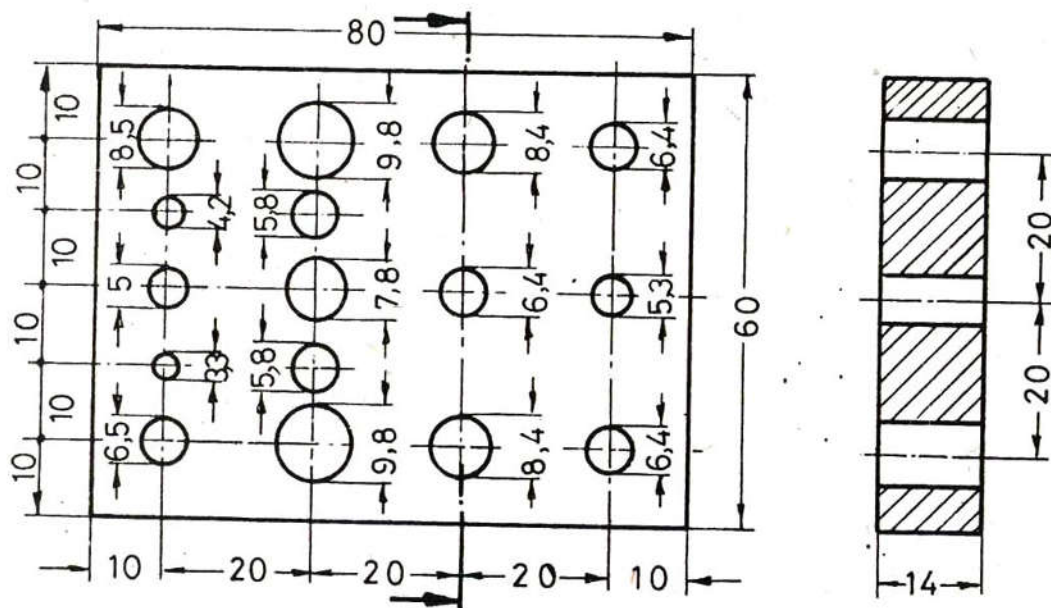
NO:— 10.1/12

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		MRKING TOOLS	MARKING OF ALL CENTRE POINTS AND CONTROL CIRCLES
2		MACHINE VICE PARALLEL PIECES	PROPER CLAMPING INTO THE MACHINE VICE
3		TWIST DRILLING ACCORDING TO GIVEN DIMENSION	DRILLIN OF HOLES. MIND THE R.P.M. AND FEED $R. P. M. = \frac{V \times 1000}{D \times \pi}$
4		COUNTE - SINK DRILL 90°	DEBURRING OF ALL HOLES FROM BOTH SIDES.

SCALE 1:1

MAT. of Ex. 08

DRILLING EXERCISE 2

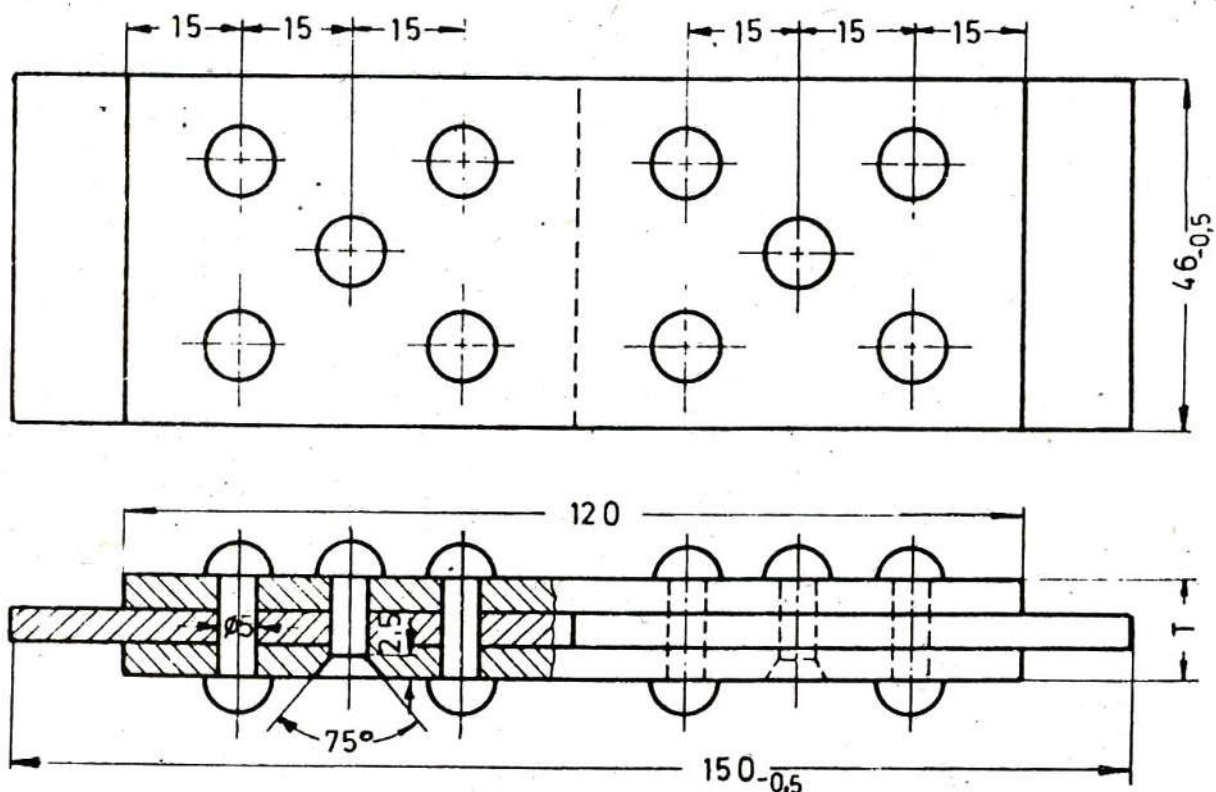
NO:- 101/13

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		MARKING TOOLS 2 HAND VICES	MARKIN OF CENTRE POINS CLAMPING TOGETHER OF ALL PARTS
2		TWIST DRILL 5,2 M.M. C/SINK DRILL 90° C/SINK DRILL 75°	DRILLING COUNTER- SINKING AND DEBURING OF THE HOLES
3		RIVET SETTING TOOLS 5 HAND HAMMER 600g. M.M.	SETTING OF RIVETS
4		HAND HAMMER 250g RIVET TOOL	PREFORMING OF RIVET HEAD
5		RIVET FORMING TOOL HAND HAMMER 600g.	FORMING OF RIVET HEAD
6		HAND HAMMER 600g. RIVET TOOL	SETTING OF COUNTERSINK RIVET
7	REPEAT RIVETING OPERATIONS FOR ALL RIVET JOINTS SHOWN IN THE DRAWING. RIVET LENGTH FOR ROUND HEAD 'L' = $T + 1,5d$. RIVET LENGTH FOR COUNTER SINK 'L' = $T \times 1 d$.		

SCALE 1:1

MAT. of Ex.09

RIVETING EXERCISE

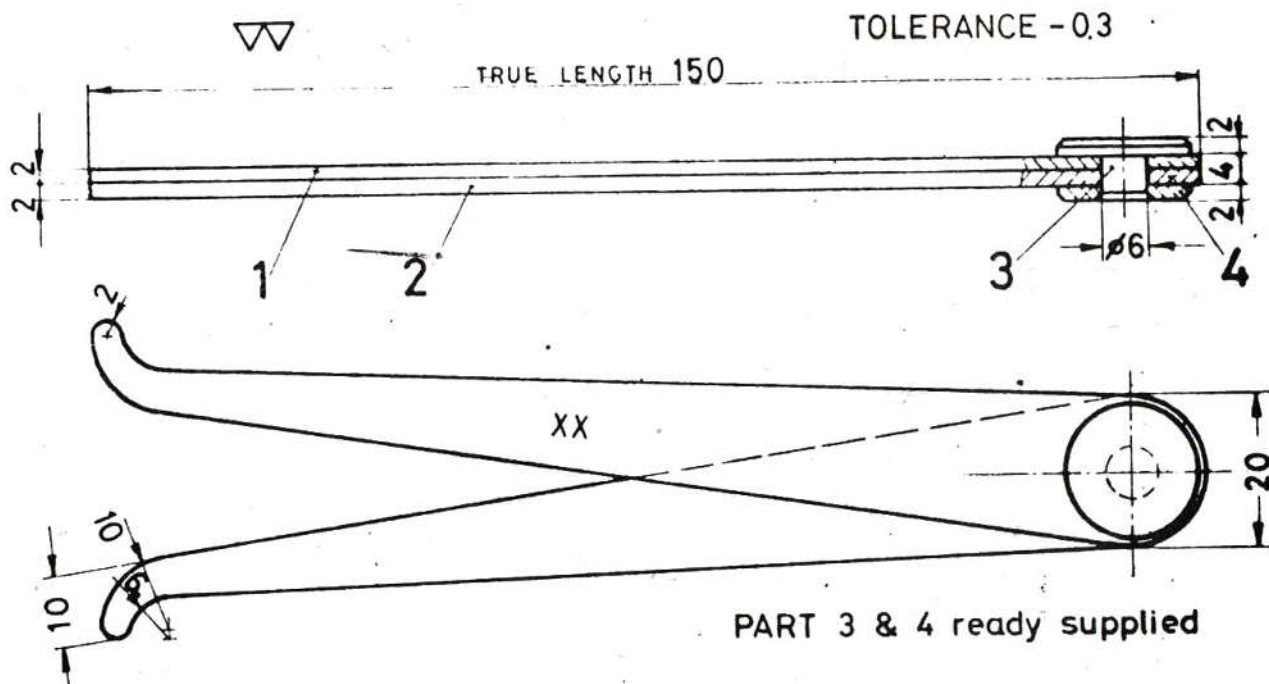
NO:— 10.1 / 14

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1			MARKING OF PART 1 AND 2 ACCORDING TO GIVEN DIMENSIONS.
2		FILES VICE CLAMPS	FILING OF PART 1 & 2 ACCORDING TO MARKING LINES.
3		TWIST DRILL 6MM HAND VICE	DRILLING WITH PART 1 AND 2 CLAMPED TOGETHER.
4		HAND HAMMER 250 g	RIVETING TOGETHER OF PART 1 AND 2.
5			FINAL WORK, DEBURRING, NUMBER PUNCHING.

SCALE 1:1

MAT. of Ex. 06

INSIDE CALIPER

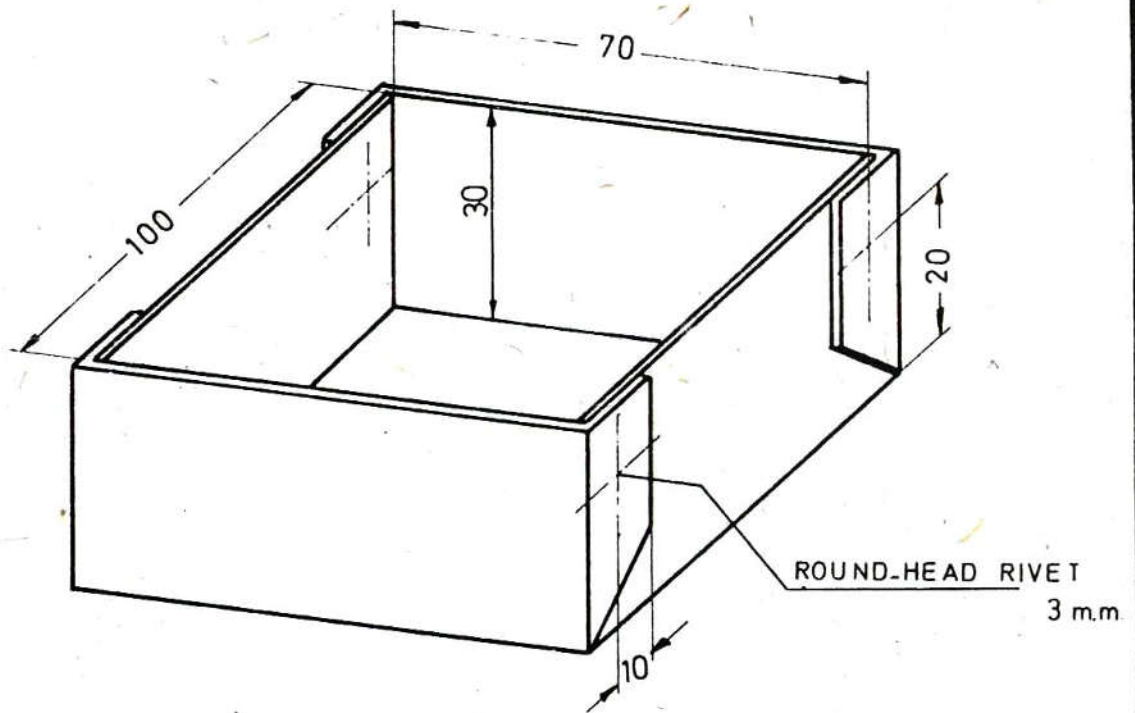
NO:- 1.0.1/15

BASIC/FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		HAND HAMMER 250g TWO ANGLE IRON	BENDING OF THE 4 FLANGES
2		HAND HAMMER 250g TWO ANGLE IRON	BENDING OF THE SIDES 100 MM LENGTH (WITHOUT FLANGES)
3		HAND HAMMER 250g SHIM	COMPLETION OF BENDING WORK
4		MARKING TOOLS TWIST DRILL 3.2 MM HAND VICE	DRILLING, DEBURRING, RIVETING
5		FILES MEASURING AND CHECKING TOOL	FILING, DEBURRING, FINAL CHECKING

SCALE 1:1

MAT. of Ex. 07

SHEET METAL BOX

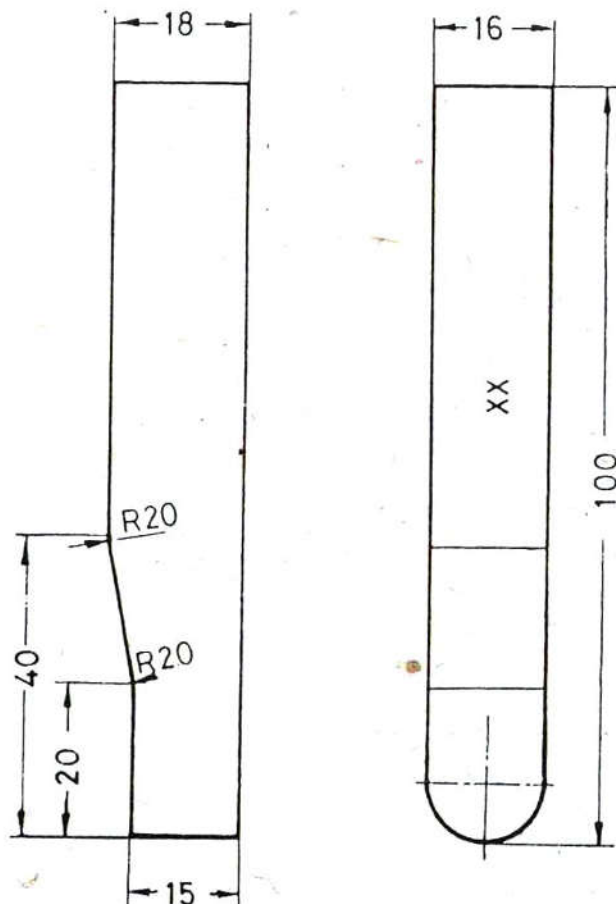
NO. 10.1 / 16

BASIC FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

2 ∇ TOLERANCE ± 0.1

FOR THE COMPLETION OF THIS EXERCISE, A LIMIT OF TIME IS GIVEN.

ALL SKILLS AND OPERATIONS NEEDED FOR THIS EXERCISE HAVE BEEN DONE PREVIOUSLY.

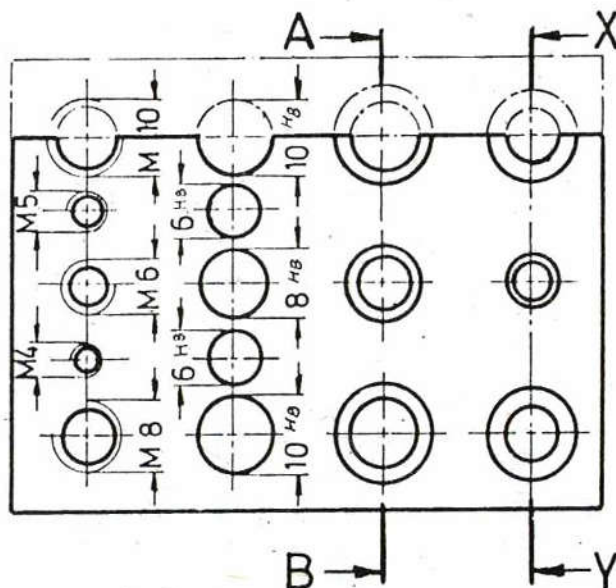
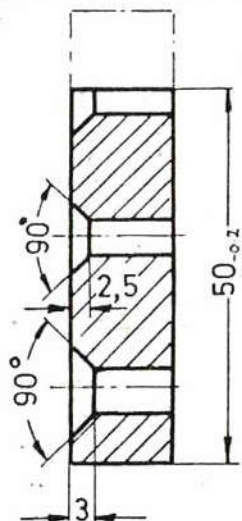
THEREFORE, NO ASSISTANCE OR SUPERVISION IS NECESSARY BY THE INSTRUCTOR.

PRORATED TIME	STARTED DATE	TIME	COMPLETED DATE	TIME	TIME USED
10 HRS.					

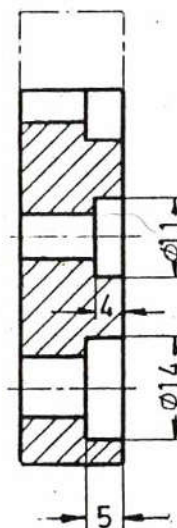
TIME MARKS + -

SCALE 1 : 1	MOVABLE JAW for SCREW CLAMP	NO :- 1.0.1/17
MAT. ST 37-1		BASIC / FITTING
 DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING		
PAK-GERMAN TECHNICAL TRAINING PROGRAMME		

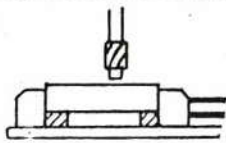
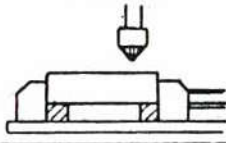
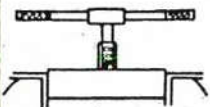
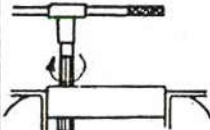
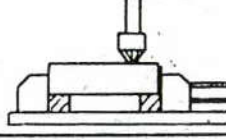
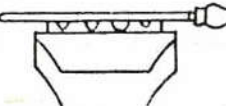
SECTION X-Y



SECTION A-B



SEQUENCE OF OPERATIONS

NO.	Symbols	Tools	Descriptions
1		CENTER BORE DRILL 6,4x11 8,4 x.14 -MACHINE VICE	COUNTER_ BORING
2		CONTER SINK DRILL 90° MACHINE VICE	COUNTER - SINKING
3		THREAD TAPS M4, M5, M6, M8, M10 TAP HANDLE	INSIDE - THREAD CUTING
4		HAND REAMER 6 ^{H8} 8 ^{H8} 10 ^{H8} HANDLE	REAMING
5		CONTER SINK DRILL MACHINE VICE	DEBURRING & RETAPPRING IF. NECESSARY
6		MARKING TOOL HAND HACSAB FILES MEARING TOOLS	MARKING, FILING, FINAL WORK

SCALE 1:1

MAT. of Ex.13

DRILLIG EXERCISE

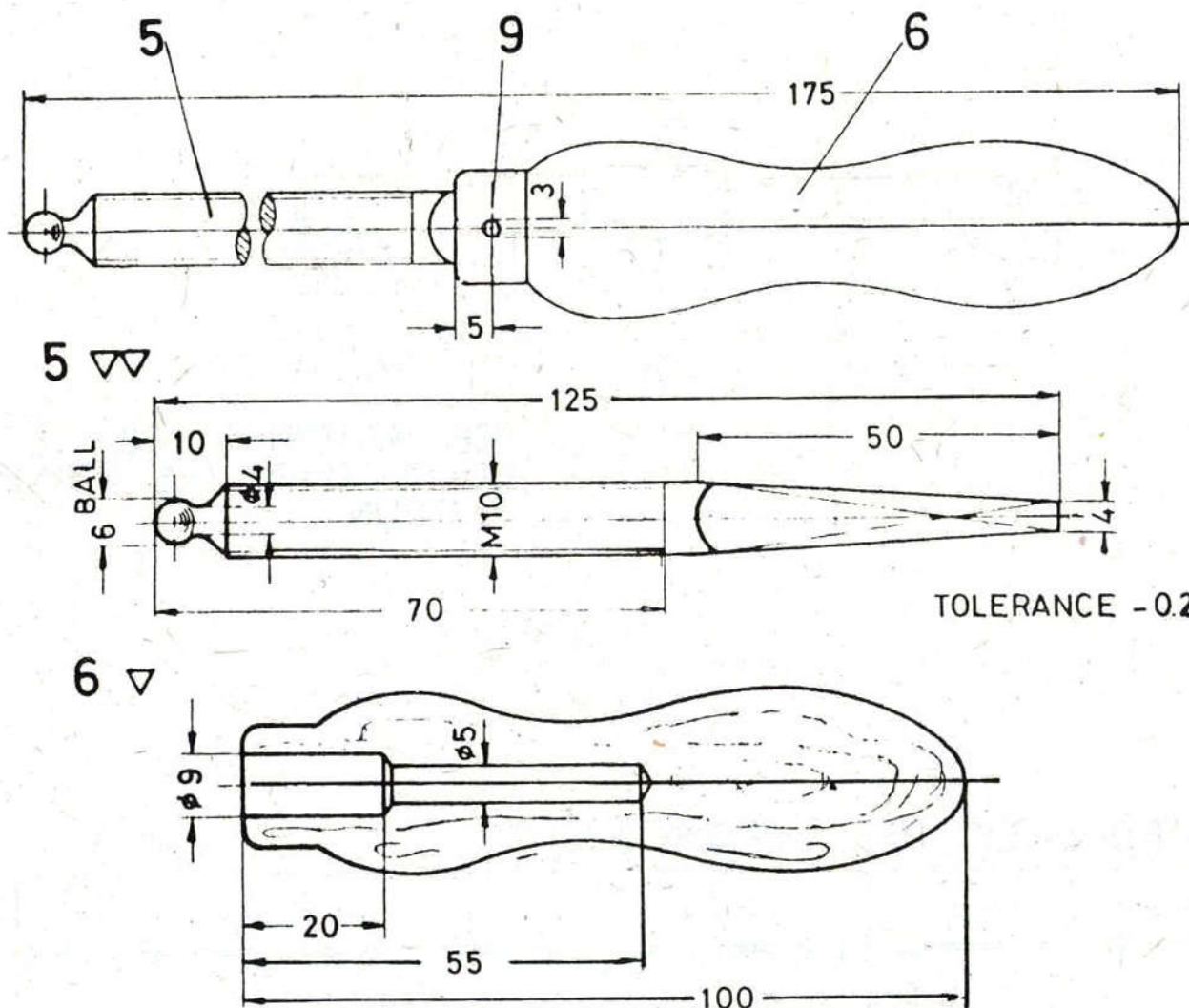
NO:— 1.0.1 / 18

SIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1		FILES MEASURING AND CHECKING TOOLS	COMPLETE FILING WORK
2		DIE 'M 10'	CUTTING OUTSIDE THREAD
3		TWIST DRILLS	DRILLING OF PART 6 JOINING PART 5 AND 6 SETTING OF PIN 3 MM

SCALE 1 : 1

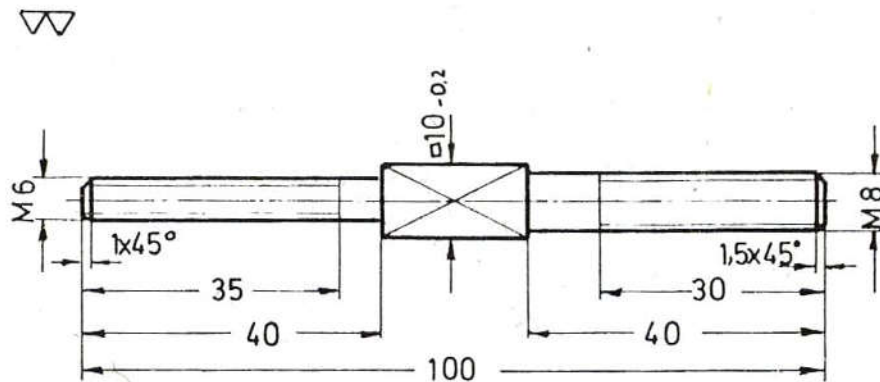
MAT. ST. 37-1
HARD WOODTHREAD BOLT
for SCREW CLAMP

NO :- 1.0.1/19

BASIC / FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



THE MATERIAL WILL BE SUPPLIED BY THE TURNER SECTION.

SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		FILES MEASURING AND CHECKED TOOLS	FILING OF SQUARING 10 MM
2		DIE M6	CUTTING OF OUTSIDE THREAD M6
3		DIE M8	CUTTING OF OUTSIDE THREAD M8

SCALE 1:1

MAT. ST 37_1

THREAD BOLT
FOR ELECTRICIAN ONLY

NO:— 1.0.1 / 19E

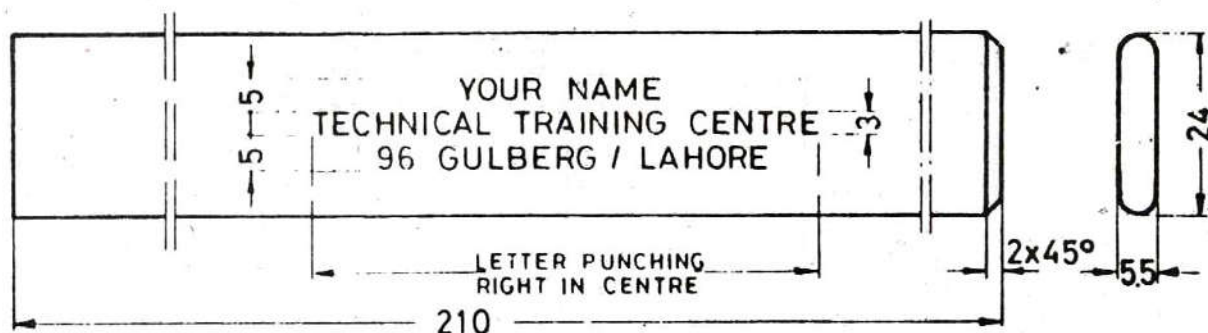
BASIC / FITTING



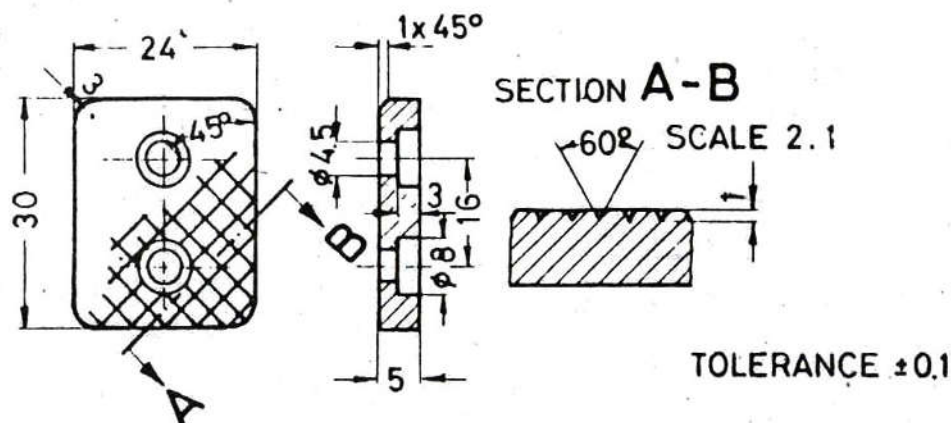
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

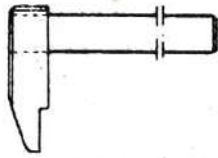
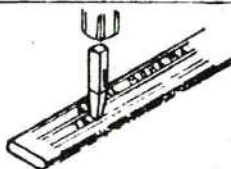
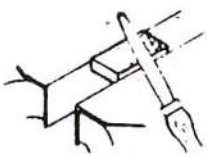
3 



4 



SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1		FILES MEASURING AND CHECKING TOOLS RADIUS GAUGE	FLAT AND RADIUS FILING
2		MARKING TOOLS LETTER PUNCHES 3 MM HAND HAMMER 250 g	STAMPING
3		FILES MEASURING AND MARKING TOOLS RADIUS GAUGE	DRILL THE HOLES FLAT AND RADIUS FILING NOTCH FILING
4	REMOVE ALWAYS THE BURRS FROM STAMPING WORK. MIND THE SURFACE QUALITY.		

SCALE: 1:1
2:1

MAT. ST. 37-1

GUIDE BAR
for SCREW CLAMP

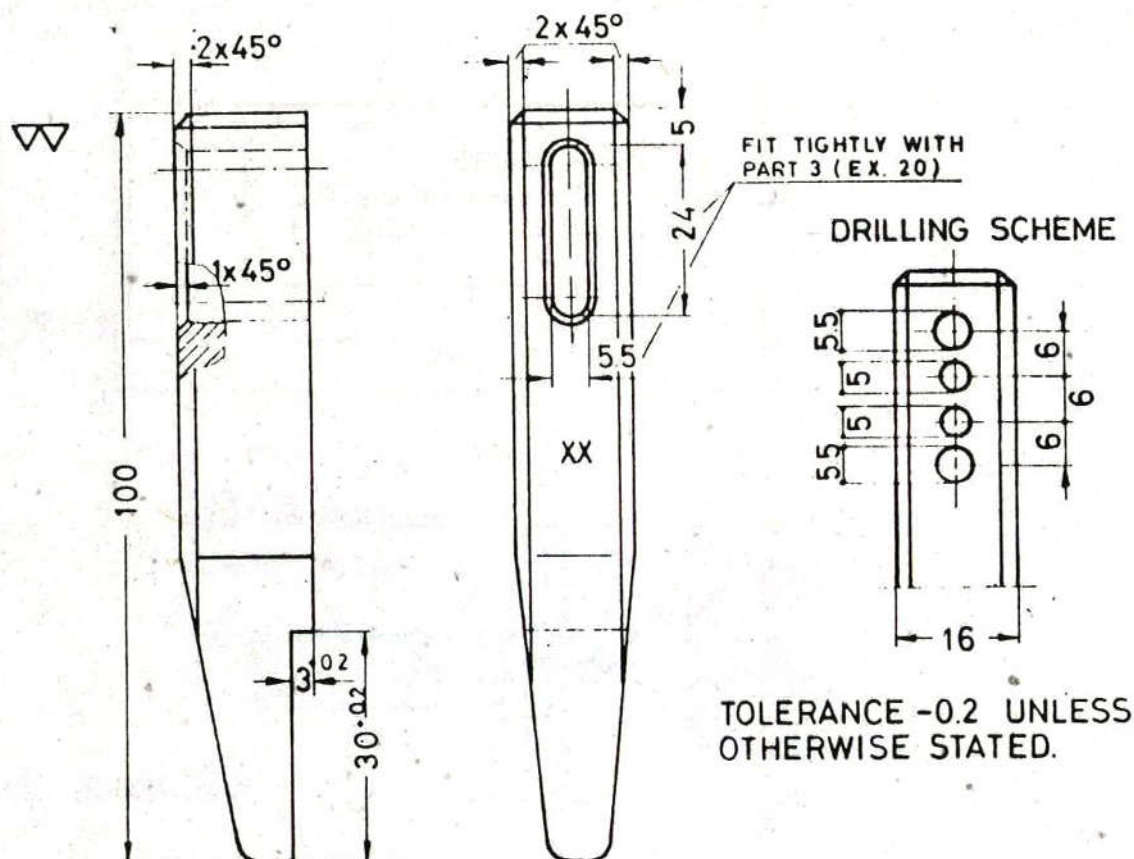
NO :- 1.01/20

BASIC/FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		MARKING TOOLS FILES MEASURING AND CHECKING TOOLS	MARKING OF THE WORK- PIECE COMPLETION OF RECESS
2		DRILLS HEWING CHISEL FILES CHECKING AND MEASURING TOOLS	DRILLING CHIPPING OF THE SLOT FILING OF THE SLOT
3		MARKING TOOLS FILES SQUARE 135° OBLIQUE CLAMP	CHAMFER FILING FINAL WORK

SCALE 1 : 1

MAT. of Ex. 11

FIXED JAW
for SCREW CLAMP

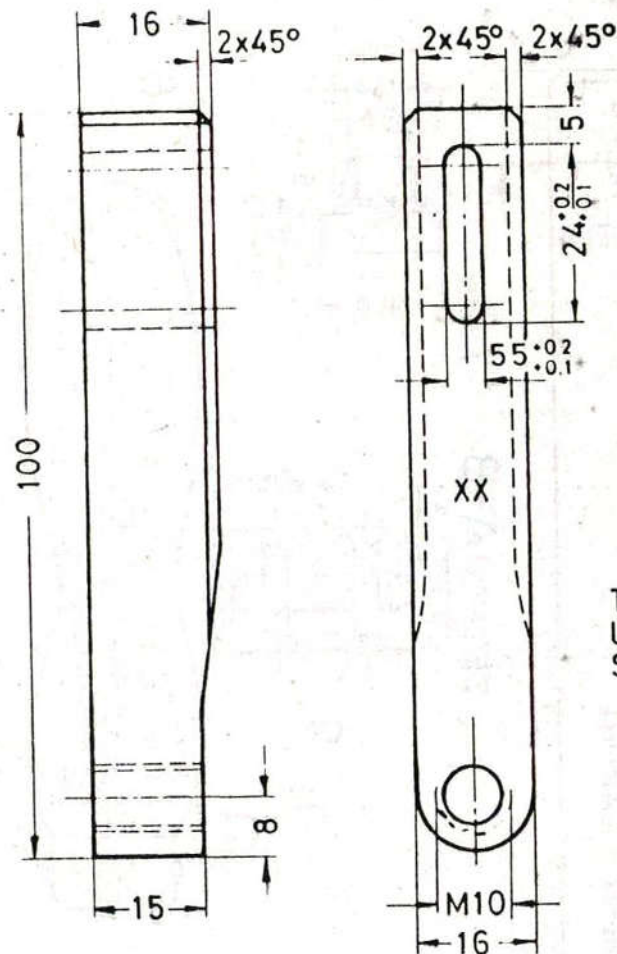
NO : - 1.0.1/21

BASIC / FITTER

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING



PAK GERMAN TECHNICAL TRAINING PROGRAMME

2 

TOLERANCE -02
UNLESS OTHERWISE
STATED

SEQUENCE OF OPERATIONS

NO.	Descriptions
1	COMPLETE THE SLOT AS DONE IN EXERCISE 21. CLEARANCE FIT WITH PART 3 (GUIDE BAR).
2	FILE CHAMFERS AS DONE IN EXERCISE 21.
3	DRILL THE HOLE FOR M 10 THREAD. CUT THE INSIDE THREAD. CHECK WITH PART NO. 5, EXERCISE 19. DO THE FINAL WORK.

SCALE 1:1

MOVABLE JAW
for SCREW CLAMP

NO :- 1.01/22

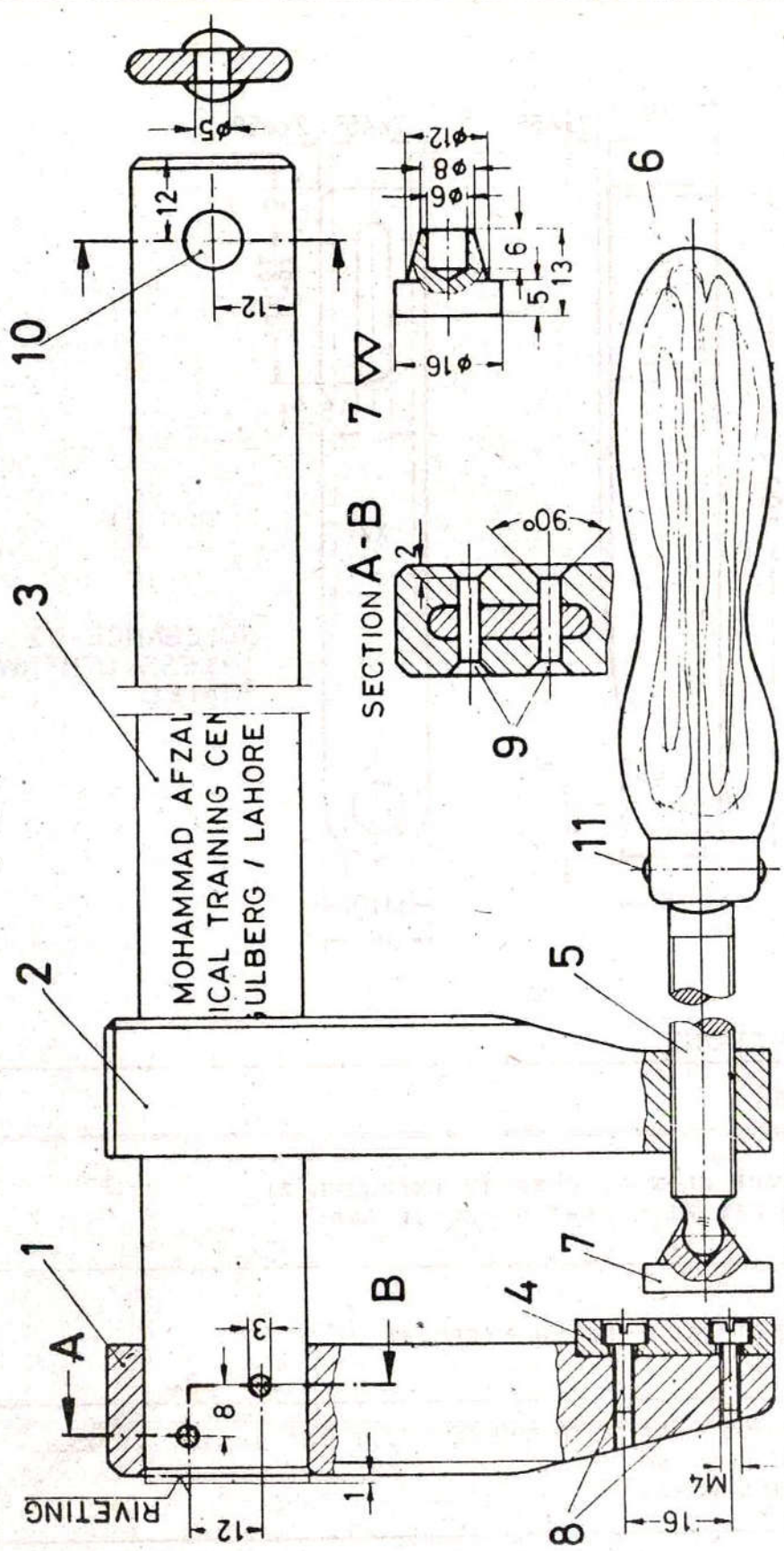
MAT. of Ex.17

BASIC/FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



MOHAMMAD AFZAL
ICAL TRAINING CEN
ULBERG / LAHORE

SECTION A-B

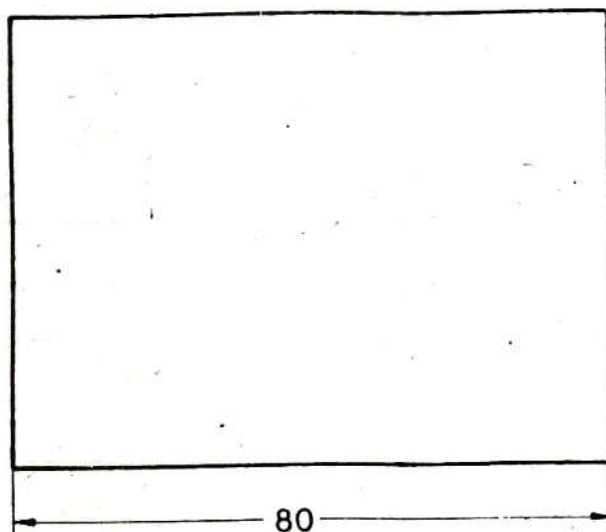
SEQUENCE OF OPERATIONS

NO.	Symbol	Discriptions
1		DRILL HOLES 3.3 MM. CUT INSIDE THREAD M4. JOIN PART 1 & 4 WITH PART 8.
2		JOIN PART 1 & 3 AS SHOWN IN THE DRAWING.
3		SCREW PART 5 INTO PART 2. JOIN PART 7 WITH PART 5.
4		SET ROUND HEAD RIVET ON PART 3 WHEN PART 2 IS MOVED ONTO PART 3.

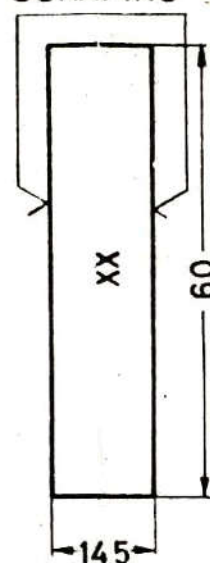
SCALE 1:1
MAT. of Ex. 19, 20
21, 22

SCREW CLAMP

NO :- 1.01/23
BASIC / FITTING



SCRAPING



TOLERANCE -0.1

SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1		FILES MEASURING AND CHECKING TOOLS	FINE SMOOTH FILING SCRAPING ALLOWANCE + 0.3 MM
2		SURFACE PLATE PRUSSIAN PAINT	MARKING OF HIGH SPOTS
3		FLAT SCRAPER MEASURING AND CHECKING TOOLS	FLAT SCRAPING REPEAT MARKING AND SCRAPING OPERATIONS
4	AFTER EACH SCRAPING OPERATION, REMOVE THE BURRS PROPERLY. FINE SCRAPING = 10 - 20 HIGH SPOTS / sq. in. DON'T USE TOO MUCH PAINT.		

SCALE 1:1

MAT or C1-25
ST. 37-1

SCRAPING EXERCISE

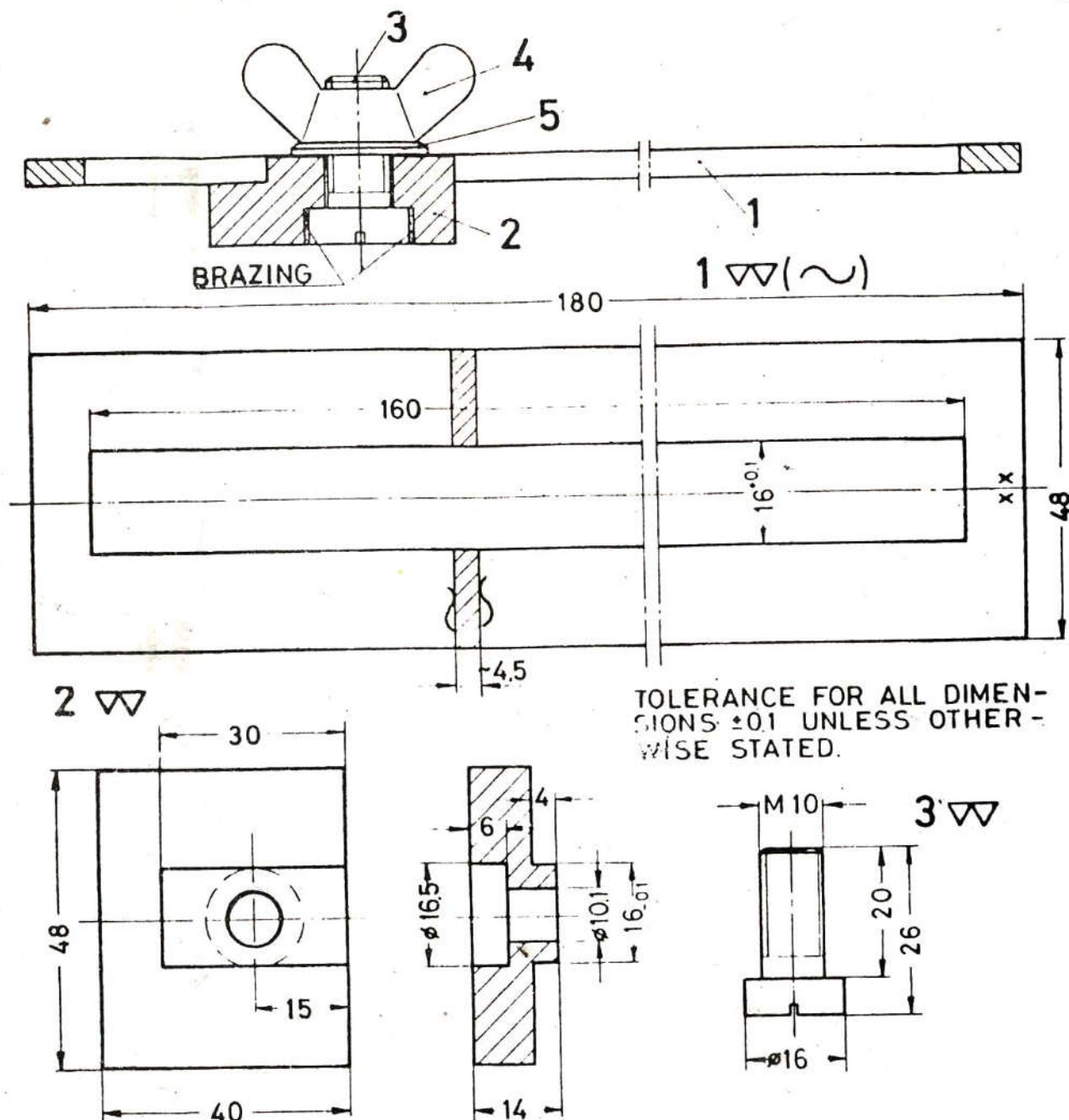
NO:- 1.01/24

BASIC / FITTING

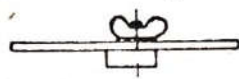
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME





SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		AS REQUIRED	COMPLETING OF PART 1 AND 2
2		BRAZING EQUIPMENT	ASSEMBLING OF ALL PARTS CHECKING OF FUNCTION FINAL WORK

SCALE 1:1

MAT. ST. 37-1

MARKING GAUGE

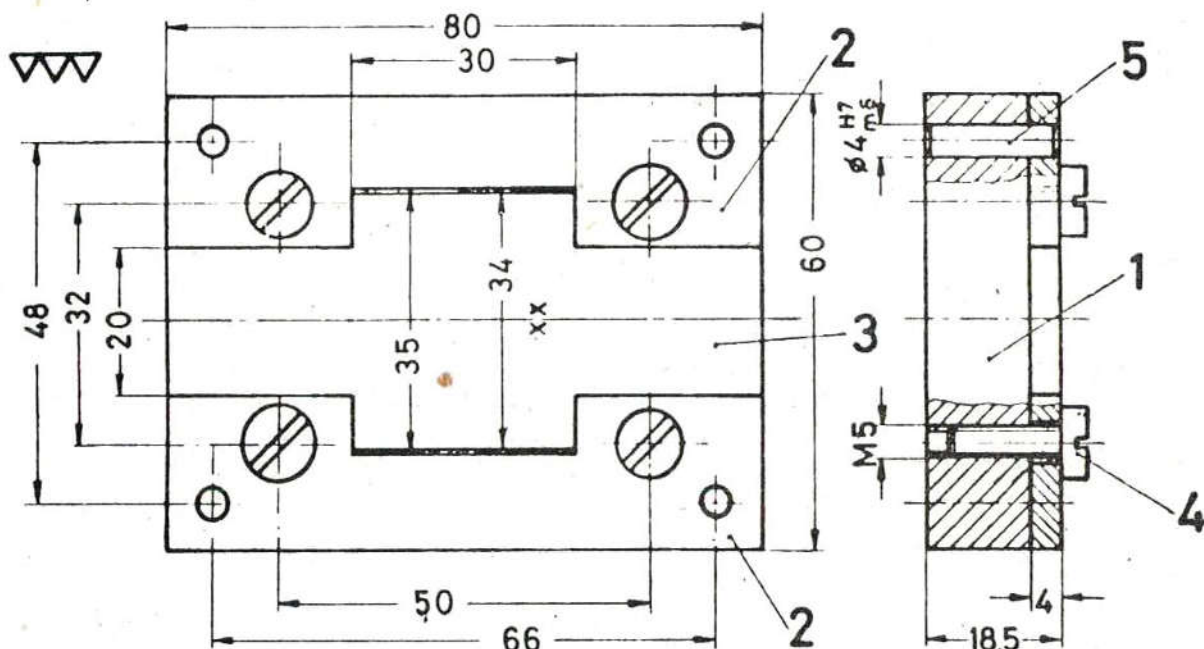
NO: - 1.01/25

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TOLERANCE ± 0.1

SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		FILES MEASURING TOOLS MARKING TOOLS	FILING OF PART 3
2		FILES MEASURING TOOLS MARKING TOOLS	FILING AND FITTING OF PART 2. MARKING THE CENTRE OF HOLES.
3		TWIST DRILLS 4.2 AND 5.5 MM	DRILLING TOGETHER OF PARTS 1 & 2 WITH 4.2 MM DRILL. REDRILLING OF PART 2 WITH 5.5MM DRILL
4		THREAD TAPS M 5 COUNTER SINK DRILL 90°	TAPPING OF PART 1 DEBURRING OF PARTS 1 AND 2
5		TWIST DRILLS THREAD TAPS M 5	SETTING OF PARTS 1, 2, 3 AND 4. DRILLING AS DONE IN OPERATION NO. 4.
6		TWIST DRILL 3.8 MM HAND REAMER 4 ^{H7}	SETTING OF PARTS 1, 2, 3 AND 4. DRILLING OF PIN HOLES. REAMING OF PIN HOLES.

SCALE 1:1

MAT. of Ex.4, 24

FITTING EXERCISE

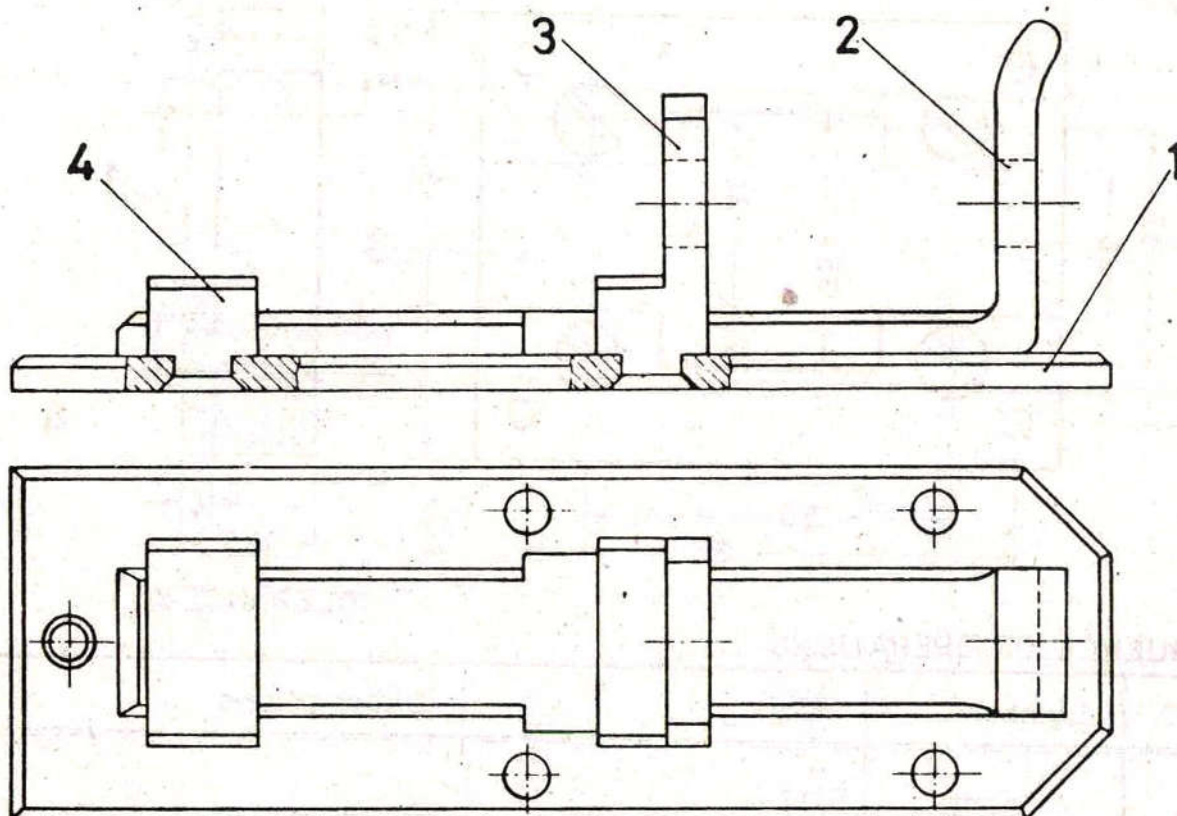
NO:- 1.01 / 26

BASIC / FITTING

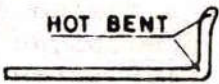
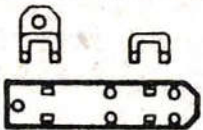
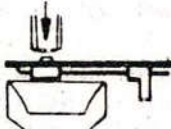


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		WELDING TORCH, FILES, MEASURING AND MARKING TOOLS, DRILLS, ETC.	BENDING OF PART 2, COMPLETING OF PART 2.
2		FILES, MEASURING AND MARKING TOOLS, DRILLS, ETC.	COMPLETING OF PARTS 1, 3 AND 4.
3		FILES HAMMER ETC.	SETTING OF ALL PARTS. CHECKING OF FUNCTION. RIVETING AND FINAL WORK.

4	1	BOLT GUIDE	ST 37-1 / REST of PART No.3
3	1	LOCKING GUIDE	ST 37-1 / 5/8" x 2 1/2"
2	1	BOLT	ST 37-1 / 1/4" x 1"
1	1	BASE PLATE	ST 37-1 / 3/16" x 2"
P. No.	Qty.	Denomination	Remarks

SCALE 1:1

MAT.

SLIDING BOLT

NO:- 1.01/27

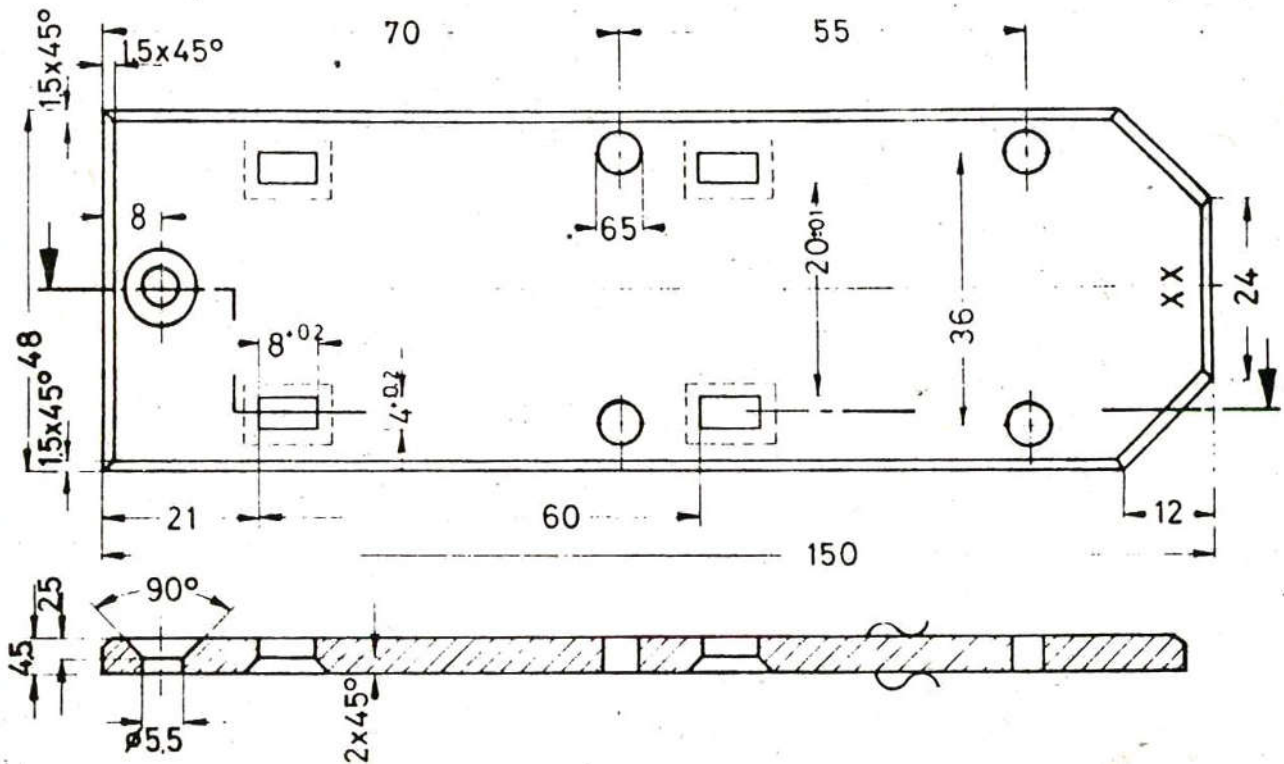
BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

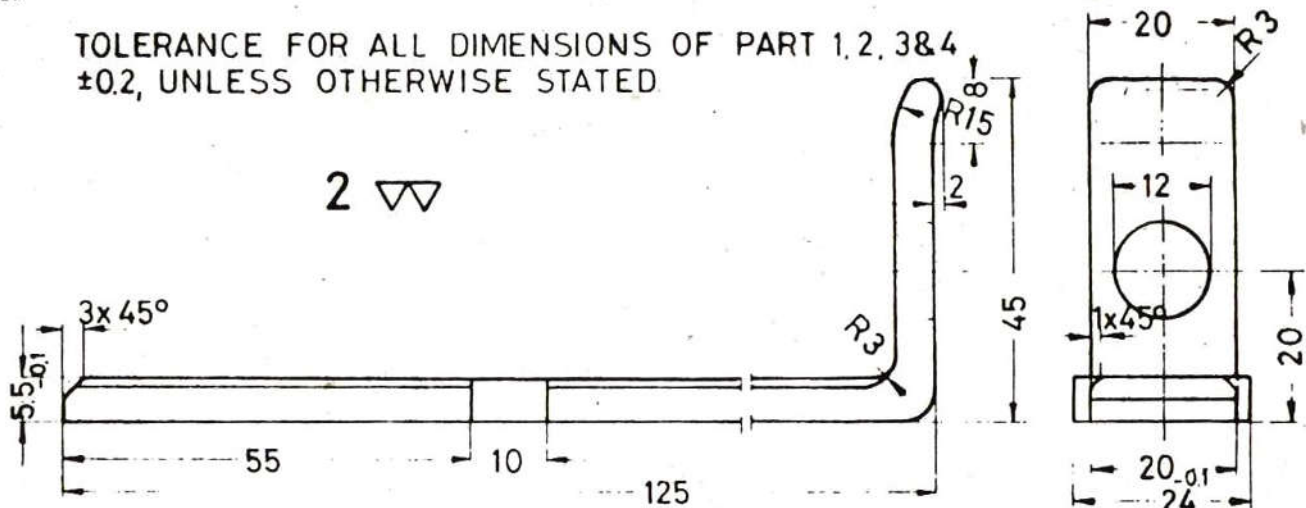
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

1 W (~)

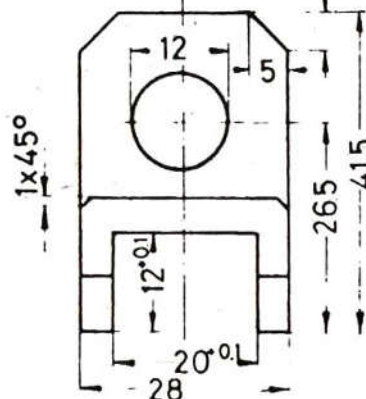
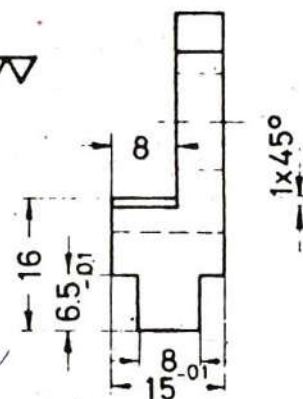


TOLERANCE FOR ALL DIMENSIONS OF PART 1, 2, 3 & 4
 ± 0.2 , UNLESS OTHERWISE STATED

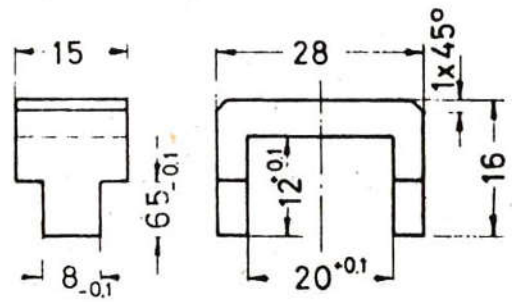
2 W



3 W



4 W



SCALE 1:1

MAT

SLIDING BOLT

NO: - 1.0.1/27.1

BASIC / FITTING



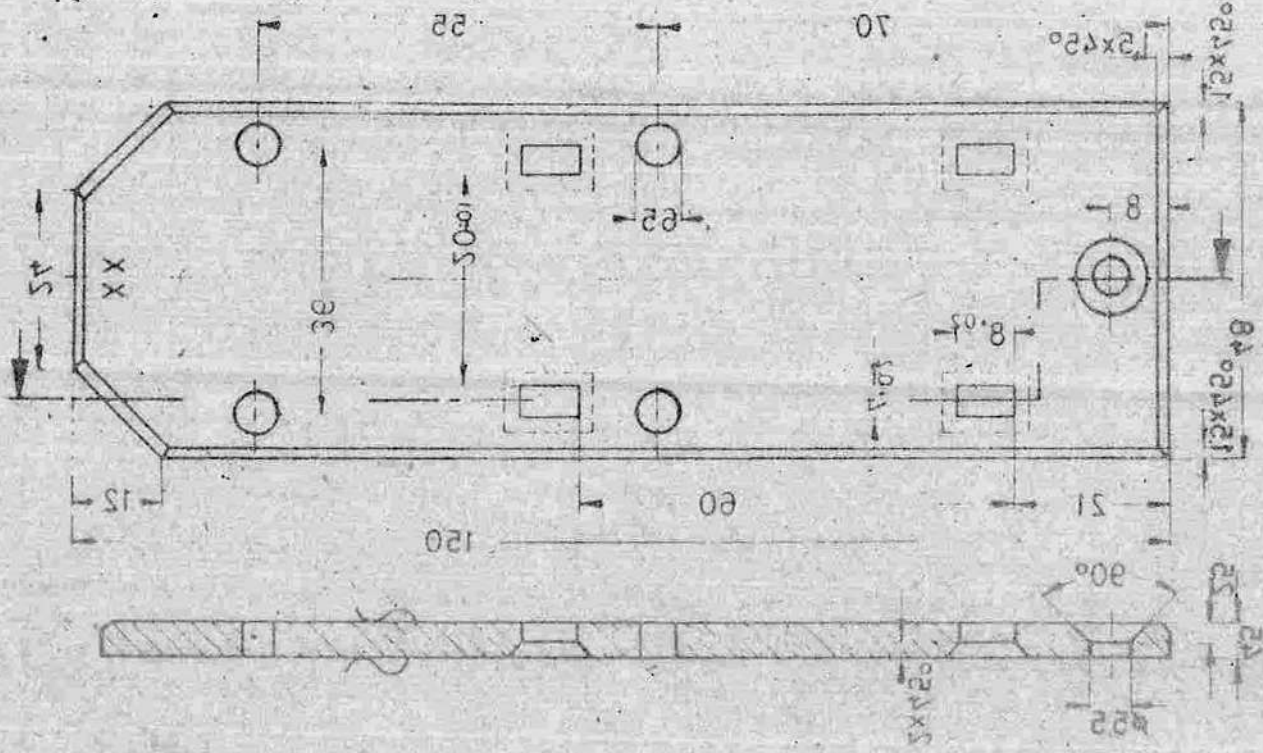
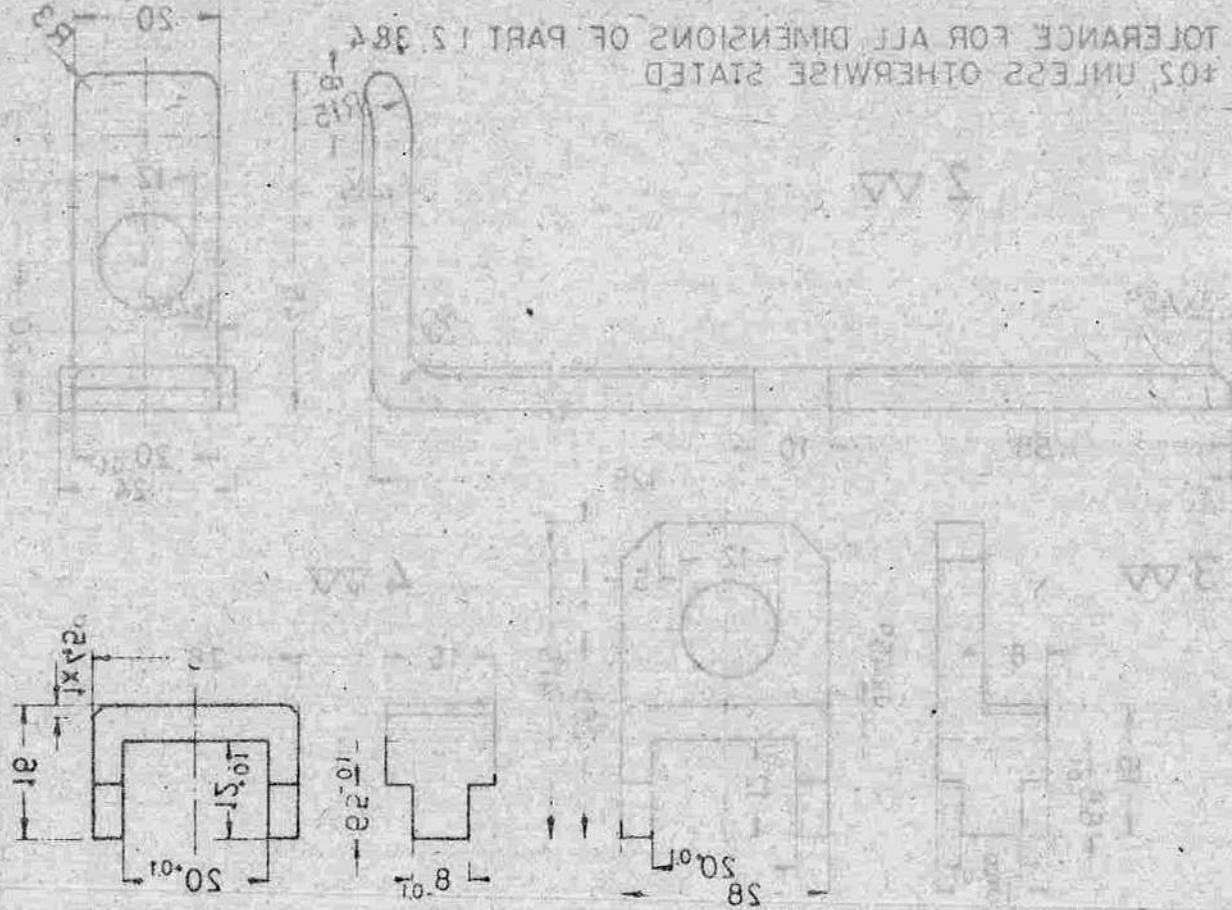
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

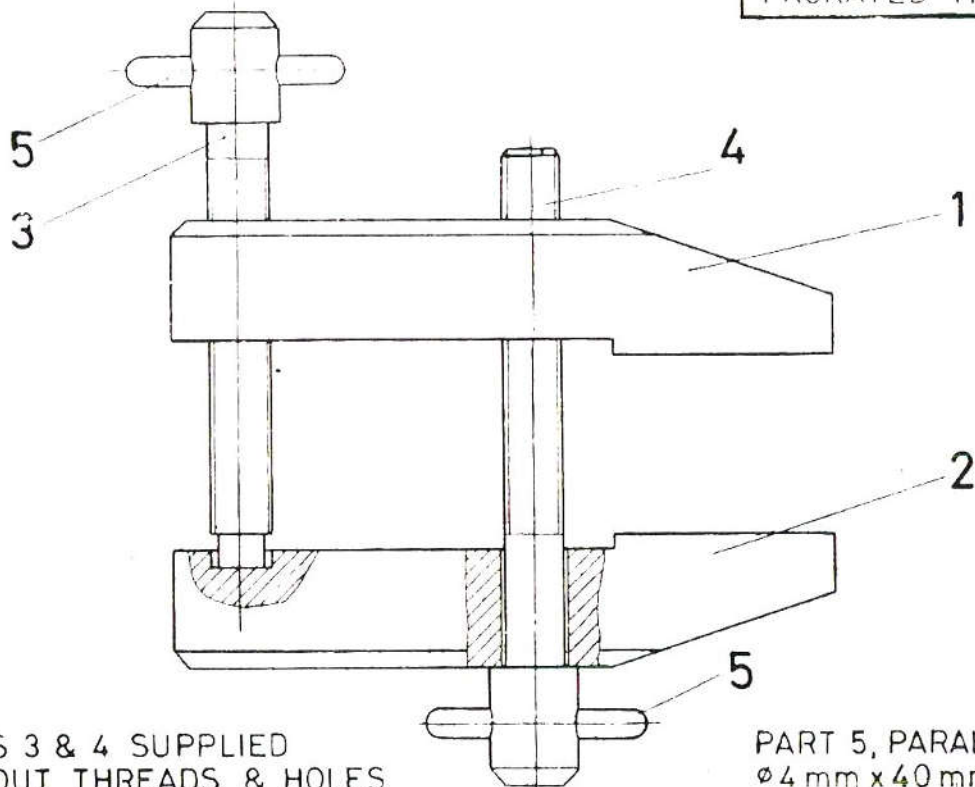
PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SLIDING BOLT

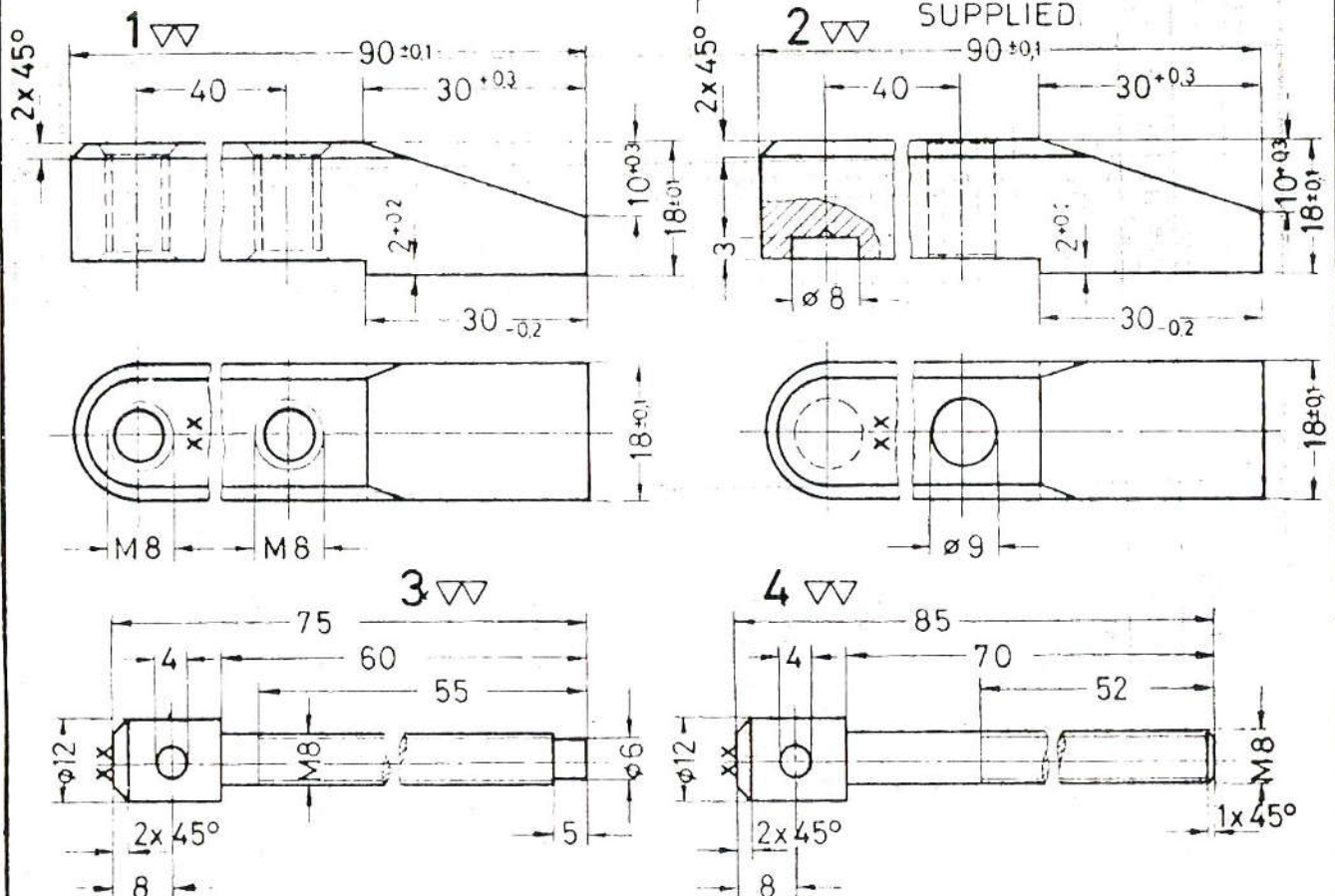
BASIC FITTING
NO: -10115271





PARTS 3 & 4 SUPPLIED
WITHOUT THREADS & HOLES

PART 5, PARALLEL PIN
Ø4 mm x 40 mm READY
SUPPLIED.



SCALE 1:1

MAT: ST 37-1

PARALLEL CLAMP

NO: 1.01/TEST

BASIC/FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FOR GERMAN TECHNICAL TRAINING PROGRAMME

MARKING SHEET for Exercise 101/TEST-FITTING

S-No	P-No	Points to be checked	NAME R-NO.				NAME R-NO.				NAME R-NO.			
			actual size	control I	control II	averg. marks	X	MARKS	actual size	control I	control II	averg. marks	X	MARKS
1	1-5	IMPRESSION ALL-AROUND	X				5		X				5	
2	1-5	FUNCTION	X				5		X				5	
3	1	OUTSIDE DIMENSION 90 ±0.1					1						1	
4	1	THICKNESS 18 ±0.1 (2x)					2						2	
5	1	OUTSIDE DIMENSION 30 - 0.2					2						2	
6	1	DEPTH DIMENSION 2 ±0.2					2						2	
7	1	RADIUS R9	X				3		X				3	
8	2	OUTSIDE DIMENSION 90 ±0.1					1						1	
9	2	DEPTH DIMENSION 2 ±0.2					2						2	
10	2	THICKNESS 18 ±0.1 (2x)					2						2	
11	2	OUTSIDE DIMENSION 30 - 0.2					2						2	
12	2	RADIUS R5	X				3		X				3	
13	1	SMOOTHNESS	X				2		X				2	
14	1	PROPER ANGLES	X				3		X				3	
15	1	CHAMFERS	X				2		X				2	
16	1	INSIDE THREADS	X				2		X				2	
17	1	DEBURRING, NO-PUNCHING etc	X				2		X				2	
18	2	SMOOTHNESS	X				2		X				2	
19	2	PROPER ANGLES	X				3		X				3	
20	2	CHAMFERS	X				2		X				2	
21	2	HOLES, DEBURRING etc	X				2		X				2	
22	3	OUTSIDE THREAD	X				4		X				4	
23	3	SMOOTHNESS ALL-AROUND	X				2		X				2	
24	4	OUTSIDE THREAD	X				4		X				4	
25	4	SMOOTHNESS ALL AROUND	X				2		X				2	
26														

CONTROLLER I _____	TOTAL MARKS =	TOTAL MARKS =	TOTAL MARKS =
CONTROLLER II _____	TOTAL MARKS $\times 0.9 =$	TOTAL MARKS $\times 0.9 =$	TOTAL MARKS $\times 0.9 =$
DATE _____	TIME MARKS =	TIME MARKS =	TIME MARKS =
	FINAL MARKS =	FINAL MARKS =	FINAL MARKS =



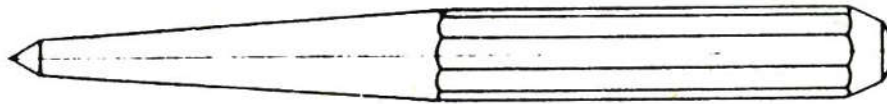
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

HINTS FOR OFFHAND GRINDING

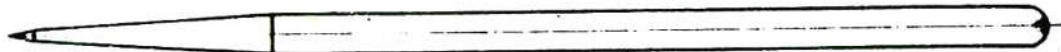
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Centre punch



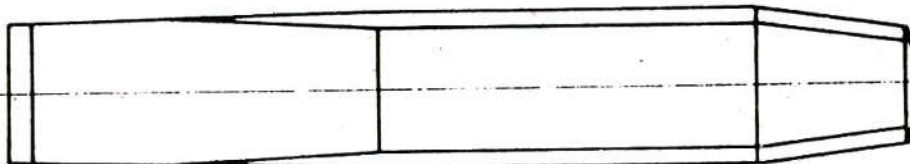
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Scriber



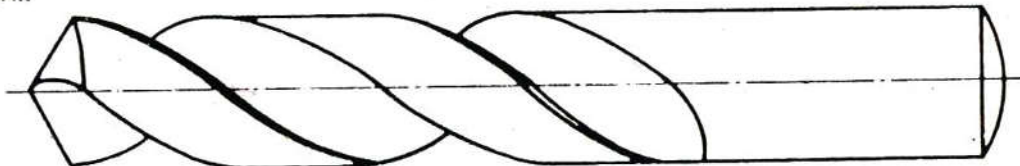
3

Flat chisel



4

Twist drill



5

The above shown exercises should be completed within 1 week.
After completion of this Offhand Grinding course, the trainees should be able to sharpen the exercised tools in correct manner and without any assistance.
The required materials for the exercises worn-out or blunt tools can be used.

LAYOUT

MP/2.3/2.14.1

OFFHAND GRINDING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER





DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER

LAYOUT

OFFHAND GRINDING

MP12 312.14.1

The required materials for the exercises worn-out or blunt tools can be used. To sharpen the exercised tools in correct manner and without any assistance After completion of this Offhand Grinding course, the trainees should be able The above shown exercises should be completed within 1 week.

2



Twist drill

4



Flat chisel

3



Scriber

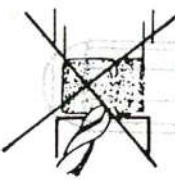
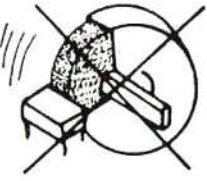
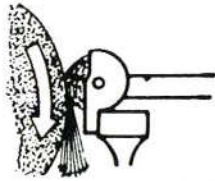
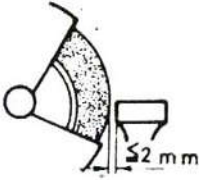
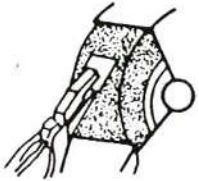
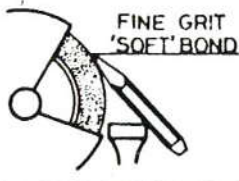
2



Center punch

1

HINTS FOR OFFHAND GRINDING

1		WHEN WORKING ON A GRINDING MACHINE, MAKE SURE THAT GUARDS AND HOODS ARE SECURELY PLACED. ALWAYS USE SOME SORT OF EYE PROTECTION, LIKE GOGGLES!
2		HAVE A CONTAINER OF COOL CLEAN WATER AVAILABLE TO COOL THE WORK AS IT BECOMES HEATED.
3		DON'T PRESS THE TOOL OR WORKPIECE CONSTANTLY AGAINST ONE PORTION OF THE GRINDING WHEEL ONLY. MOVE THE WORK ACROSS THE FULL FACE OF THE WHEEL TO PREVENT IT FROM BECOMING GROOVED.
4		DON'T GRIND ON THE SIDE OF A GRINDING WHEEL EXCEPT WHEN ABSOLUTELY NECESSARY! FOR ROUGH GRINDING ALWAYS WORK ON THE FACE OF A STRAIGHT GRINDING WHEEL!
5		BLUNT, GLAZED, GROOVED OR WOBBLING WHEELS MUST BE DRESSED OR TRUED.
6		DON'T WORK ON A GRINDING MACHINE WHICH HAS AN ABNORMAL 'SOUND'. MAYBE THE WHEEL HAS FRACTURES OR CRACKS OR IS NOT PROPERLY BALANCED.
7		WHEN GRINDING, KEEP THE TOOL REST ADJUSTED CLOSE TO THE WHEEL. A MAXIMUM DISTANCE OF 2 MM (1/16 IN.) IS RECOMMENDED TO PREVENT THE WORK FROM BEING CAUGHT BETWEEN THE REST AND THE WHEEL.
8		SMALLER TOOLS DON'T HOLD ON THE TOOL REST; SUPPORT THEM IN THE LEFT HAND AND SUPPORT THIS HAND WITH THE TOOL REST. VERY SMALL PARTS HOLD IN SUITABLE FIXTURES OR WITH PLIERS.
9		FOR HEAVY WORK, BIG GRINDING MACHINES AND COARSE GRIT WHEELS ARE REQUIRED. FOR FINE WORK, FINE GRIT WHEELS ARE REQUIRED. IF SPECIAL WORK OR MATERIALS OTHER THAN STEEL HAVE TO BE GROUND, ASK YOUR INSTRUCTOR!

HINTS FOR OFFHAND GRINDING

MP/2.3/2.14.1/1

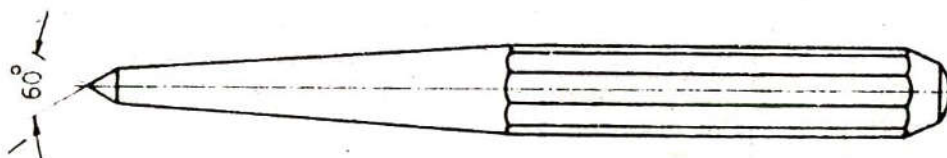
OFFHAND GRINDING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER



SEQUENCE OF OPERATIONS

Nos.	Symbol	Tools	Descriptions
1		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES BEVEL PROTRACTOR	ROTATE THE CENTRE PUNCH TO PRODUCE CONICAL POINT COOL THE CENTRE POINT AS SOON AS IT BECOMES HEATED

SCALE 1 : 1

MAT. CARBON STEEL

CENTRE PUNCH

MP/2.3/2.14.1/2

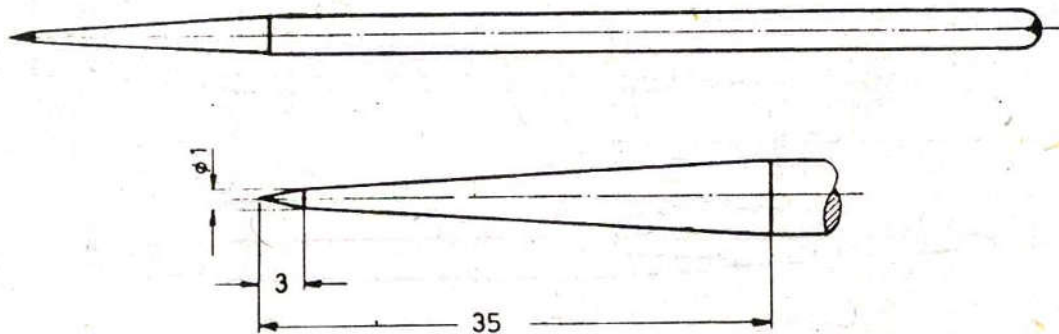
OFFHAND GRINDING



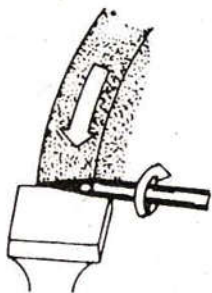
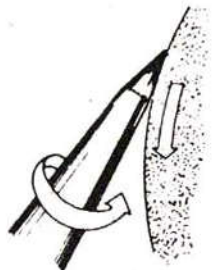
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER



SEQUENCE OF OPERATIONS

Nos.	Symbol	Tools	Descriptions
1		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES CHECKING TOOLS	GRINDING OF LONG CONE
2		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES	GRINDING OF CONICAL POINT

SCALE 1:1, 2:1

MAT. CARBON STEEL

SCRIBER

MP/2.3/ 2.14.1/3

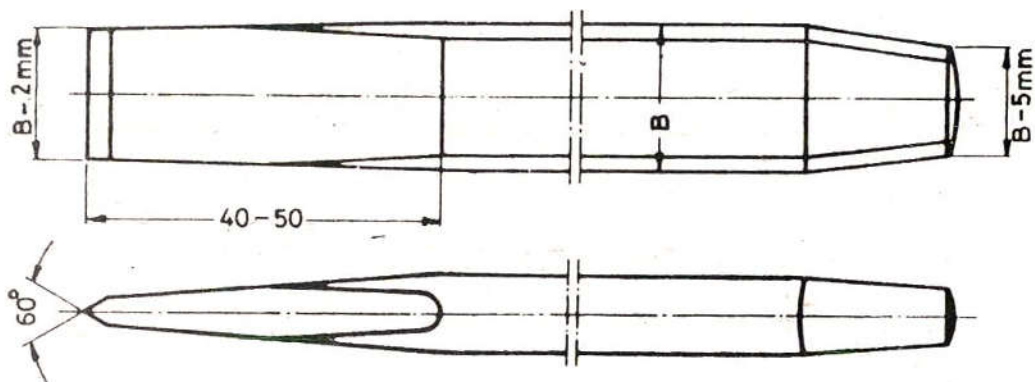
OFFHAND GRINDING



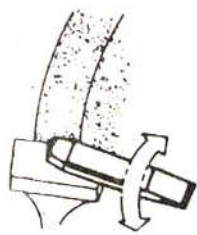
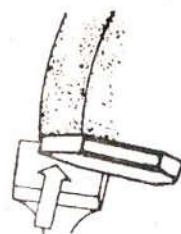
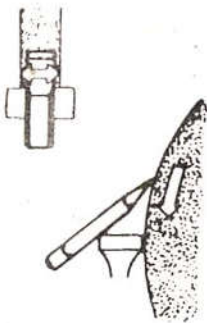
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER



SEQUENCE OF OPERATIONS

Nos.	Symbol	Tools	Descriptions
1		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES	GRINDING OF CHISEL HEAD
2		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES	GRINDING OF THE LONG CONICAL PORTION
3		PEDESTAL WHEEL GRINDING MACHINE SAFETY GOGGLES	SHARPENING OF CUTTING EDGE

SCALE 1 : 1

MAT. CARBON STEEL

FLAT CHISEL

MP/2.3/2.14.1/4

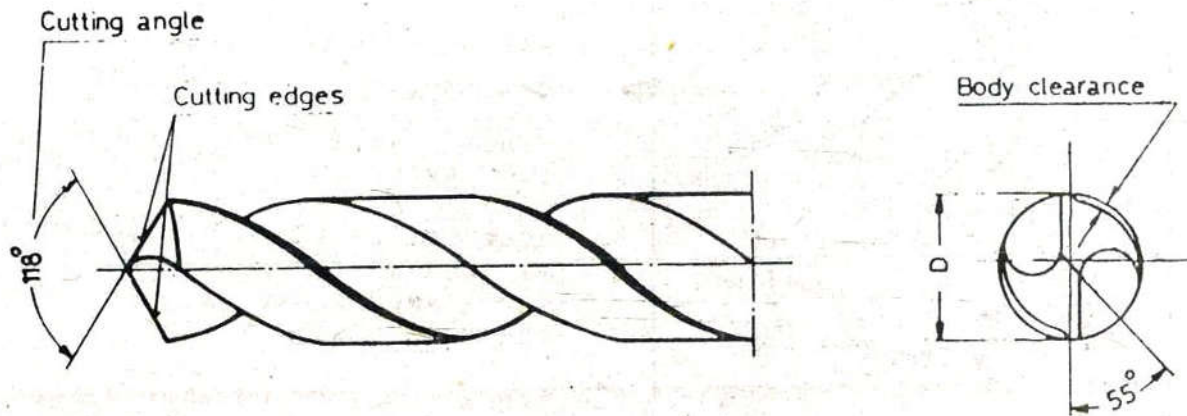
OFFHAND GRINDING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER



SEQUENCE OF OPERATIONS

Nos.	Symbol	Descriptions
1		FOR THIS EXERCISE A 10 TO 15 MM ϕ TWIST DRILL WOULD BE SUITABLE. EITHER THE TWIST DRILL CAN BE HELD AS SHOWN, OR THE HANDS CAN BE PLACED IN OPPOSITE POSITION. 1.1 STAND IN FRONT OF THE WHEEL AND SLIGHTLY TO THE LEFT OF THE MACHINE. 1.2 HOLD THE DRILL BETWEEN THE THUMB AND FIRST FINGER OF THE RIGHT (OR LEFT) HAND. 1.3 SUPPORT THE HAND ON THE TOOL REST WITH OTHER FINGERS. 1.4 HOLD THE SHANK OF THE DRILL BETWEEN THE THUMB AND FINGER OF THE LEFT (OR RIGHT) HAND. 1.5 POSITION YOURSELF BY MOVING THE FEET SO THAT THE DRILL MAKES AN ANGLE OF 59° TO THE WHEEL FACE. 1.6 HOLD THE DRILL LEVEL AND TWIST IT UNTIL ONE CUTTING EDGE IS HORIZONTAL AND PARALLEL TO THE WHEEL FACE.

cont.....5.1

SCALE 1 : 1

MAT. HIGH SPEED ST.

TWIST DRILL

MP/2.3/2.14.1/5

OFFHAND GRINDING

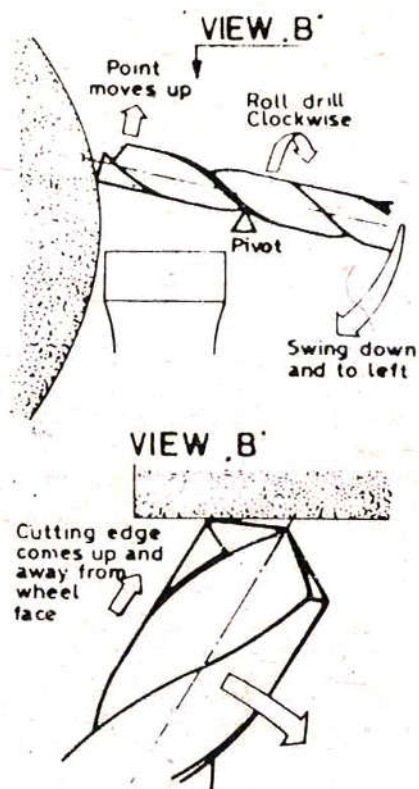


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

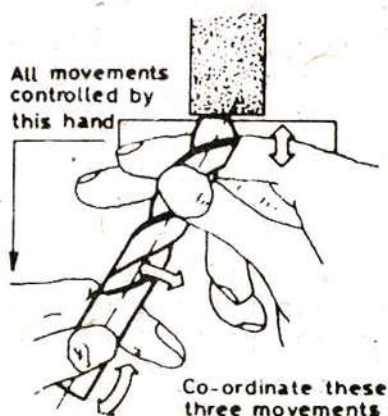
BENCH
FITTER

2



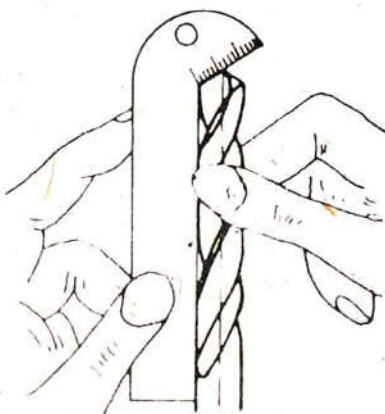
- 2.1 SWING THE SHANK OF THE DRILL SLIGHTLY DOWNWARDS AND TO THE LEFT (OR RIGHT) HAND. THE OTHER HAND, IS SUPPORTED BY THE TOOL REST.
- 2.2 ROLL THE DRILL TO THE RIGHT BY TURNING IT BETWEEN THE THUMB AND FINGER, AS YOU SWING THE HAND DOWN.
- 2.3 APPLY A SLIGHT FORWARD MOTION TO YOUR HAND. THIS PRODUCES THE LIP CLEARANCE.

3



- 3.1 MOVE THE DRILL BACK CLEAR OF THE WHEEL FACE.
- 3.2 TURN THE DRILL OVER WITHOUT MOVING THE POSITION. THIS PRESENTS THE SECOND EDGE TO THE WHEEL FACE AT THE SAME ANGLE AS THE FIRST CUTTING EDGE. PROCEED TO SHARPEN THE SECOND CUTTING EDGE USING THE SAME DRILL MOVEMENT AS BEFORE.

4



- 4.1 USE A DRILL GAUGE TO CHECK THAT THE CUTTING ANGLE IS CORRECT 118° FOR MILD STEEL, THE CUTTING EDGES ARE OF EQUAL LENGTH, THE LIP CLEARANCES ARE EQUAL AND CORRECT, ABOUT 10 TO 12 DEGREES.

SCALE 1:1

MAT. HIGH SPEED ST.

TWIST DRILL

MP/2.3/2.14.1/5.1

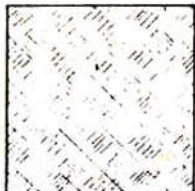
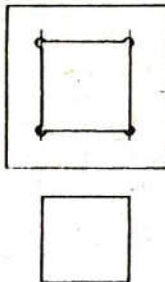
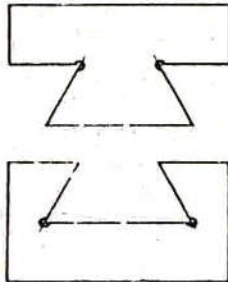
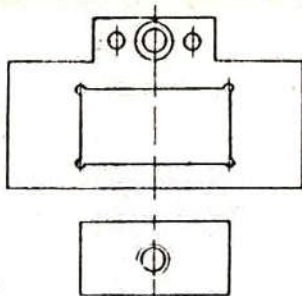
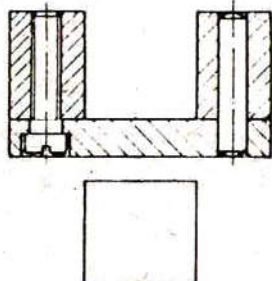
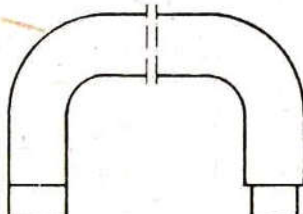
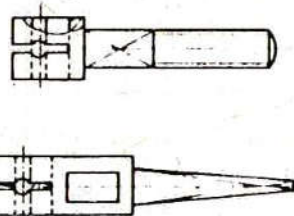
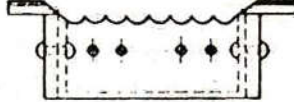
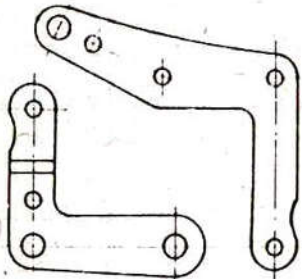
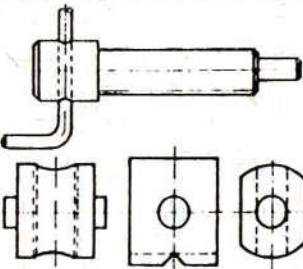
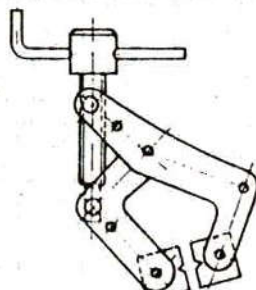
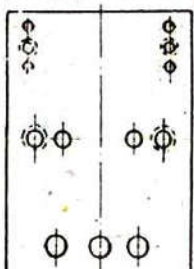
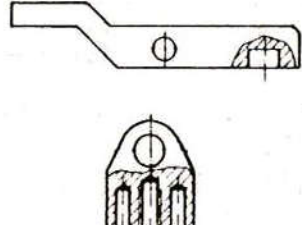
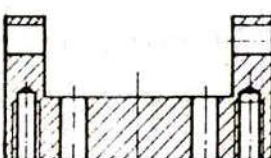
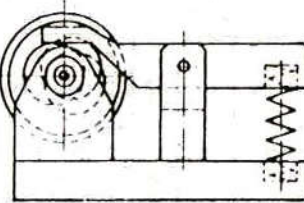
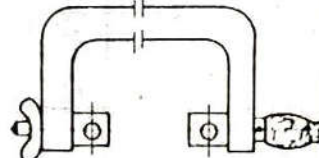
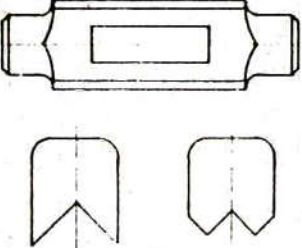
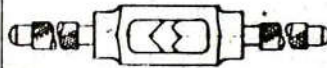
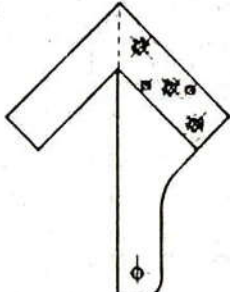
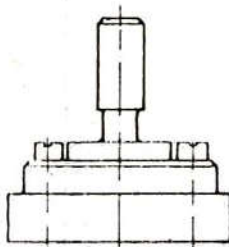
OFFHAND GRINDING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

BENCH
FITTER

			
1 → 12	2	3	4
			
5	6 → 16	2.13.2/5,6 → 7 → 16	8 1-3
			
9 → 11	2.13.2/12 → 10 → 11	9,10 → 11	1 → 12 → 15
			
13 → 15	14 → 15	12,13,14 → 15	6,7 → 16
			
2.13.2/20 17 → 18	17 18	19	2.13.2/10 → Test
TRADE TRAINING 1	LAYOUT		MP/2.1/ 2.13.1
			FITTING II
 DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING PAK GERMAN TECHNICAL TRAINING PROGRAMME			

TRADE TRAINING
FITTING II

MATERIAL REQUIRED
FITTER

No. 2.13.1/1to 8.3

Drg. No.

Part No.	1	2	3	4	5	6	8.1	8.2	8.3	LENGTH PER TRAINEE	TOTAL LENGTH FOR - 16 TRAINEES	TOTAL WEIGHT FOR - 16 TRAINEES
										mm	Meter	Kg
M.S.Flat 62 x 12.7 (2 1/2" x 1/2")	1	90								90	1.5	9.6
M.S.Flat 38 x 12.7 (1 1/2" x 1/2")	2		43							43	0.7	2.8
M.S.Flat 25.4 x 12.7 (1" x 1/2")	1	30								30	0.5	1.3
M.S.Flat 76 x 6.4 (3" x 1/4")	1-2		95							95	1.6	6.5
M.S.Flat 25.4 x 3.2 (1" x 1/8")	Gauge		40							40	0.65	0.5
M.S.Flat 76 x 9.6 (3" x 3/8")	1			66						66	1.1	5.8
M.S.Flat 50.8 x 9.6 (2" x 3/8")	2			26						26	0.42	1.7
M.S.Round ϕ 12.7 (1/2" ϕ)	3			62						62	1.00	1.00
M.S.Square 16 x 16 (for 2 pieces)	2				60					60	1.00	2.1
M.S.Square 25.4 x 25.4 (1" x 1")	3				20					20	0.4	2.5
M.S.Flat 50.8 x 9.6 (2" x 3/8")	1				30					30	0.5	2.00
M.S.Flat 19 x 10 (3/4" x 3/8")	1					550				550	8.8	13.2
M.S.Round ϕ 32 (ϕ 1 1/4")	2					30				30	0.5	3.2
M.S.Flat 25 x 3.2 (1" x 1/8")	2						324			324	5.2	3.6
M.S. Sheet 105 x 0.75 (21 S.W.G.)	1							150		150	0.265 meter.	1.9

	NO, S PER TRAINEE	TOTAL NO, S FOR - 16 TRAINEES
	4 Nos.	64
Cylindrical pin 4m6 x 20	5	
Cylindrical screws M4 x 15	4	
Round head rivets ϕ 4 x 10	3	
	16	270



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TRADE TRAINING
FITTING II

MATERIAL REQUIRED

FITTER

FITTING II										FITTER				LENGTH PER TRAINEE	TOTAL LENGTH FOR - 16 TRAINEES	TOTAL WEIGHT FOR - 16 TRAINEES
No. 2.13.1/9 to 15		Part No.	Drg. No. CLAMP			Drg. No. ROCKER ARM			mm	Meter	Kg					
			9	10	11	13	14	15								
M.S. Sheet strip 105 x 2 mm ($\frac{1}{4}$ " x 3/32") or 13 S.W.G. (for 2 pieces).		1	270						270	0.45 Sq.m.	7.5					
M.S. Sheet strip 80 x 2 mm ($\frac{1}{4}$ " x 3/32") or 13 S.W.G. (for 2 pieces)		2	180						180	0.25 Sq.m.	4.0					
M.S. Square 25 x 25 mm (1" $\square$) (for 2 pieces)		4		40					40	0.65 M.	3.2					
M.S. Square 12 x 12 mm (1/2" $\square$) (for 3 pieces) (By bending end)		2				276			276	4.5 M.	5.1					
M.S. Flat 62 x 12 mm ($2\frac{1}{2}$ " x 1/2")		3					30		30	0.5 M.	3.2					
M.S. Square 25 x 25 mm (1" $\square$) (for 2 pieces)		4				30			30	0.5 M.	2.5					
M.S. Round ϕ 3.2 mm (1/8" ϕ)		10						12	12	0.2 M.	0.5 or 1f					
										NOS. PER TRAINEE	TOTAL NCS FOR - 16 TRAINEES					
Cylindrical pin ϕ 2 x 12		11														
M.S. Washer Hole ϕ 6x1.5 thick		11						1		1	18					
Split pin ϕ 2 x 15		12						1		1	18					
Cylindrical pin ϕ 4m ⁶ x 18		14						4		4	70					
Socket head cap screw M4 10		15						2		2	36					
Socket head cap screw M5 x 15		16						2		2	36					
Cylindrical pin 5M ⁶ x 18		17						2		2	35					
Threaded pin M4 x 5		18						3		3	50					



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

TRADE TRAINING
FITTING - II

MATERIAL REQUIRED
FITTER

LENGTH
PER
TRAINEE

TOTAL
LENGTH
FOR -16
TRAINEES

TOTAL
WEIGHT
FOR - 16
TRAINEES

No.2.13.1/17 to 19 & Test

Drg. No.

Part No.	16	17	18	19	TEST	mm	Meter	Kg.
2-3	52					52	0.84	1.7
1				80		80	1.3	4.1
2				170		170	2.8	4.00
1					52	52	0.84	3.00
2-3					92	92	1.5	2.00

Low C/Steel Square 16x16 mm
(5/8") (For 2 pieces)

M.S.Flat 76x6.5 mm (3"x1/4")

M.S.Flat 60x3 mm (2 1/2" x 1/8")

M.S.Flat 50x9 mm (2" x 3/8")

M.S.Flat 25x6.4 mm
(1" x 1/4") (for 2 pieces)

Nos.Per
Trainee

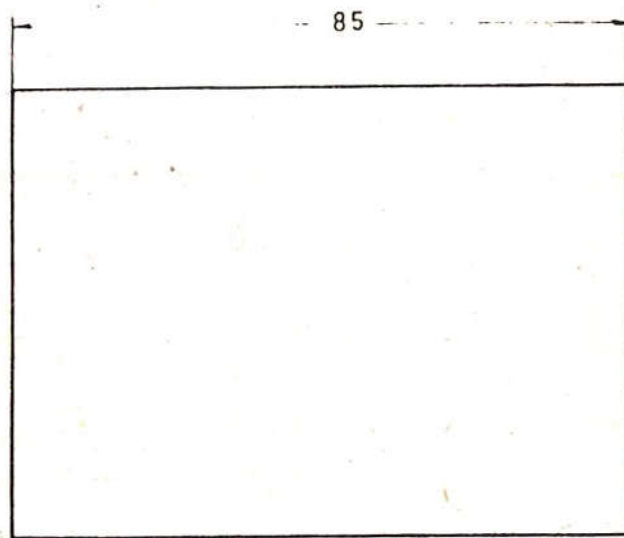
Total Nos.for
16 Trainees

Wing Nut M8	5	1				1	16
M.S.Washer hole ϕ 8.5x1.5 thick	6	1				1	16
Cylindrical Pin ϕ 4x18	7					4	64
Wooden handle 100 mm	8	1				1	20
Cylindrical Pin ϕ 3x18	9	1				1	16
Cylindrical Pin ϕ 2x14 mm	6		1			1	16
Grub screw M4 x 18	7		1			1	16
Farallel Pin ϕ 4 x 13	5			2	2	2	32
Cheese head screw M4 x 12	6			2	2	2	32
Counter sunk screw M4 x 7	3			3		3	48
Cylindrical Pin ϕ 3 x 7	4			2		3	48

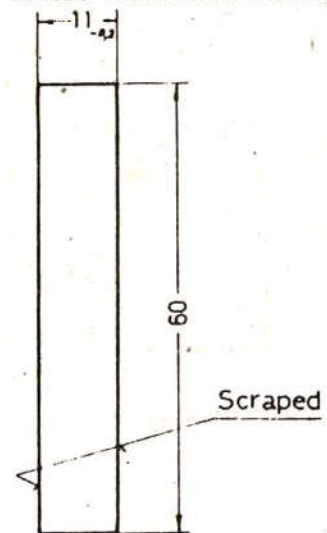


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance ± 0.2
unless otherwise stated



Scraped

SCRAPED SURFACES



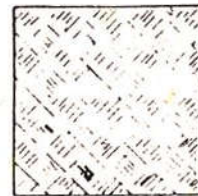
Rough scraping



Smooth scraping



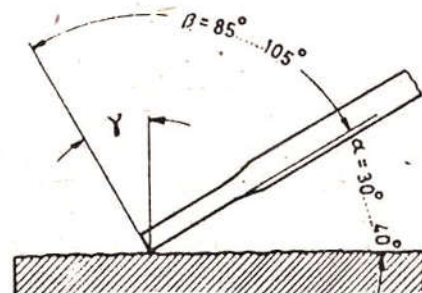
Fine scraping



Design scraping

SEQUENCE OF OPERATION

1. Mark out and file the workpiece to 85 x 60 x 11.3.
2. Rough scraping of workpiece
2 - 6 high spots / squ. inch.
3. Smooth scraping
6 - 15 high spots / squ. inch.
4. Fine scraping
16 - 25 high spots / squ. inch.
5. Design scraping



DIRECTIONS

1. Mind the parallelity of the thickness.
2. Don't use too much "Prussian blue" (scraping paste).

SCALE 1:1

MAT. MILD STEEL

SCRAPING EXERCISE

MP/2.3/2.13. 1/1

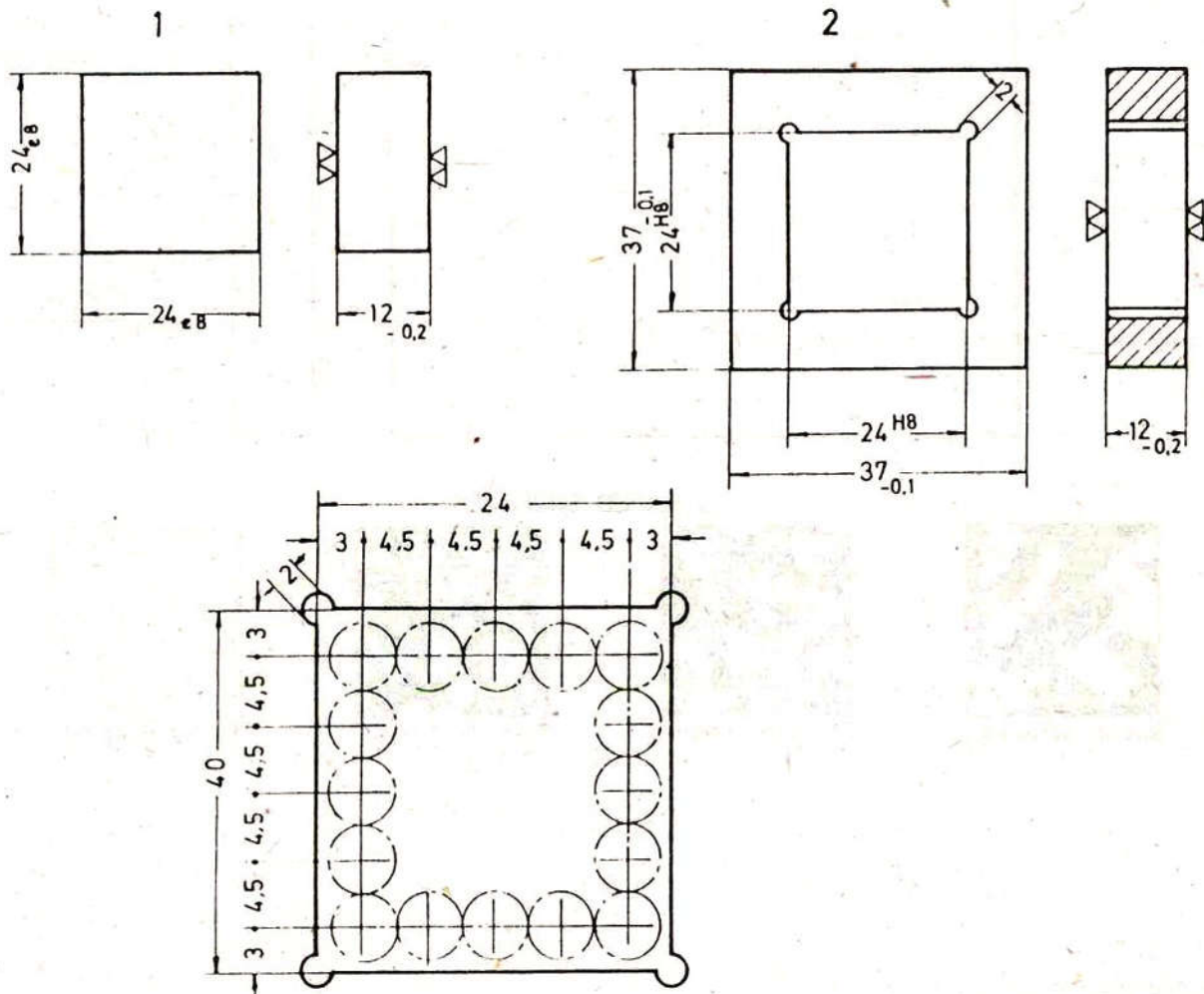
FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

▽▽▽(▽▽)



SEQUENCE OF OPERATION

1. File part 2 to outside dimensions. 37 x 37.
2. File part 1 to outside dimensions 24 x 24. Mind the tolerances and angularity.
3. Mark the square hole and drill the 4 corner holes.
4. Mark and drill as shown in the sketch.
5. File the internal square according to part 1.

DIRECTIONS

When fitting work is required, normally the sequence of operation will be:

1. Complete the male piece.
2. Prepare the female piece according to the male piece.

24 e8	- 0.040 - 0.073
24 H8	+ 0.033 - 0

SCALE 1:1

MAT. MILD STEEL

FITTING EXERCISE

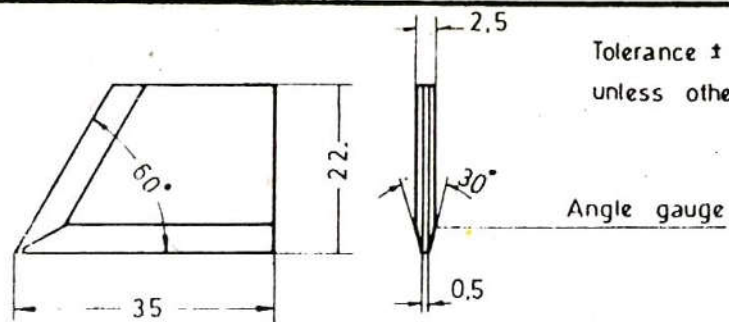
MP/2.3/2,13.1/2

FITTING II

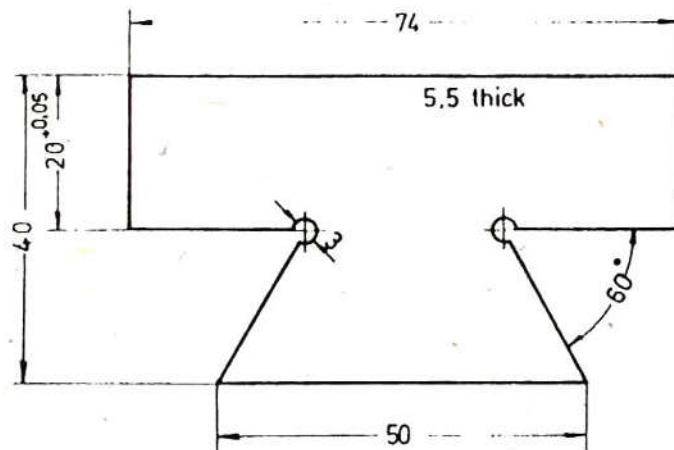
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FAK GERMAN TECHNICAL TRAINING PROGRAMME

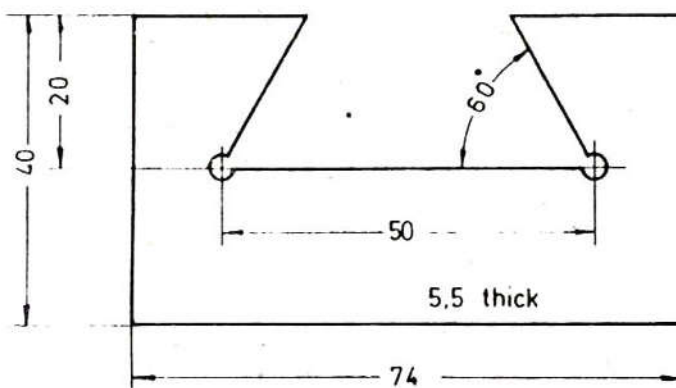




1



2



Part 2 to be fit in part 1.

SEQUENCE OF OPERATION

1. Prepare one angle gauge according to the drawing.
2. File outer dimension of part 1.
3. Mark out the dovetail and drill two corner holes $\varnothing$ 3 mm.
4. Saw and file external dovetail. Check with self made angle gauge.
5. File outer dimension of part 2.
6. Mark out the dovetail and drill corner holes $\varnothing$ 3 mm.
7. Saw and file internal dovetail according to part 1.

SCALE 1:1

MAT MILD STEEL

DOVETAIL FITTING

MP / 2.3 / 2.13.1/3

FITTING II

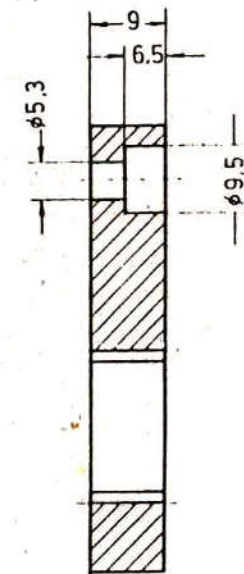
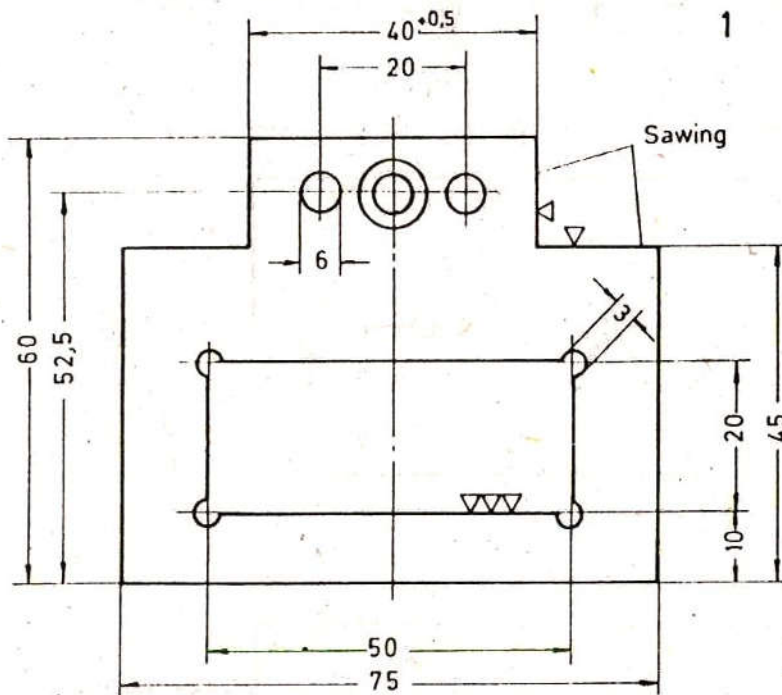
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

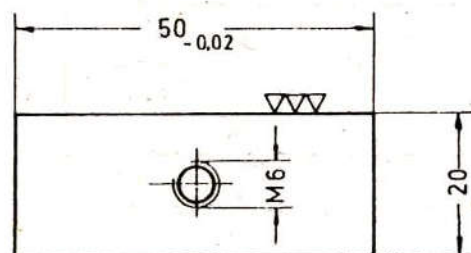


▽ (▽, ▽, ▿)

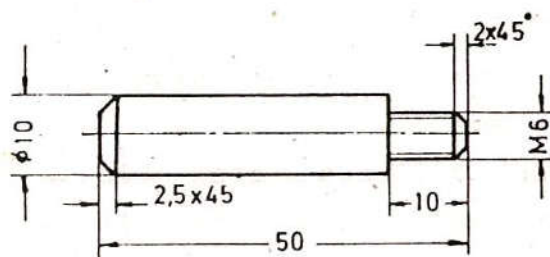
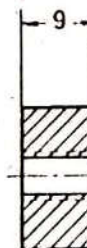
Tolerance ± 0.1
unless otherwise stated



Part 2 to be fit in part 1.



2



3

SCALE 1:1

MAT. MILD STEEL

FITTING PIECE

MP/2.3/2.13.1/4

FITTING II

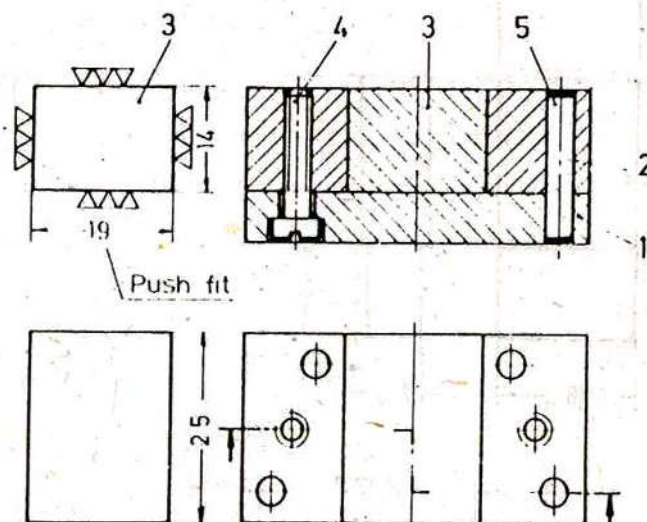
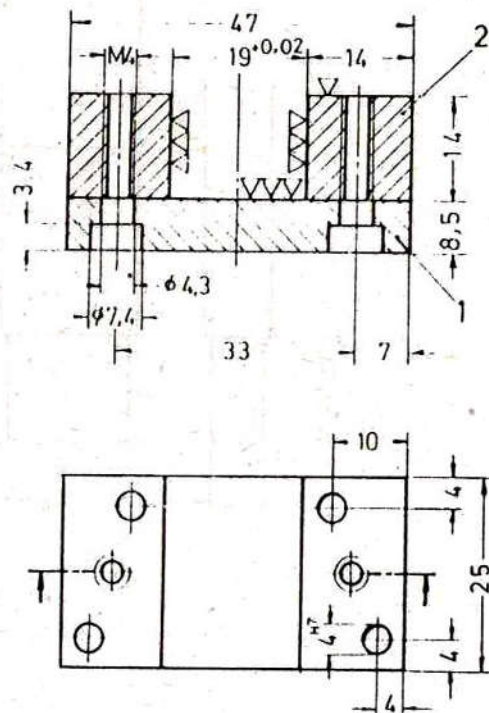


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

▽ (▽ ▽ ▽ ▽)

Tolerance $\pm 0,1$
unless otherwise stated



4 H7 $\pm 0,012$
0

4	Cylindrical pin 4mm x 20	5	St. 50
2	Cylindrical screw M4 x 15	4	5 S
1	Slide block	3	St. 34 $\square 25 \times 15$
2	Side guide	2	St. 34 $\square 15 \times 26$
1	Base plate	1	St. 34 $\square 25 \times 8 \times 48$
Qty	Denomination	Part No	Material / Remarks

SCALE 1:1

SLIDE FITTING

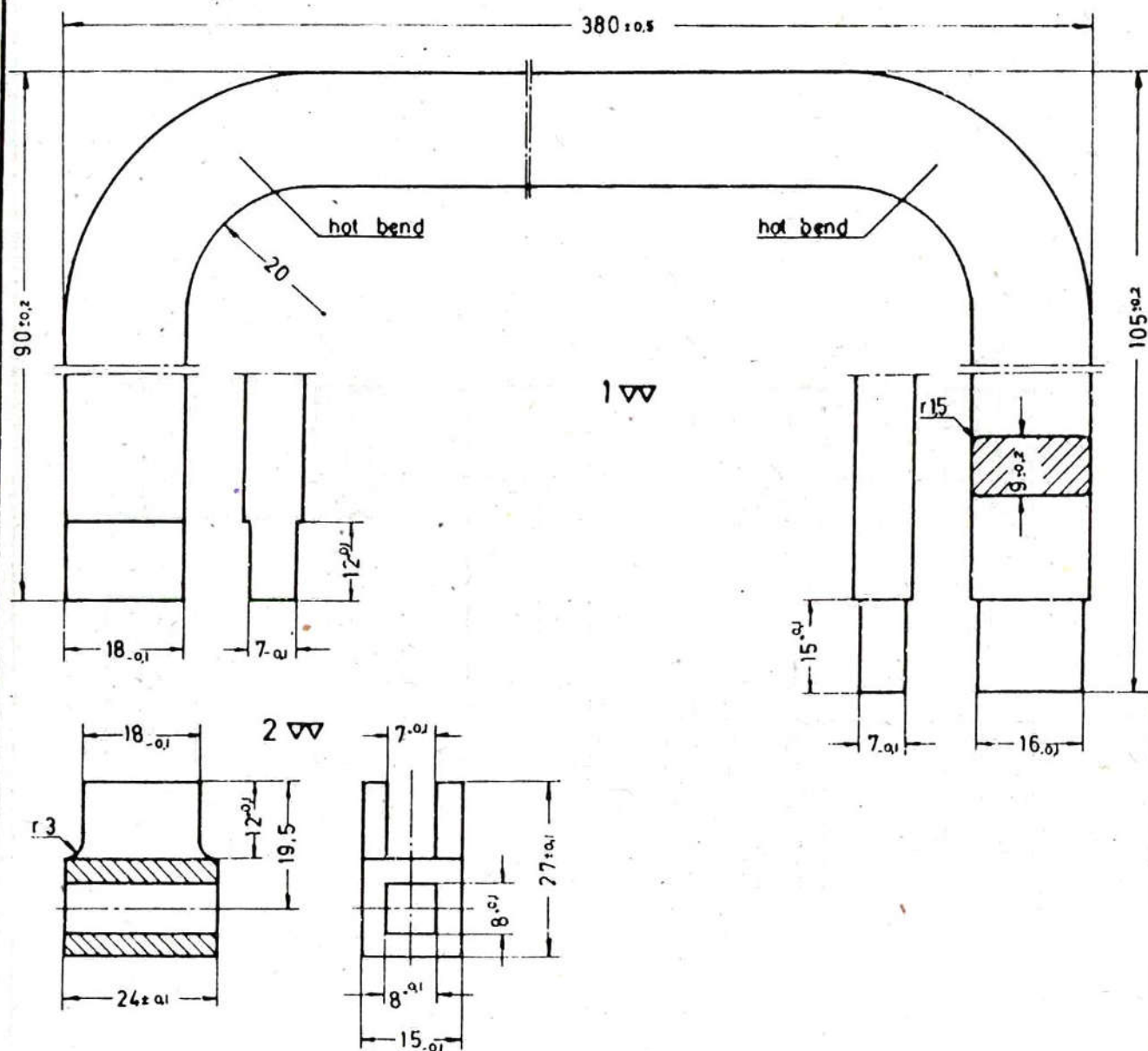
MP / 23 / 2.13.1 / 5

FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATION

1. Heat up the workpiece by means of torch and bend according to drawing.
2. Saw to length and file both ends to size.
3. Mark, drill and file part 2 according to given dimensions.

DIRECTIONS

1. Mark out the portions to be heated with chalk.

SCALE 1:1

MAT MILD STEEL

SAW BOW

MP/2.3/2.13.1/6

FITTING II

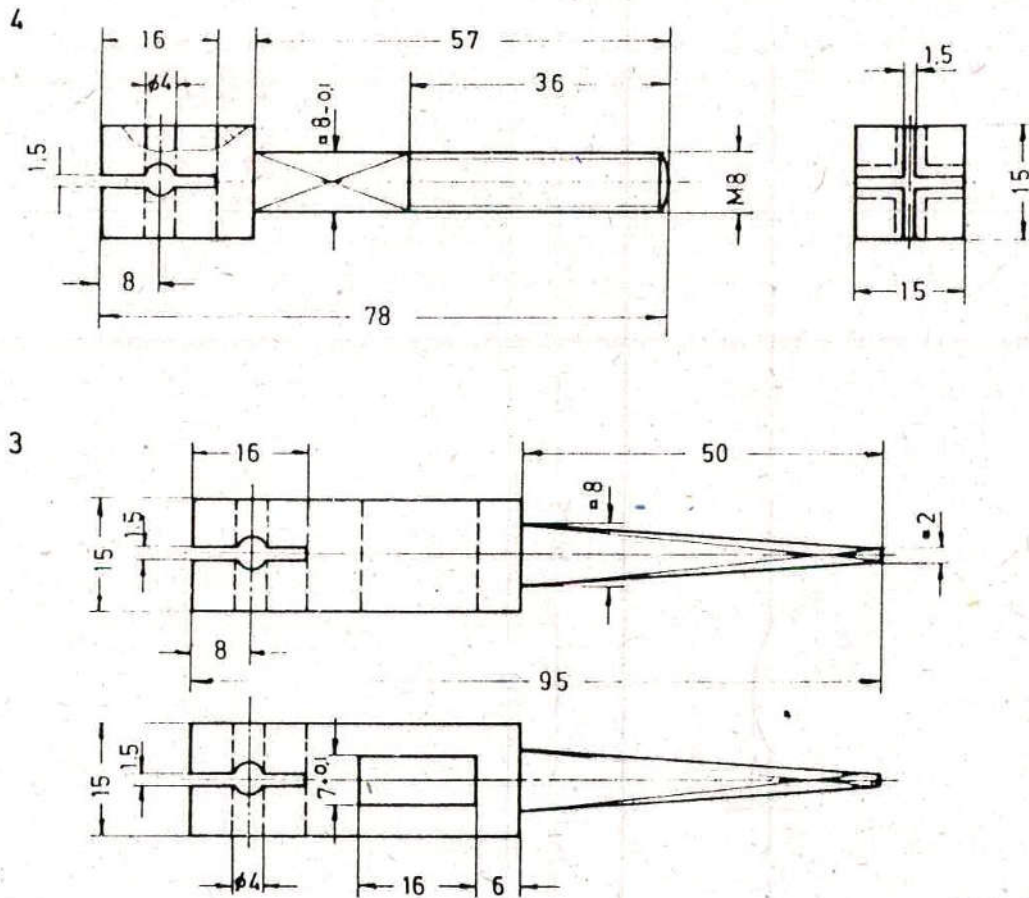


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance ± 0.1
unless otherwise stated



SEQUENCE OF OPERATION

1. Cut the external thread M 8 with a die.
2. Mark out the holes $\phi 4$ on both pieces and drill.
3. Saw the cross slots by hand hack saw.
4. Drill and file the internal recess 16 x 7.
5. File the tapered end.

DIRECTIONS

1. The internal recess and the cross-cuts must be aligned correctly, otherwise the sawblade will be bent.

SCALE 1:1

MAT. MILD STEEL

BLADE HOLDER

From Ex. 2.13-2/5&6

(FOR HAND HACKSAW)

MP/2.3/2.13.1/7

FITTING II

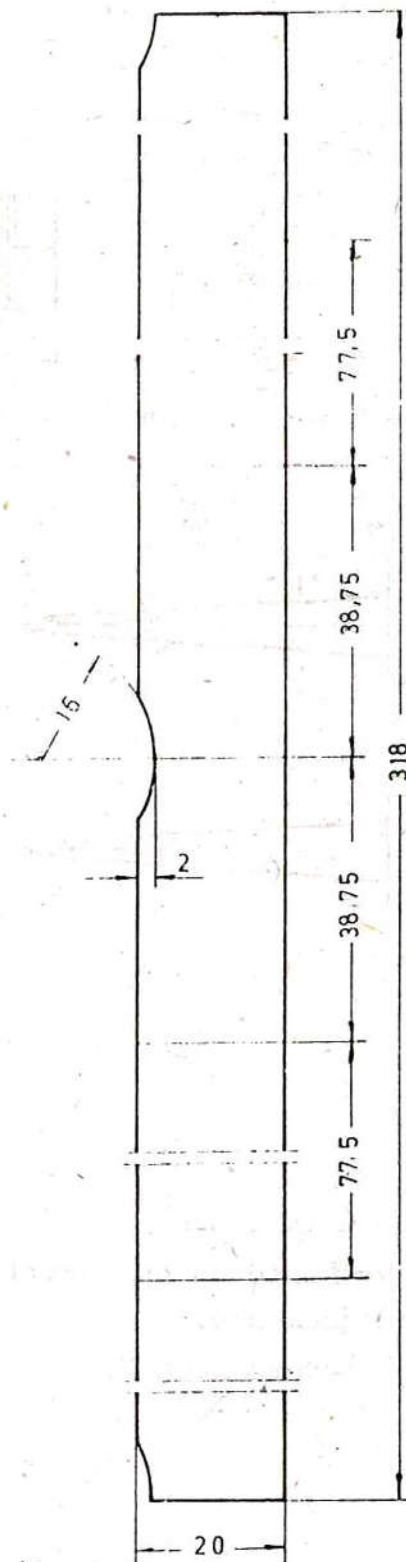
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance ± 0.2
unless otherwise stated

2



3-0.3 thick

SCALE 1:1

MAT. MILD STEEL

FRAME

(FOR ASH TRAY)

MP/2.3/2.13.1/8.1

FITTING II

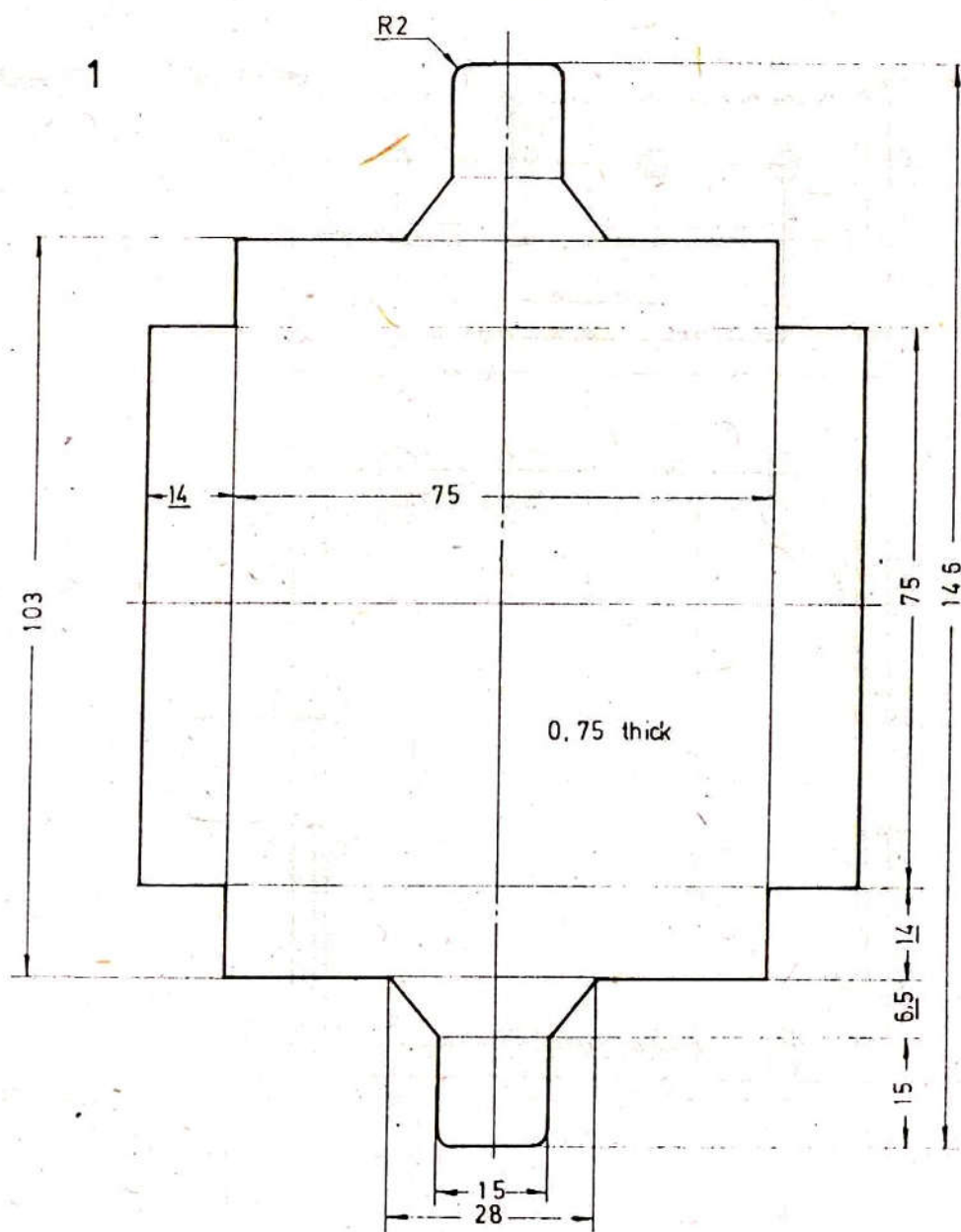


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,2$



SCALE 1:1

MAT M.S. SHEET

BOTTOM

(FOR ASH TRAY)

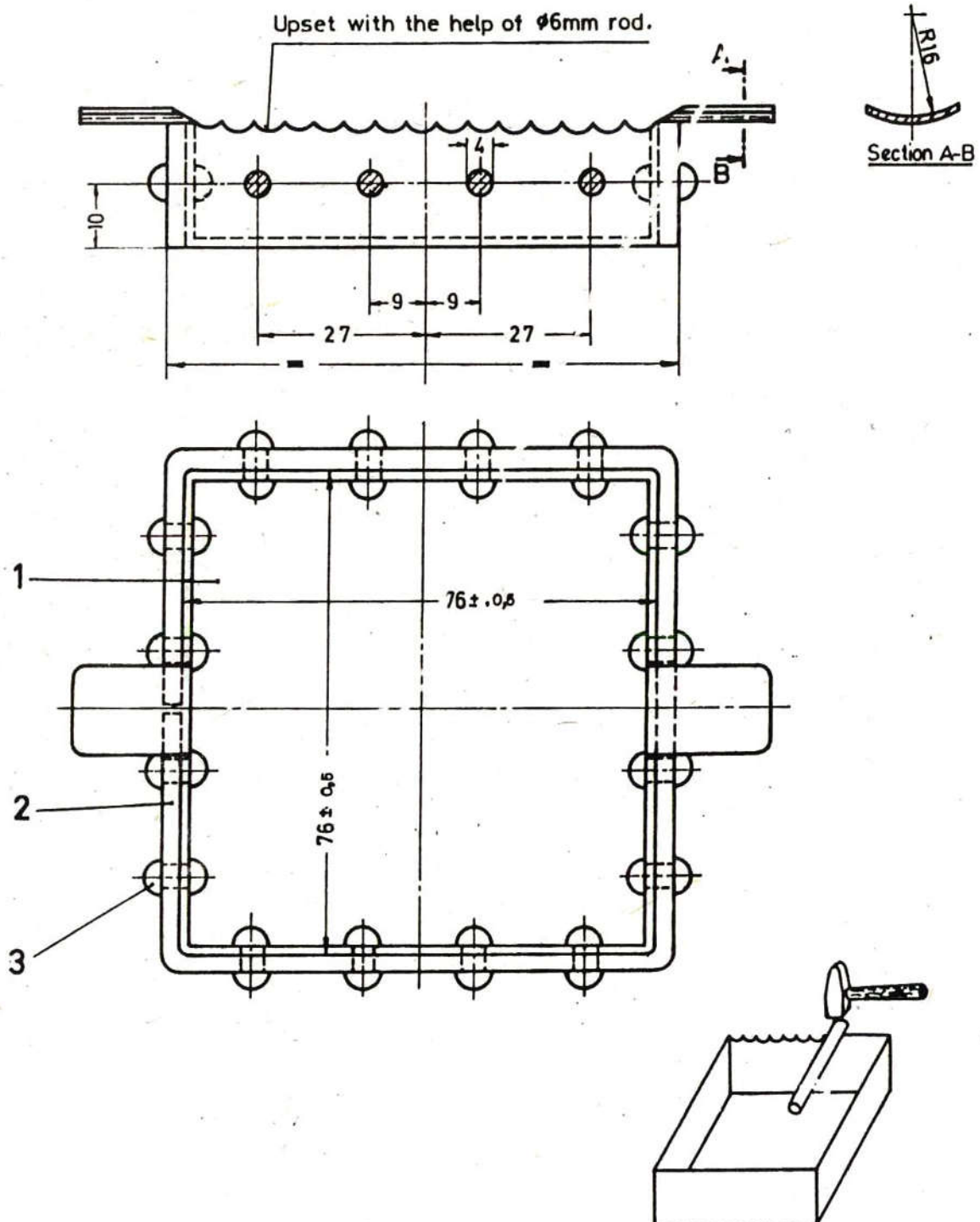
MP/2.3/2.13.1/8.2

FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



16	Roundhead rivet	3	$\phi 4 \times 10$
1	Frame	2	Mild steel 3x20x318
1	Bottom	1	Mild steel sheet 0.75x103x146
Qty.	Denomination	Part No.	Material / Remarks

SCALE 1:1

ASH TRAY

MP/ 2.3/2.13.1/8.3

FITTING II



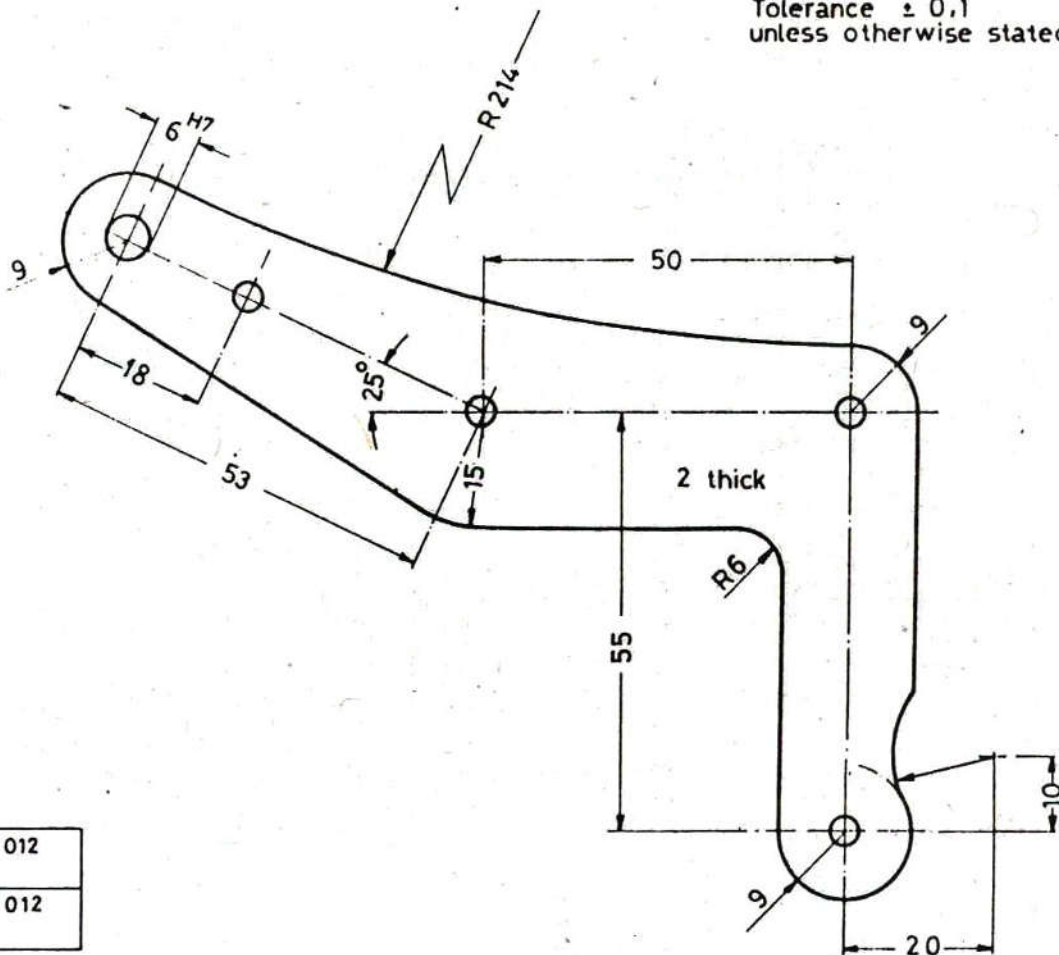
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



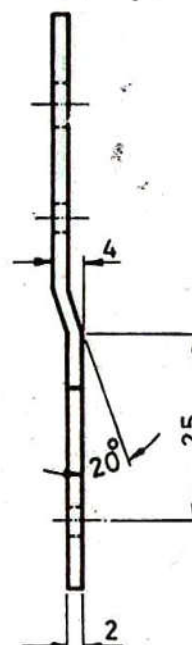
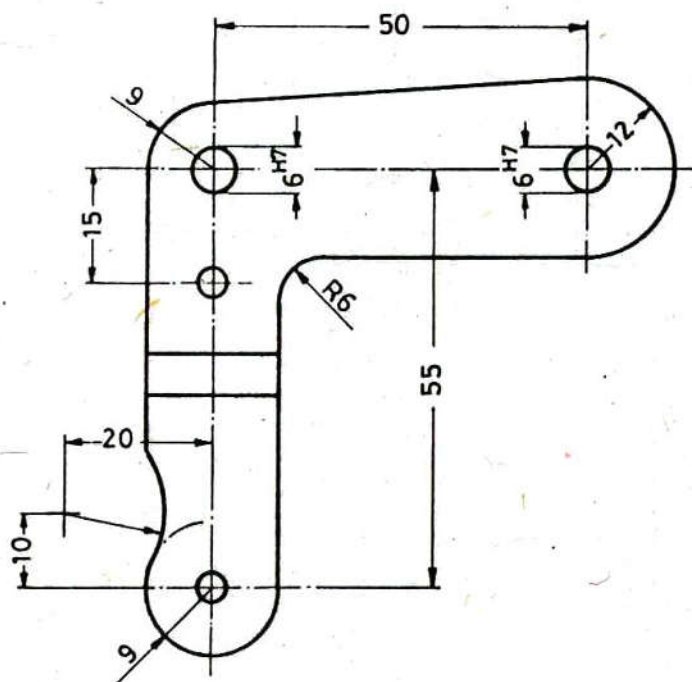
Tolerance ± 0.1
unless otherwise stated

1



6 H7	$\begin{matrix} -0.012 \\ 0 \end{matrix}$
4 H7	$\begin{matrix} +0.012 \\ 0 \end{matrix}$

2



Holes without dimensions $\phi 4$ H7

SCALE 1:1

MAT. MILD STEEL

FIXED & MOVABLE LEVER

(FOR CLAMP)

MP/2.3/2.13.1/9

FITTING II

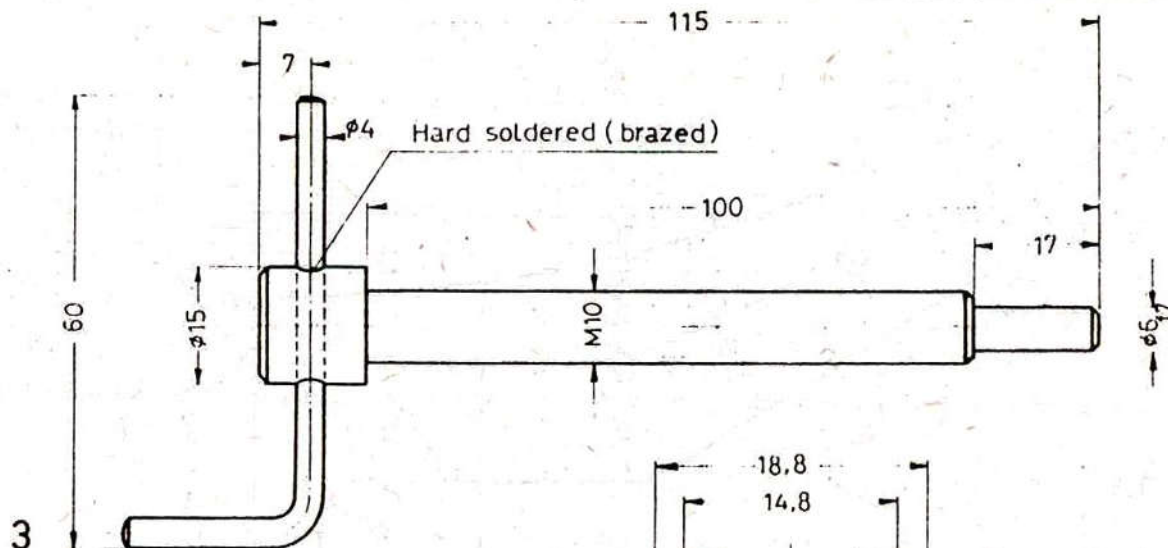
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



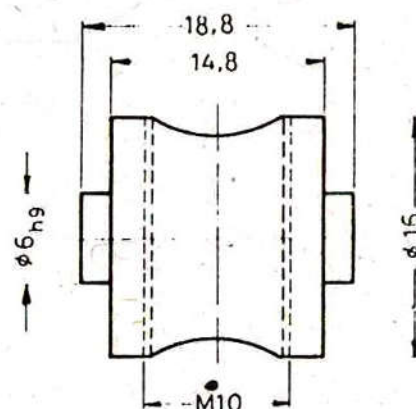


Tolerance $\pm 0,1$
unless otherwise stated

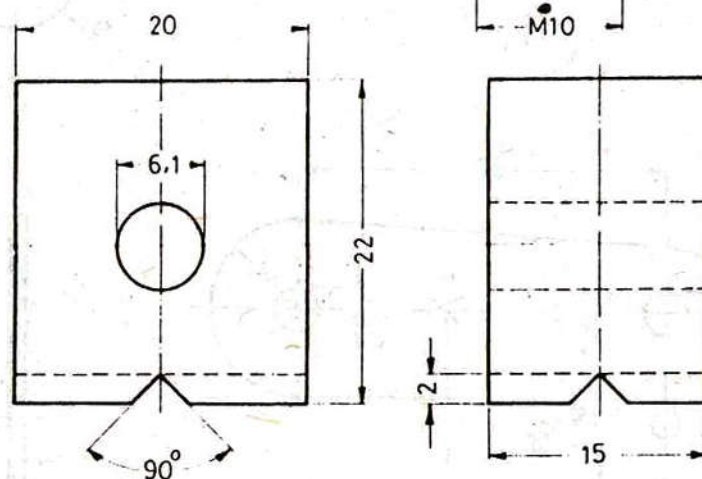


3
SCALE 1 : 1
From 2.13.2/9

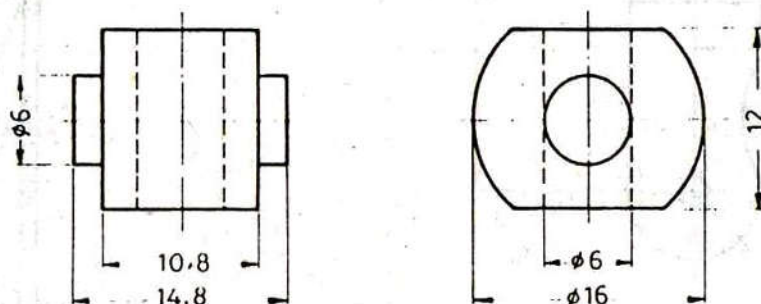
5
From 2.13.2/12



4
2 Pieces



6
From 2.13.2/12



6 _{h9}	0 -0.030
6 _{f17}	-0.010 -0.022

SCALE 2:1 (1:1)

MAT. MILD STEEL

SPINDLE, JAW & SPINDLE GUIDES

(FOR CLAMP)

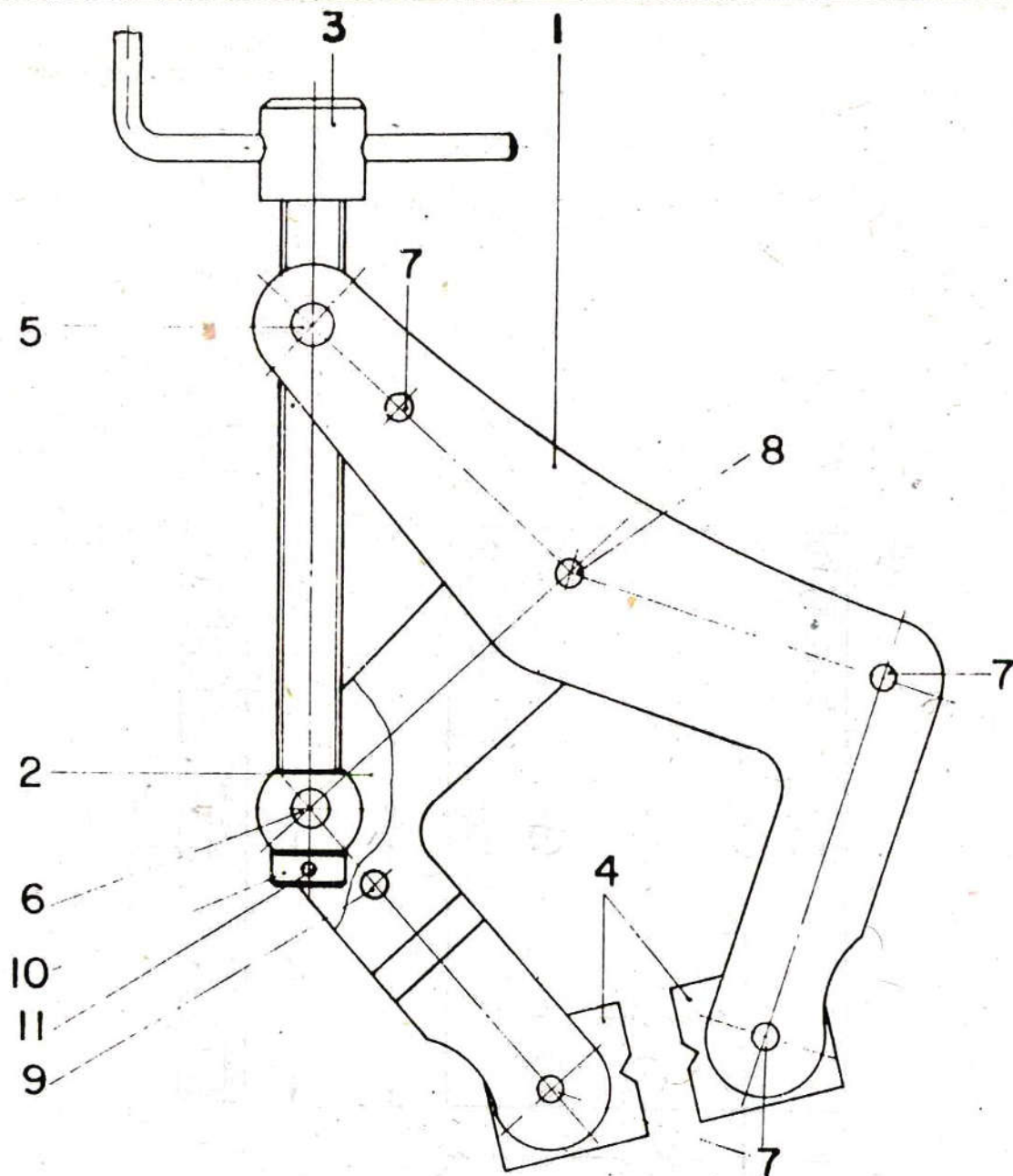
MP/2.3/2 13.1/10

FITTING 11

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME





1	Cylindrical pin	11		φ 2 x 12
1	Bush	10	From	2 13 2 / 9
1	Distance pin	9	From	2 13 2 / 13
1	Distance pin	8	From	2 13 2 / 13
4	Distance pin	7*	From	2 13 2 / 13
1	Spindle guide	6	From	2 13 2 / 12
1	Threaded spindle guide	5	From	2 13 2 / 12
2	Jaw	4	M S Flat	23 x 21 x 16
1	Spindle	3	From	2 13 2 / 9
2	Movable lever	2	M S Sheet	2 x 80 x 90
2	Fixed lever	1	M S Sheet	2 x 100 x 130
Qty	Denomination	Part No	Material / Remarks	

Scale 1:1

CLAMP

MP/2 3 / 2 13 1 / 11

FITTING II

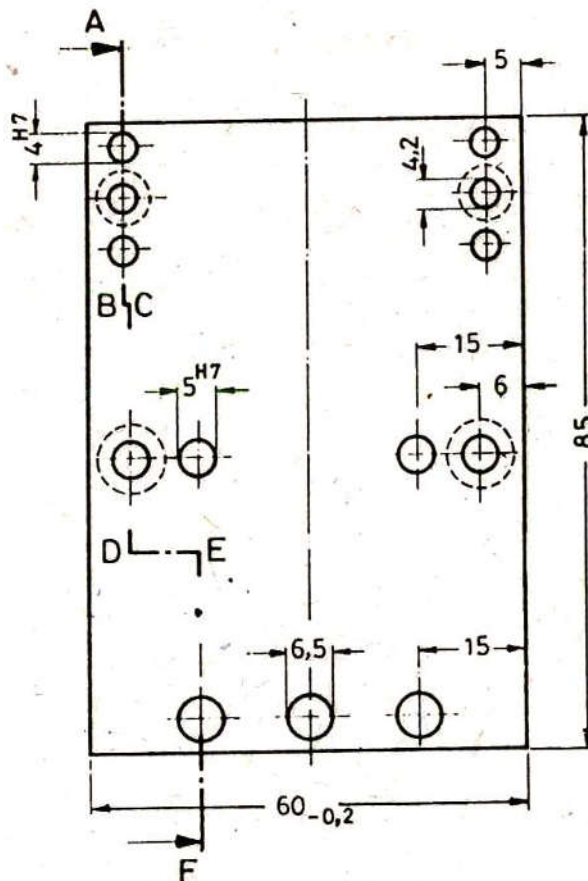


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

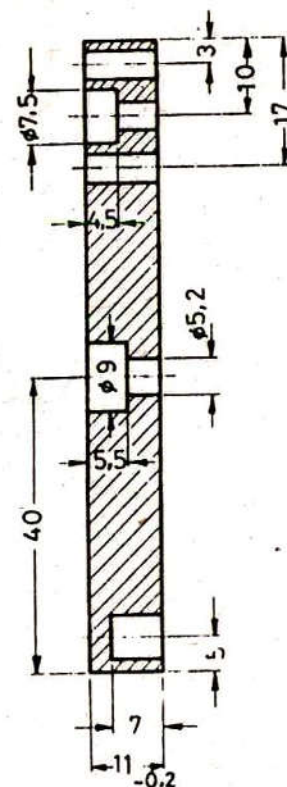
PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated



Section A - F



4 H7	$\pm 0,012$ 0
5 H7	$\pm 0,012$ 0

SCALE 1:1

MAT. MILD STEEL

BASE PLATE

From Ex. 2.13.1/1

(FOR ROCKER ARM MODEL)

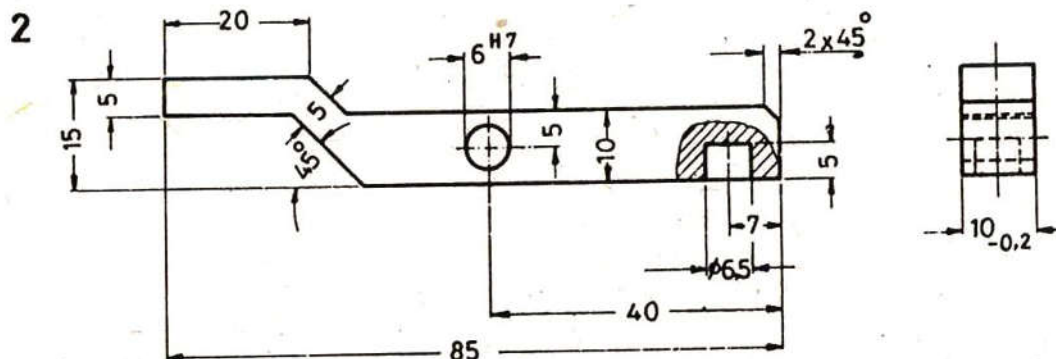
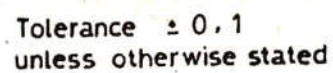
MP/2.3/2.13.1/12

FITTING 11

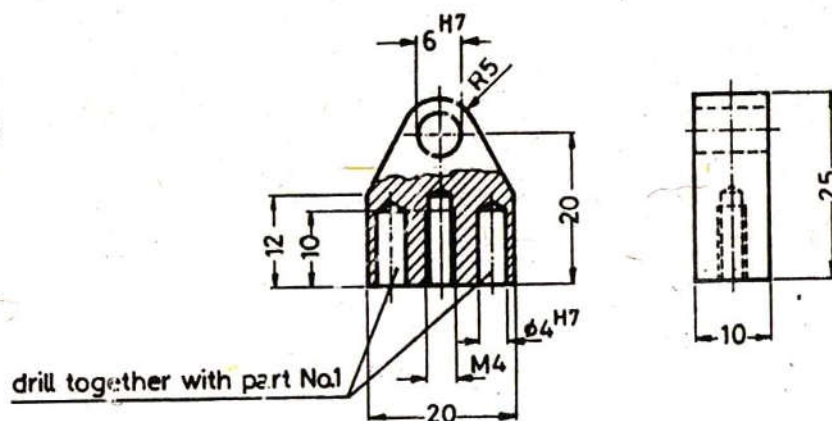


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



4



drill together with part No.1

6^{H7}	$\cdot 0,012$ 0
----------	--------------------

SCALE 1 : 1

MAT. MILD STEEL

ROCKER ARM & BRACKET

(FOR ROCKER ARM MODEL)

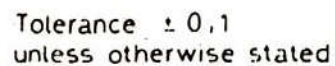
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FITTING II



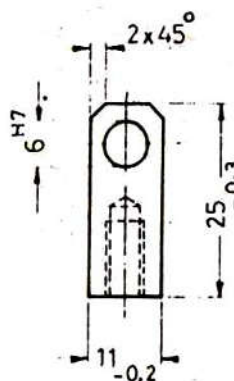
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

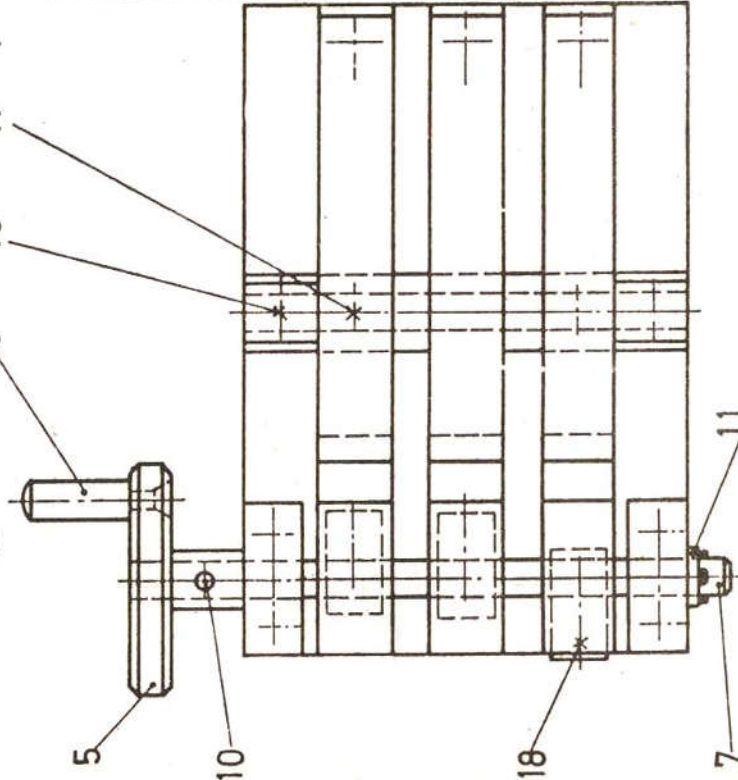
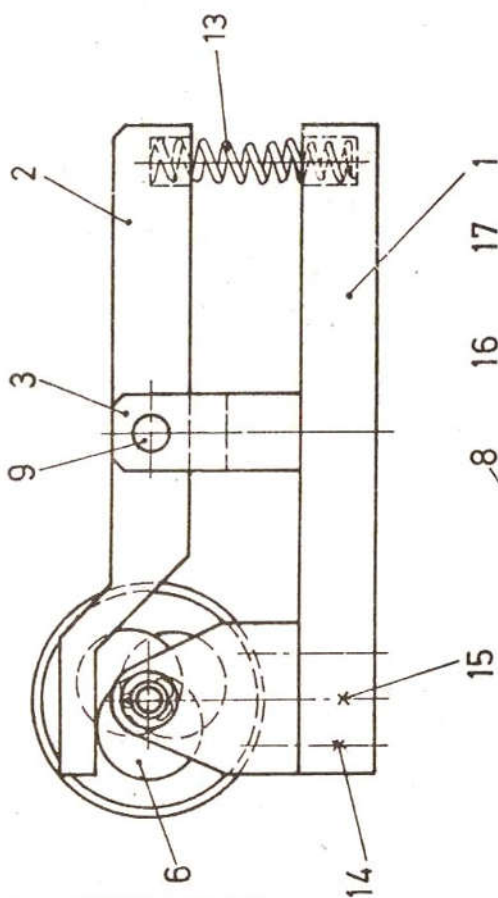
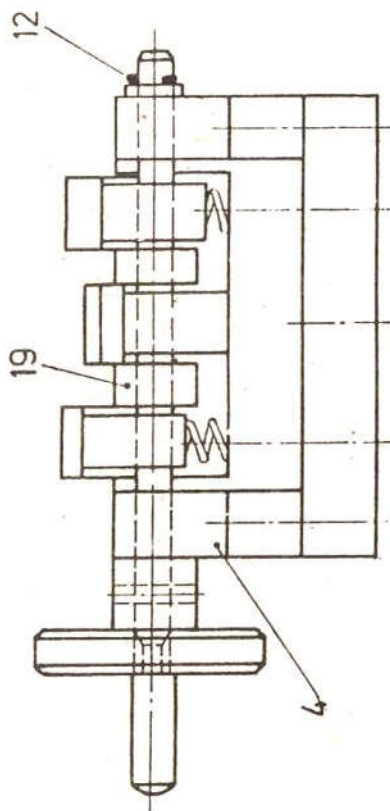
PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Technical drawing of a mechanical part with dimensions and a note:

- Overall width: 40
- Overall height: 20
- Top flange thickness: 10
- Bottom flange thickness: 10
- Central hole diameter: $\phi 5^{H7}$
- Central hole length: M5
- Note: "drill together with part No. 1" (pointing to the central hole)
- Overall length: 60

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Eccentric bushes part 6 to be fixed on the shaft at an angle of 3x120°

Qty.	Denomination	Part No.	Material / Remarks
2	Distance ring	19	From 2.13.2/16
3	Thread pin	18	M4x 5
2	Cylindrical pin	17	φ 5 _{h8} x 18
2	Socket head cap screw	16	M5x 15
2	Socket head cap screw	15	M4x 10
4	Cylindrical pin	14	φ 4 _{h8} x 18
3	Pressure spring	13	From 2.13.2/16
1	Split pin	12	φ 2 x 15
1	Washer	11	M.S. φ 6 x 1,5
1	Cylindrical pin	10	M.S. φ 3 x 10
1	Axle	9	From 2.13.2/17
1	Handle	8	From 2.13.2/17
1	Axle	7	From 2.13.2/17
3	Eccentric bush	6	From 2.13.2/16
1	Hand wheel	5	From 2.13.2/17
2	Bracket	4	M.S. Flat 20x8x26
1	Bracket	3	M.S. Flat 25x10x61
3	Rocker arm	2	M.S. Flat 15, 10x86
1	Base plate	1	M.S. Flat 60x10x86

SCALE 1:1

ROCKER ARM MODEL

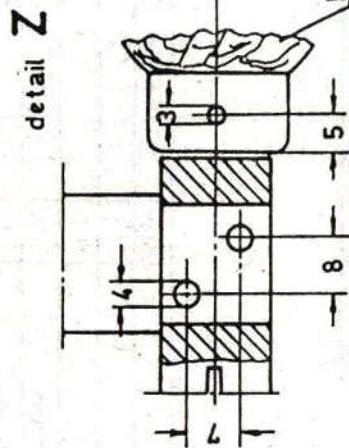
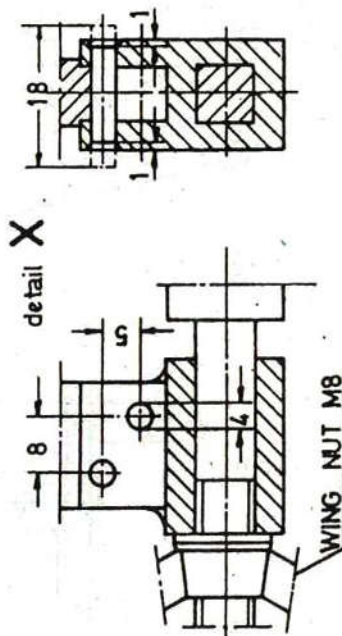
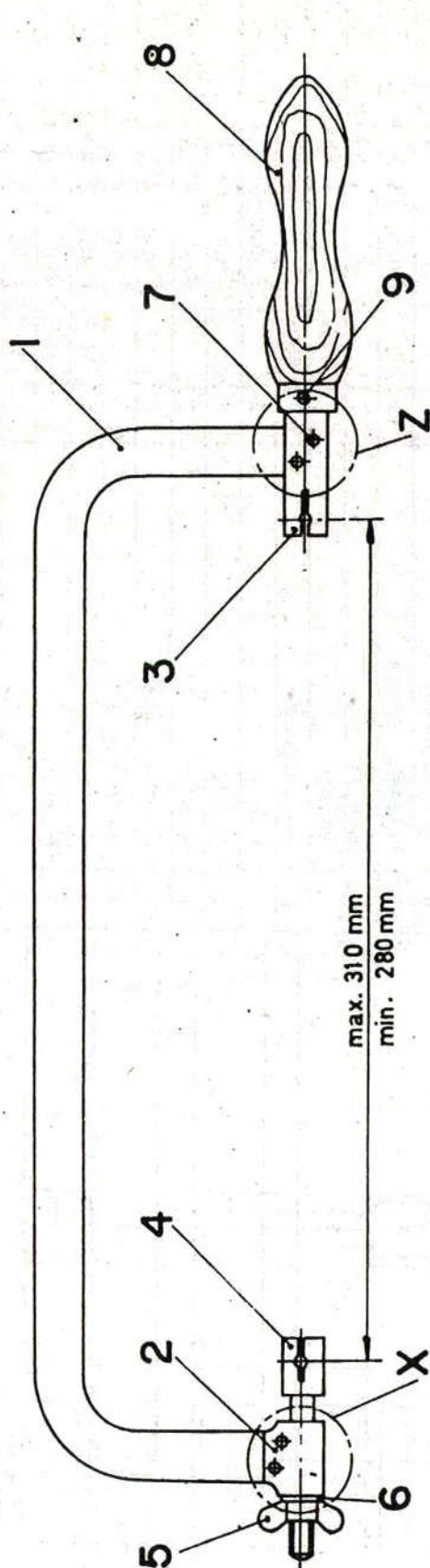
MP/2.3/2.13.1/15

FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Qty.	Denomination	Part No.	Material / Remarks
1	Cylindrical pin	9	slightly riveted
1	Wooden handle	8	3x18 100 mm
4	Cylindrical pin	7	M.S. 4 x 18
1	Washer	6	M.S. ø8.5 x 1.5
1	Wing nut	5	M8
1	Movable blade holder	4	From ex. 7
1	Fixed blade holder	3	From ex. 7
1	Guide piece	2	From ex. 6
1	Saw bow	1	From ex. 6

SCALE 1:1

HAND HACKSAW

MP/2.3/2.13.1/16

FITTING II

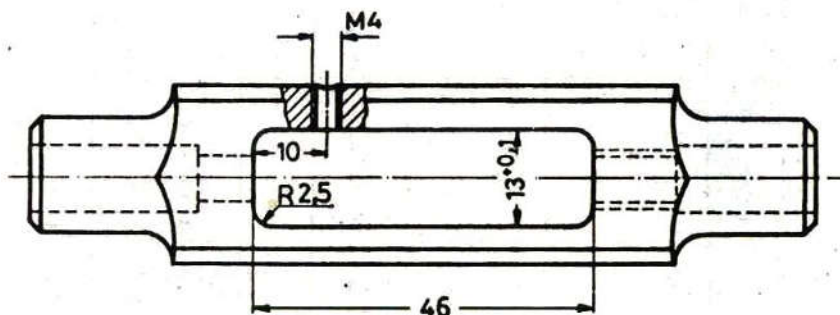


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

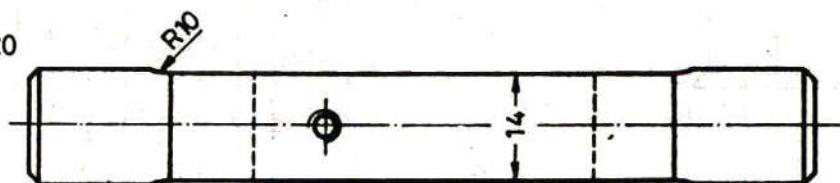


Tolerance $\pm 0,1$
unless otherwise stated



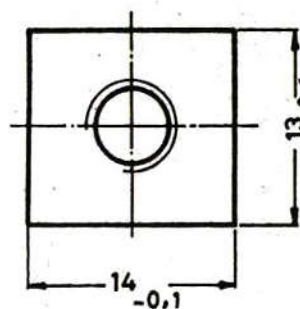
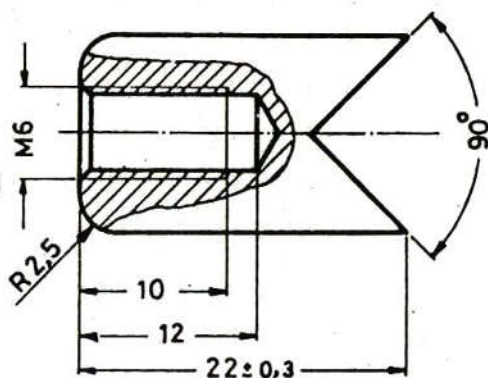
1

SCALE 1:1
From ex. 2.13.2/20



2

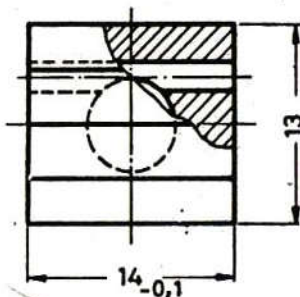
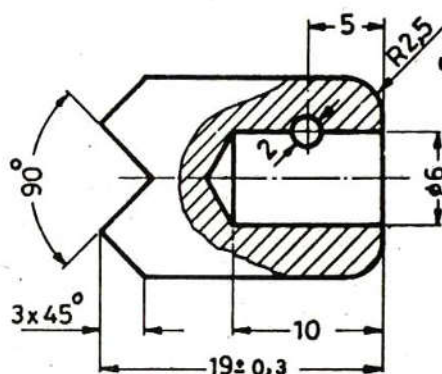
MAT. LOW CARBON
STEEL



Slide fit with
part No. 1

3

MAT. LOW CARBON
STEEL



Tight fit with
part No. 1

SCALE 2:1 (1:1)

MAT. M.S.(LOW C.ST.)

BODY & JAWS

(FOR TAP HANDLE)

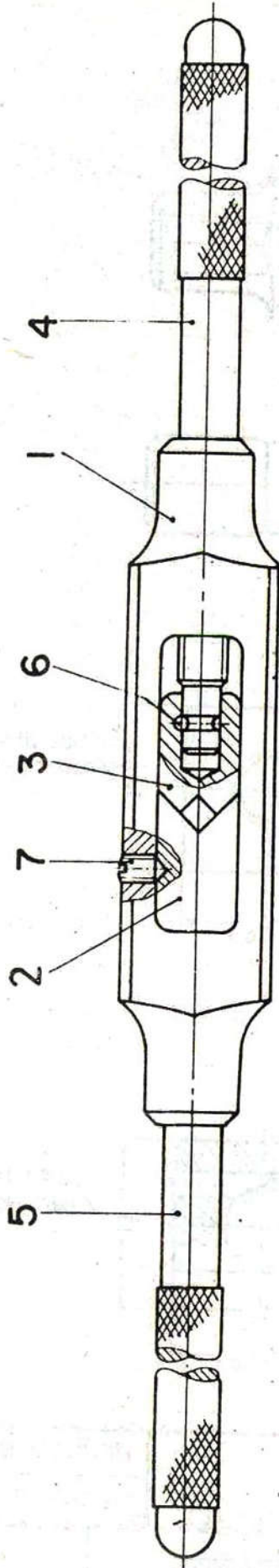
MP/2.3/2.13.1/17

FITTING II

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

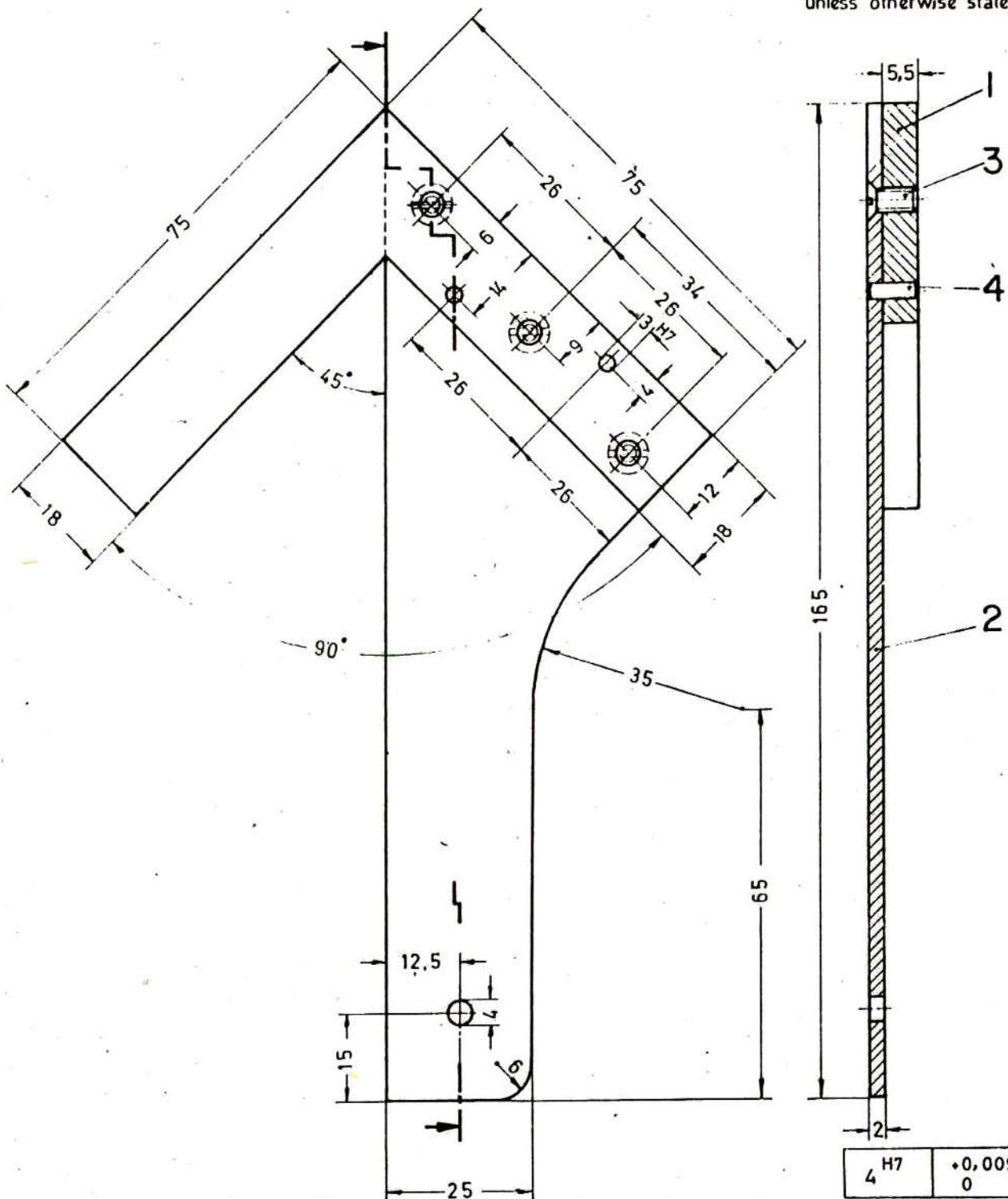




Qty.	Denomination	Part No.	Material / Remarks
1	Grub screw	7	M 4x8
1	Cylindrical pin	6	φ 2x14
1	Knurled handle	5	M.S. From ex. 2.13.2/20
1	Knurled handle	4	M.S. From ex. 2.13.2/20
1	Movable jaw	3	Low carbon steel From ex. 17
1	Fixed jaw	2	Low carbon steel From ex. 17
1	Body	1	M.S. From ex. 17

SCALE 1:1	TAP HANDLE	MP/23/2.13.1/18
		FITTING II

Tolerance ± 0.1
unless otherwise stated



4 H7 $+0.009$
0

2	Cylindrical pin	4	M.S. $\phi 3 \times 7$
3	Counter sunk screw	3	M.S. M4 x 7
1	Marking rail	2	M.S. Sheet 3 x 60 x 170
1	Angle part	1	M.S. $\square 6.5 \times 76 \times 80$
Qty.	Denomination	Part No.	Material / Remarks

SCALE 1:1

CENTRE SQUARE

MP/2.3/2.13.1/19

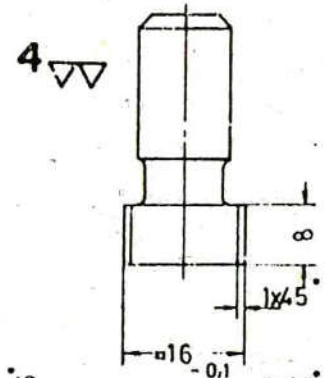
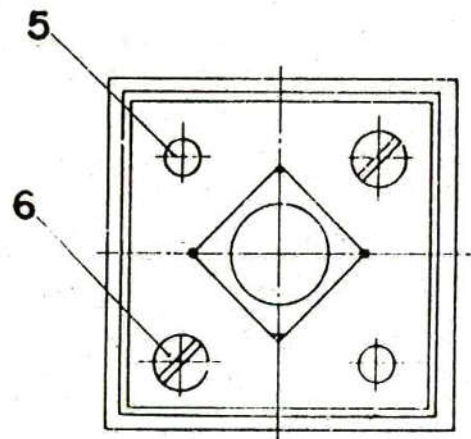
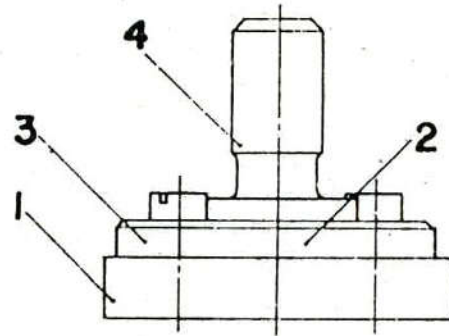
FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

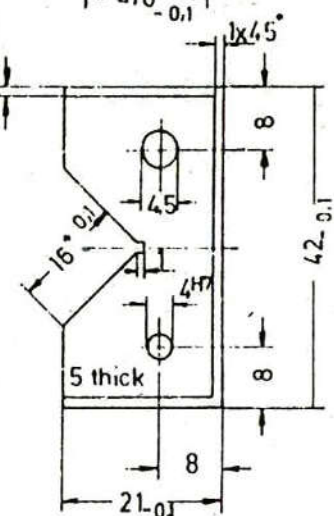
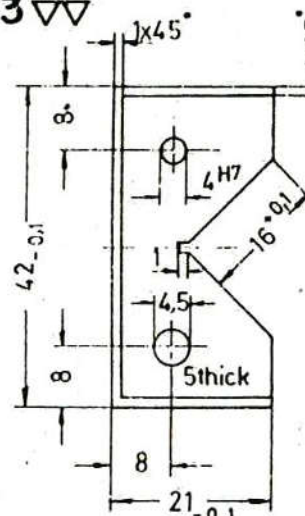
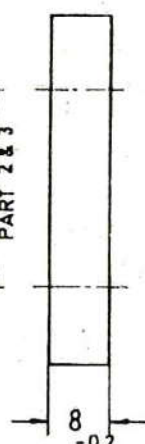
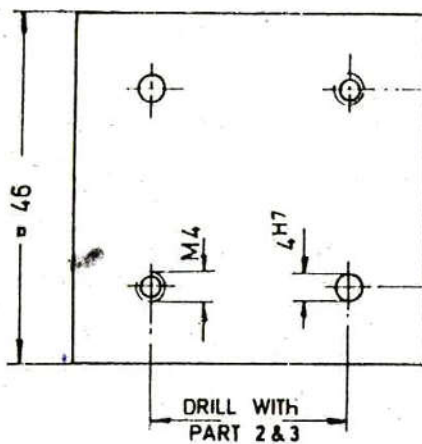
Tolerance ± 0.1
unless otherwise stated



H7	+0.012
$\phi 4$	0

1 $\nabla \nabla$

2, 3 $\nabla \nabla$



2	Cheese head screw	6	M4 x 12
2	Parallel pin	5	$\phi 4$ x 13
1	Punch	4	From ex. 2.13.2/10
1	Guide plate	3	M.S. 43 x 22 x 5.2
1	Guide plate	2	M.S. 43 x 22 x 5.2
1	Base plate	1	M.S. 47 x 47 x 8
Qty.	Denomination	P No	Material / Remarks

SCALE 1:1

PUNCH FITTING

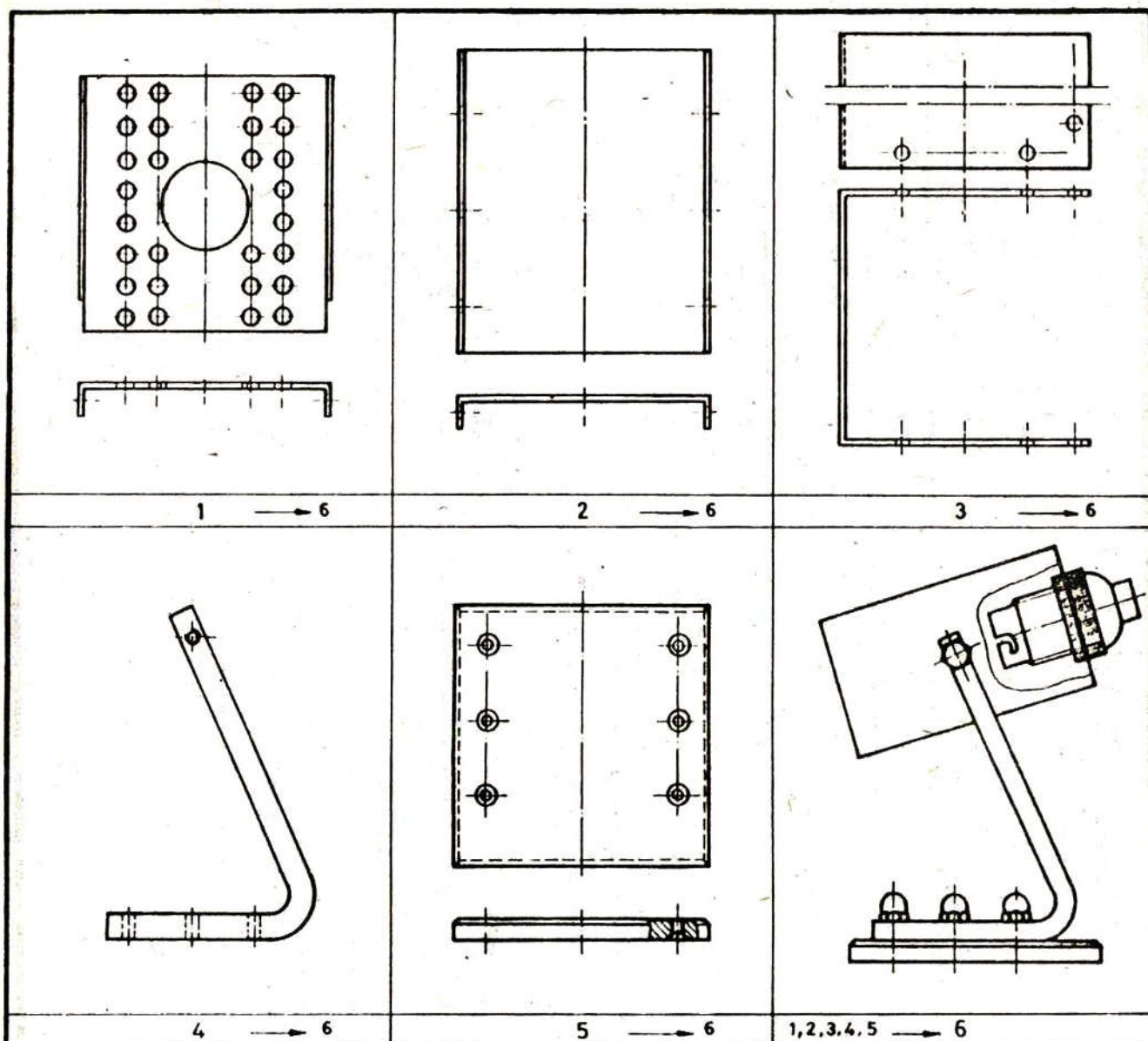
MP/2.3/2.13.1/ Test

FITTING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



This workshop project is meant for those trainees who have completed all the practical courses of Trade Training I. The lamp, therefore, should be prepared at the end of Trade Training I if sufficient time is available.

TRADE TRAINING I

LAYOUT

(FOR LAMP)

MP/2.1/2.13.3

WORKSHOP PROJECT



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TRADE TRAINING
WORKSHOP PROJECT

MATERIAL REQUIRED
FILTER

LAMP

2.13.3/

PART NOS.

LENGTH PER TRAINEE	TOTAL LENGTH FOR-16 TRAINEES	TOTAL WEIGHT FOR -16 TRAINEES
mm	Meter	Kg.
220	0.36 Sqm.	2.5
250	0.6 Sqm.	3.6
650	10.5 M.	6.7
130	2.1 M.	13.5

NOS.PER
TRAINEE

TOTAL NOS.
FOR 16
TRAINEES

PART NOS.

6 7 8 9 10 11 12

Brass Bulb holder												1
Cylindrical head Screw M4x18											2	
Washer M.S. Ø 9x0.8												
Spring washer spring St. Ø 9 x 0.8							2					
Counter sunk screw M4 x 18									6			
Button head screw with screw & Nut M3 x 8										10		
Cap Nut M4	8											

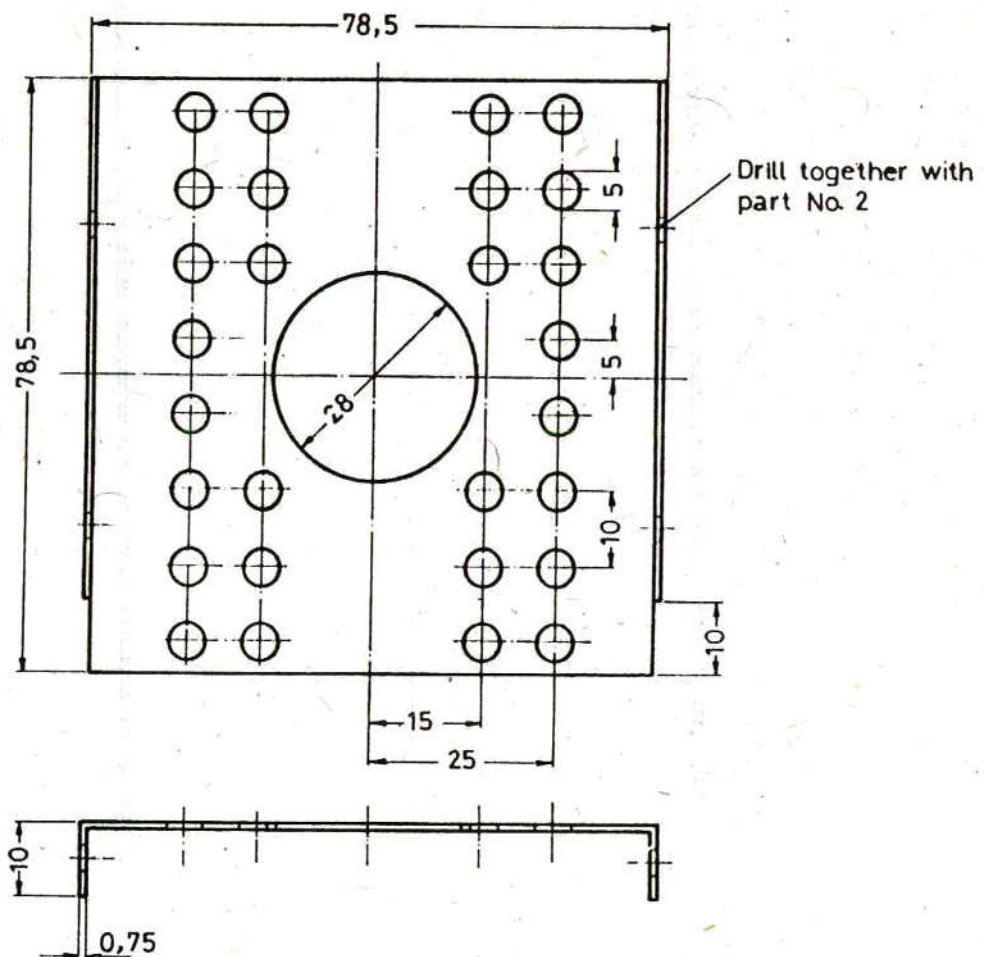


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,2$



SCALE 1:1

MAT. M.S. SHEET

COVER SHEET OF SHADE

(FOR LAMP)

MP / 2.3/2.13.3/1

WORKSHOP PROJECT

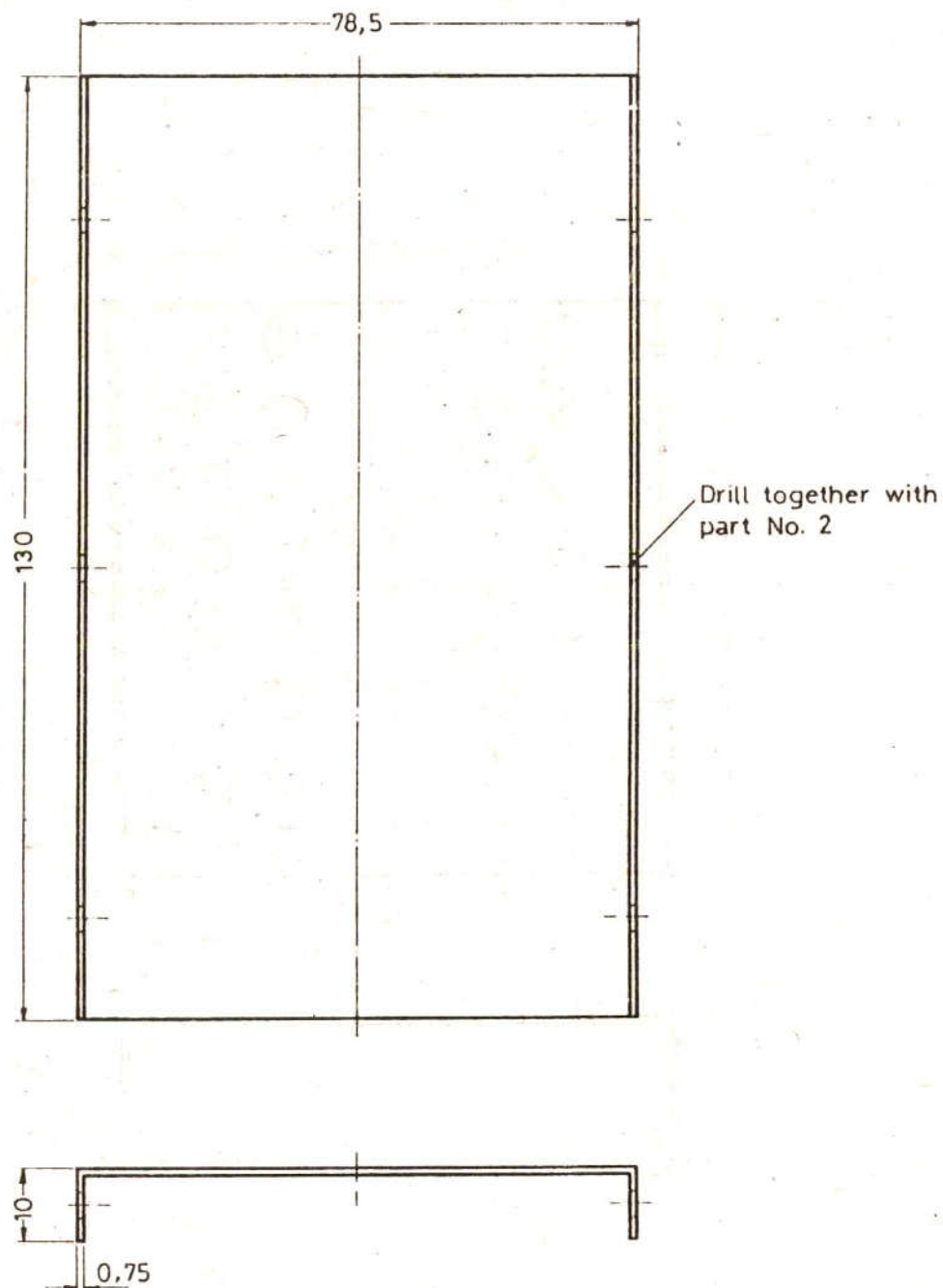
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME





Tolerance $\pm 0,2$



SCALE 1:1

MAT. M.S.SHEET

LOWER PART OF SHADE

(FOR LAMP)

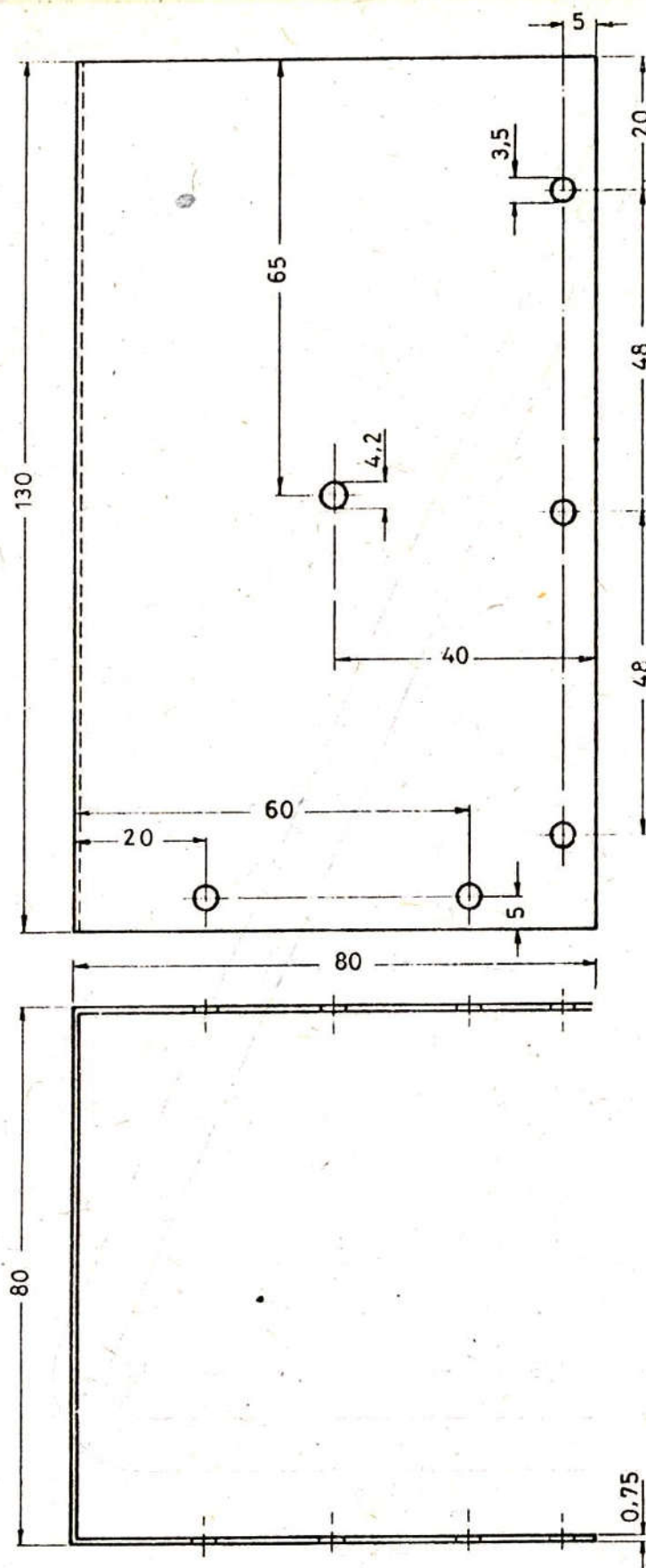
MP/2.3/2.13.3/2

WORKSHOP PROJECT



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,2$

SCALE 1:1

MAT. M.S.SHEET

U-PIECE OF LAMP SHADE

(FOR LAMP)

MP/2.3/2.13.3/3

WORKSHOP PROJECT

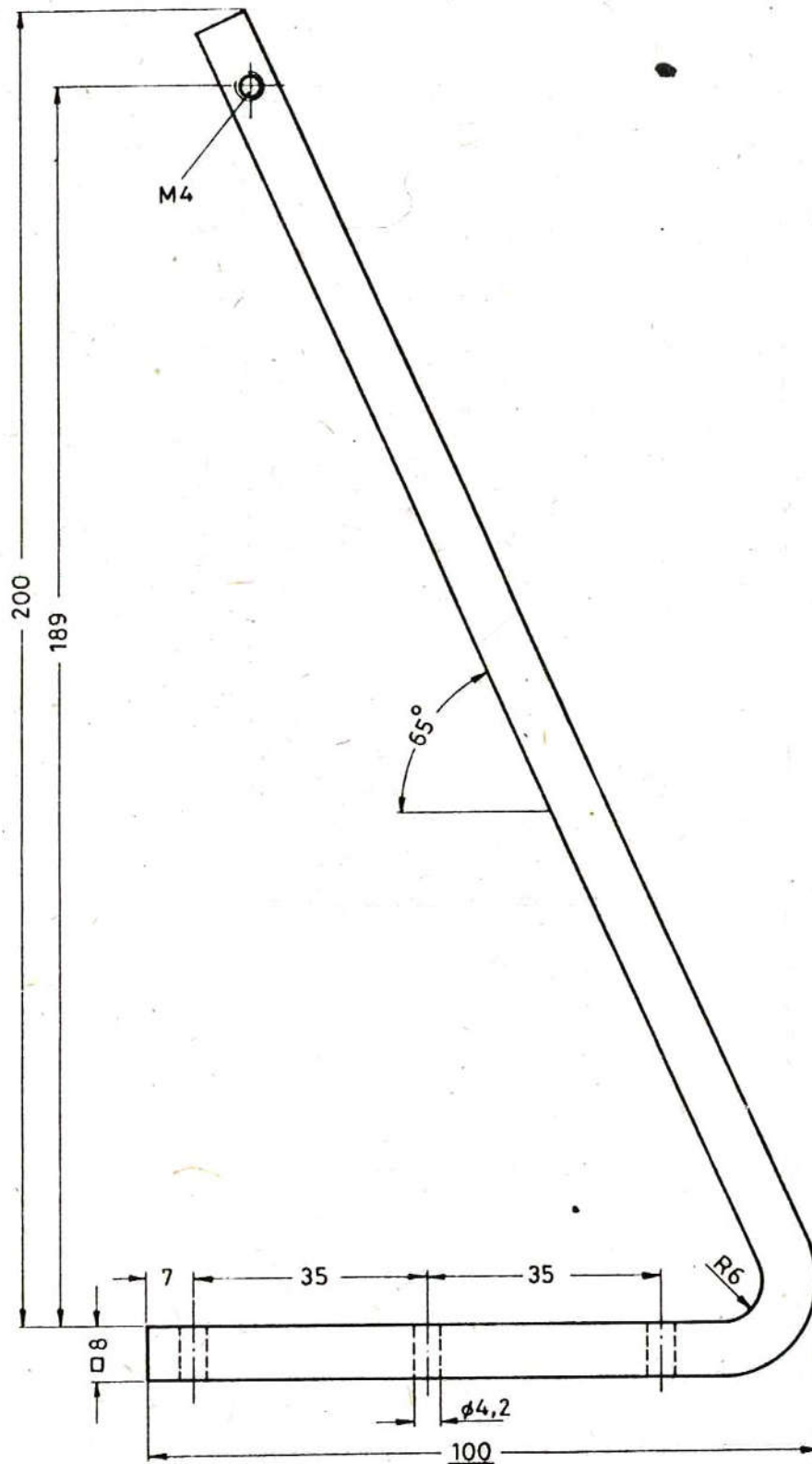
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME





Tolerance $\pm 0,2$



2 Pieces

SCALE 1 : 1

MAT. MILD STEEL

STAND

(FOR LAMP)

MP/2.3/2.13.3/4

WORKSHOP PROJECT

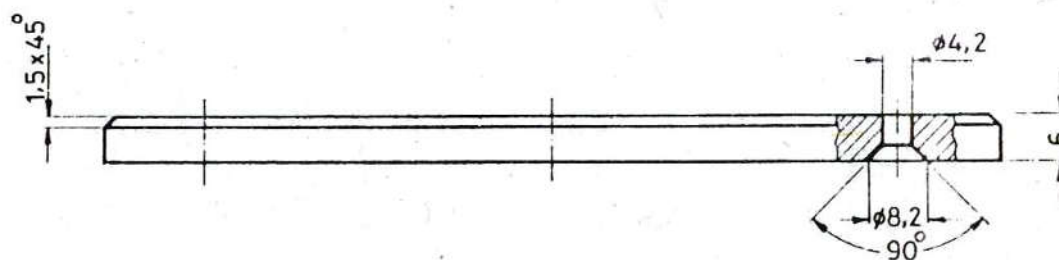
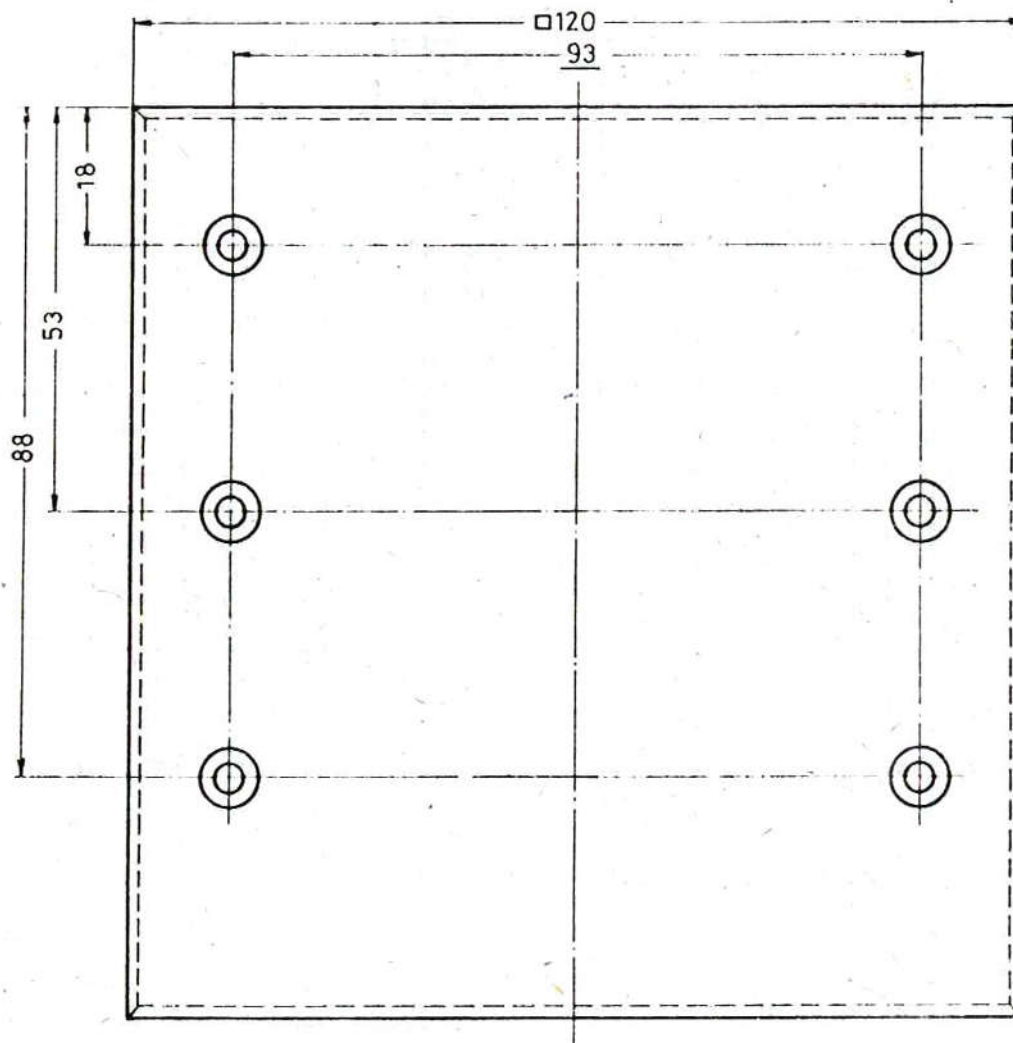


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,2$



SCALE 1:1

MAT. MILD STEEL

BASE PLATE

(FOR LAMP)

MP/2.3/ 2.13.3/5

WORKSHOP PROJECT

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

TRADE TRAINING

WORKSHOP PROJECT

MATERIAL REQUIRED

FITTER

No.3.13.1/ VICE

PART NO,S

LENGTH
PER
TRAINEE

TOTAL
LENGTH
FOR -16
TRAINEES

TOTAL
WEIGHT
FOR -16
TRAINEES

1	2	3	4	5	6	7	MM	Meter	Kg.
62	25	25					112	1.8	36.7
M.S.Square 50 x 50 mm (2" x 2")									
Tool Steel 18 x 10 mm (3/4" x 3/8") (for 2 pieces)									
			108				108	1.8	2.6
M.S.Flat 50 x 16 mm (2" x 5/8")									
				106			106	1.7	10.7
M.S.Flat 50 x 6 mm (2" x 1/4")									
					36		36	0.6	1.5
M.S.Flat 38 x 13 mm (1 1/2" x 1 1/2") (for 2 pieces)									
						88	88	1.5	5.9

NOS.PER
TRAINEETOTAL NOS.
FOR - 16
TRAINEES

PART Nos.

14

15

16

17

18

19

20

4

4

1

3

6

2

2

Cylindrical pin 5mm⁶ x 24

Socket head cap screw M5 x 24

Cylindrical pin 2mm⁶ x 12

Countersunk screw M5 x 12

Socket head cap screw M4 x 10

Countersunk screw M3 x 10

Cylindrical pin 4mm⁶ x 24

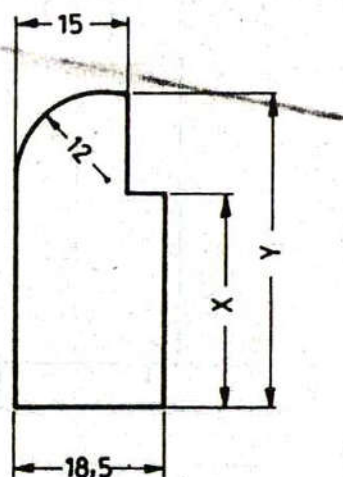
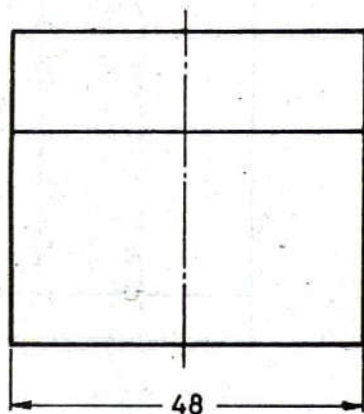
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated

2 & 3



	X	Y
Piece I	28	42
Piece II	32	46

SCALE 1:1

MAT. : MILD STEEL

FIXED JAW & MOVABLE JAW

(FOR VICE)

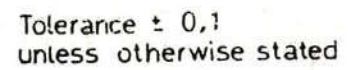
MP/2.3/3.13.1/1

WORKSHOP PROJECT

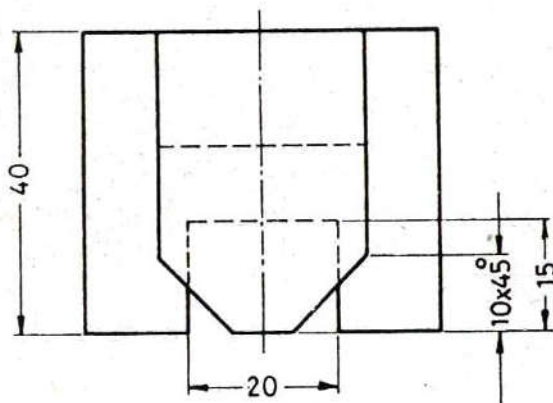
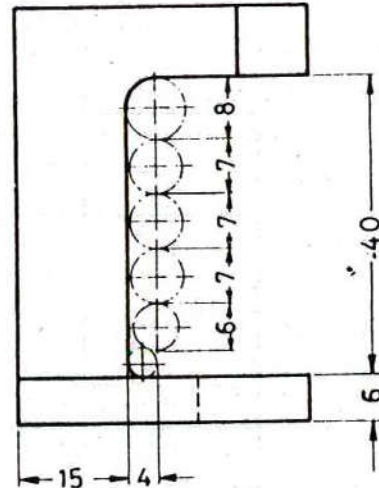


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Technical drawing of a stepped block. The top surface is a rectangle with a width of 28 and a height of 55. The bottom surface is a rectangle with a width of 48. The block has a stepped profile on the right side.

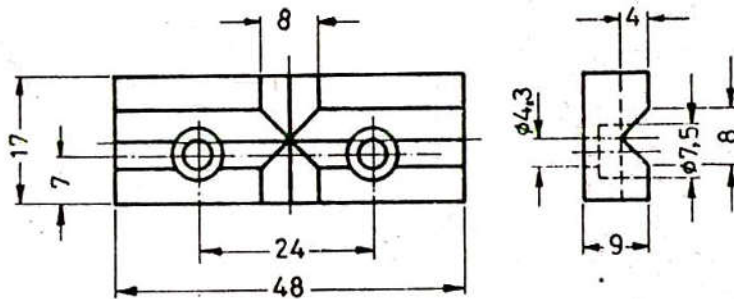


PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated

4



2 Pieces
Hardened to 48 HRC.

SCALE 1:1

MAT.: TOOL STEEL

JAW INSERT

(FOR VICE)

MP/2.3/3.13.1/3

WORKSHOP PROJECT



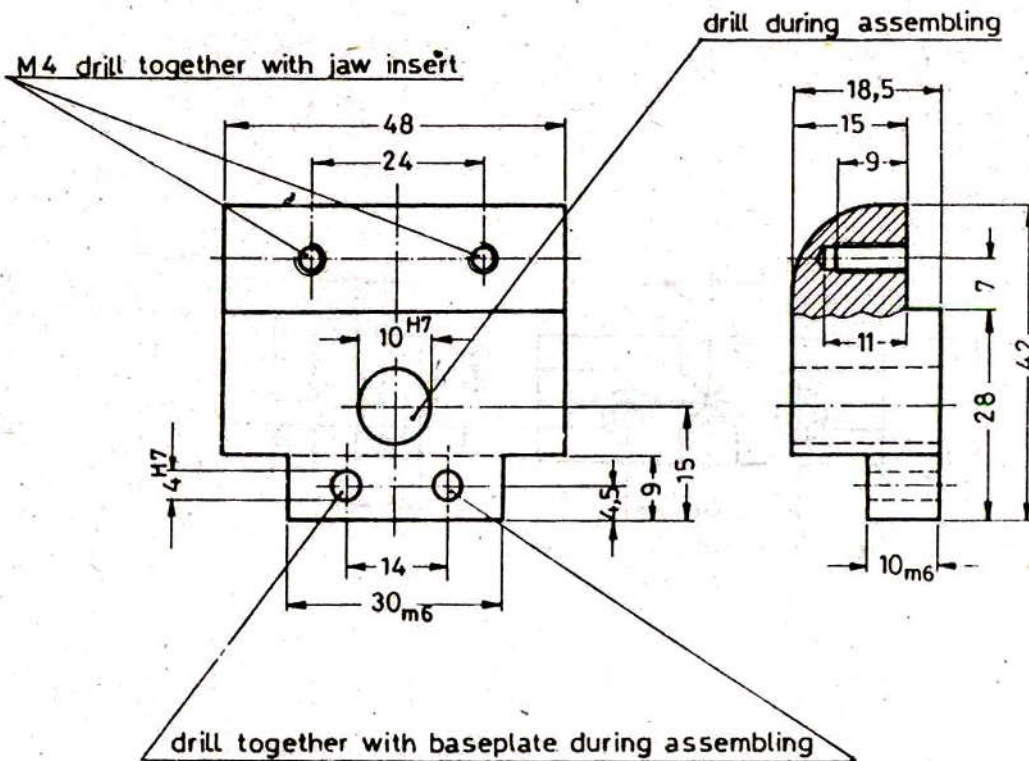
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated

2



30 m6	+ 0,021 • 0,008
10 m6	+ 0,015 • 0,006
10 H7	+ 0,015 0
4 H7	+ 0,012 0

SCALE 1:1

FIXED JAW

From exercise No. 1

(FOR VICE)

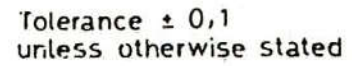
MP/2.3/3.13.1/4

WORKSHOP PROJECT

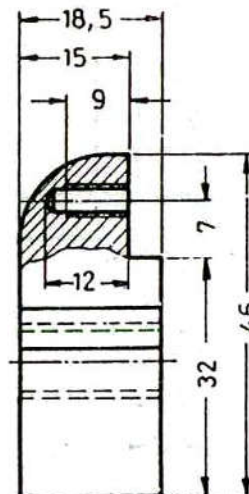


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



M4 drill together with jaw insert

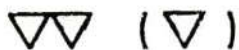


20 f7	- 0,020 - 0,041
5 H7	+ 0,012 0

WORKSHOP PROJECT

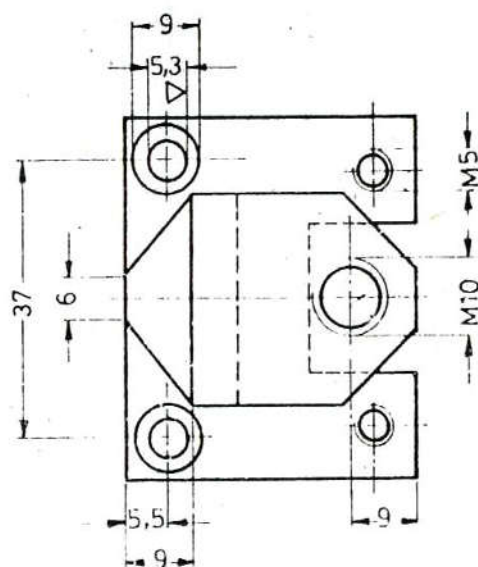
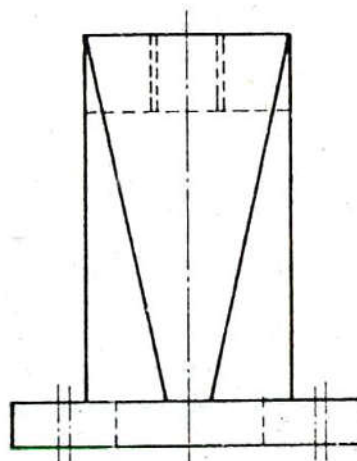
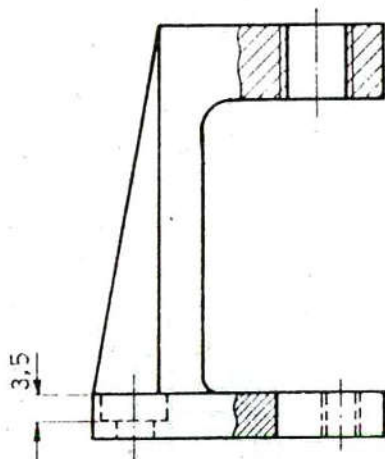
PAK-GERMAN TECHNICAL TRAINING PROGRAMME





Tolerance $\pm 0,1$
unless otherwise stated

1



Drill during assembling

SCALE 1:1

BOW

From exercise No. 2

(FOR VICE)

MP/2.3/3.13.1/6

WORKSHOP PROJECT



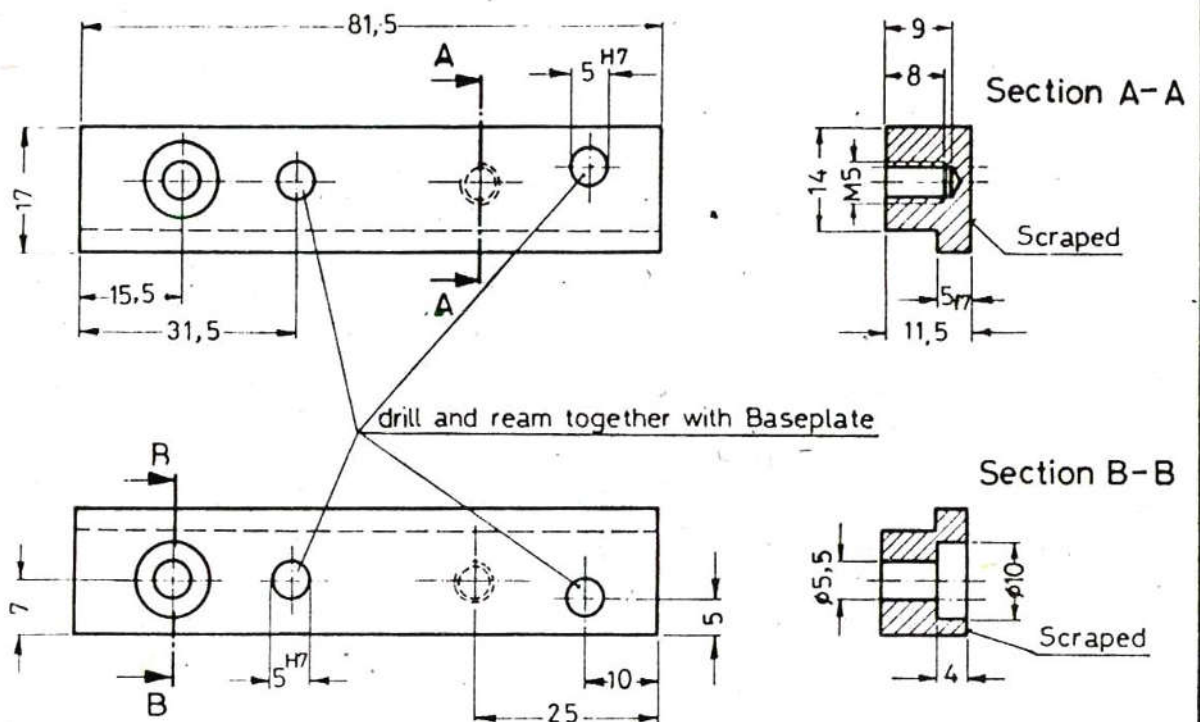
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated

7



5 H7	+ 0,012 0
5 f7	- 0 010 - 0 022

SCALE 1:1

MAT.: MILD STEEL

GUIDE RAIL

(FOR VICE)

MP/2.3/3-13.1/7

WORKSHOP PROJECT



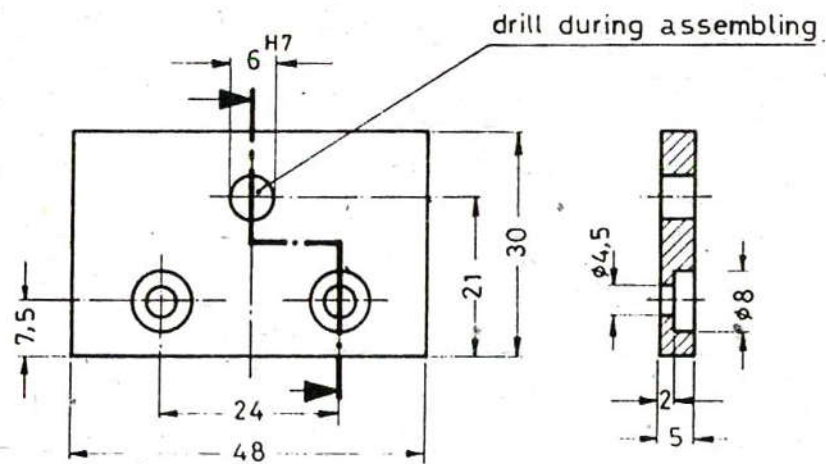
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance $\pm 0,1$
unless otherwise stated

6



6 ^{H7}	$\begin{matrix} +0,012 \\ 0 \end{matrix}$
-----------------	---

SCALE 1:1

MAT.:MILD STEEL

SPINDLE GUIDE

(FOR VICE)

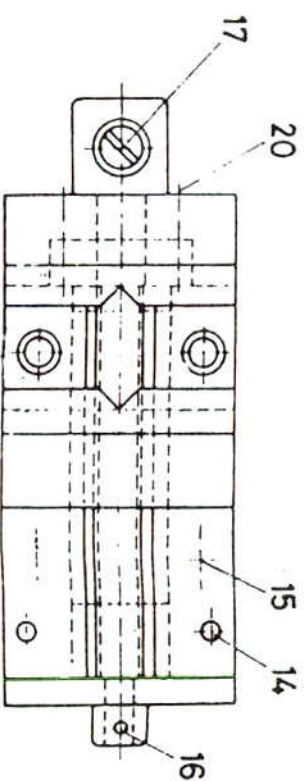
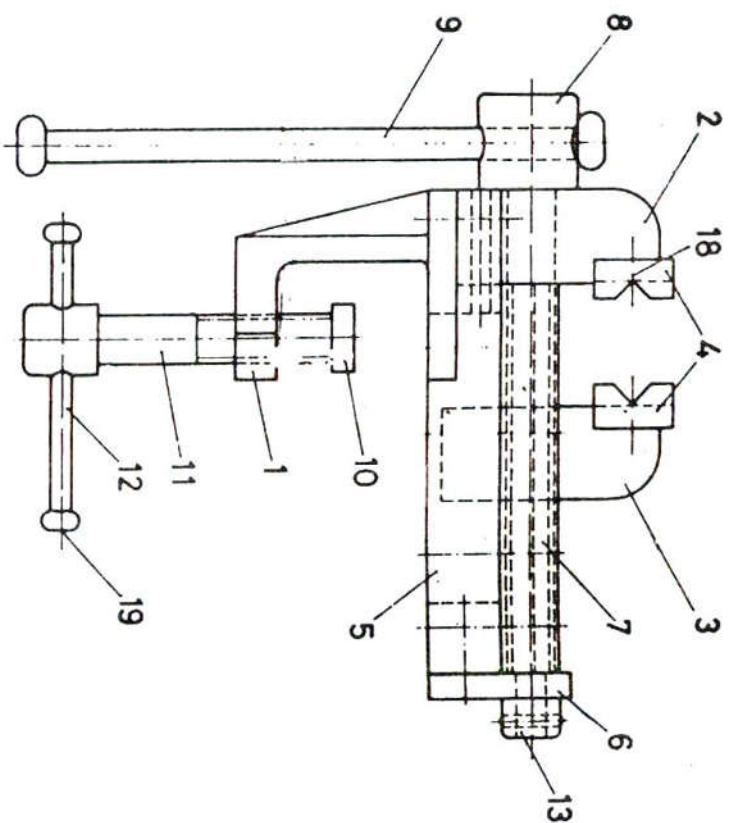
MP/2.3/3.13.1/8

WORKSHOP PROJECT



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



2	Cylindrical pin	20	4m6 x 26	
2	Countersunk screw	19	M3 x 10	
6	Socket head cap screw	18	M4 x 10	
3	Countersunk screw	17	M5 x 12	
1	Cylindrical pin	16	2m8 x 12	
4	Socket head cap screw	15	M5 x 26	
4	Cylindrical pin	14	5m6 x 26	
1	Bush	13	Mild steel Ø13 x 10 (from ex. 2.13.2/8)	
1	Locking handle	12	Mild steel Ø5 x 55 (from ex. 2.13.2/11)	
1	Locking spindle	11	Mild steel Ø15 x 65 (from ex. 2.13.2/7)	
1	Pressure disc	10	Mild steel Ø15 x 6 (from ex. 2.13.2/7)	
1	Locking handle	9	Mild steel Ø8 x 112 (from ex. 2.13.2/11)	
1	Main spindle	8	Mild steel Ø20 x 135 (from ex. 2.13.2/8)	
2	Guide rail	7	Mild steel 18 x 13 x 83	
1	Spindle guide	6	Mild steel 50 x 6 x 32	
1	Base plate	5	Mild steel 50 x 16 x 102	
2	Jaw insert	4	Tool steel 18 x 50 x 10	
1	Moveable jaw	3	Mild steel 50 x 47 x 20	
1	Fixed jaw	2	Mild steel 50 x 43 x 20	
1	Bow	1	Mild steel 50 x 50 x 57	
Qty.	Denomination	Part No.	Material / Remarks	

VICE

MP/2 3/3 13 1/10

WORKSHOP PROJECT

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

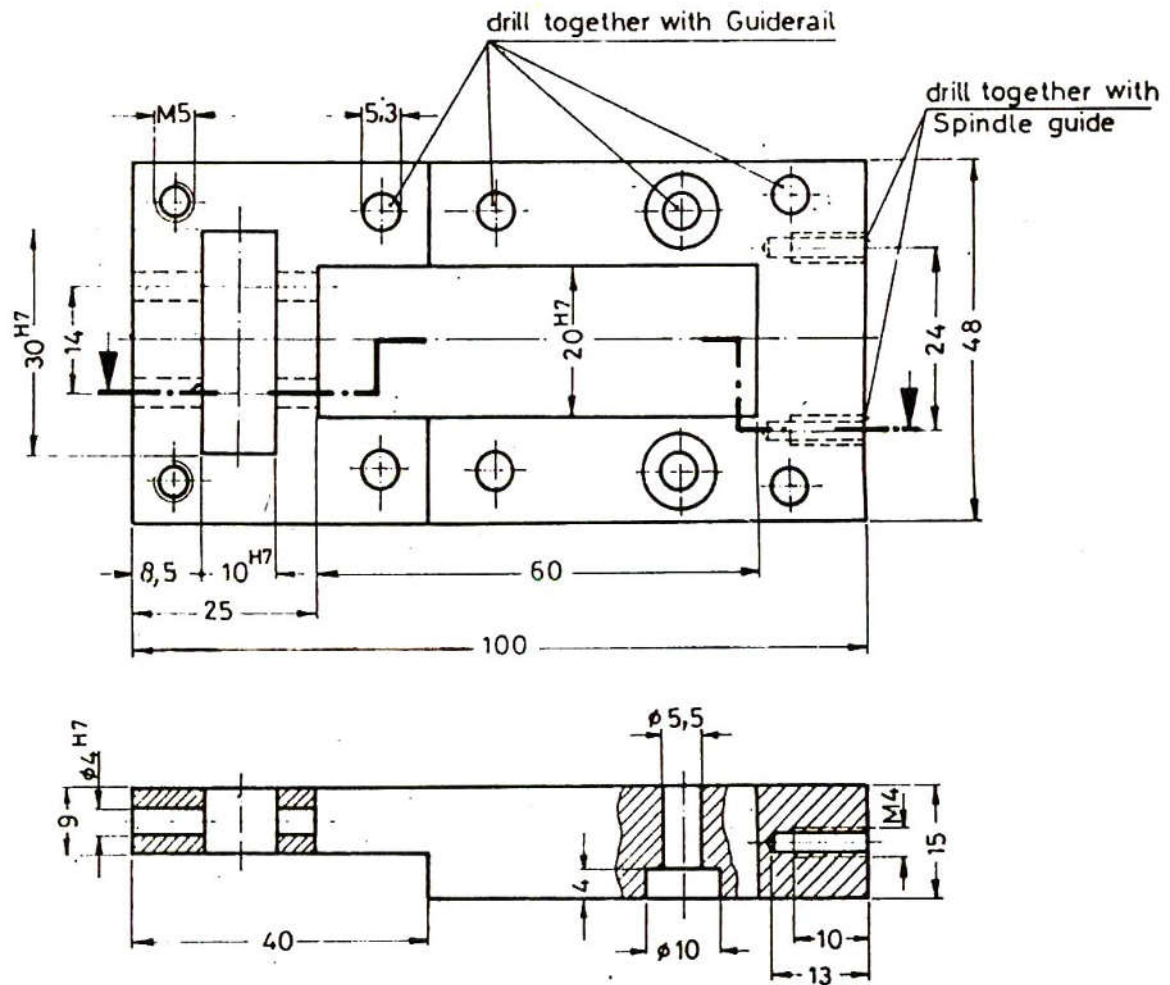
PAKISTAN TECHNICAL TRAINING PROGRAMME





Tolerance ± 0.1
unless otherwise stated

5



4 H7	2
10 H7	+ 0.015 0
20 H7	+ 0.021 0
30 H7	+ 0.021 0

SCALE 1:1

MAT.: MILD STEEL

BASE PLATE

(FOR VICE)

MP/2.3/3.13.1/9

WORKSHOP PROJECT



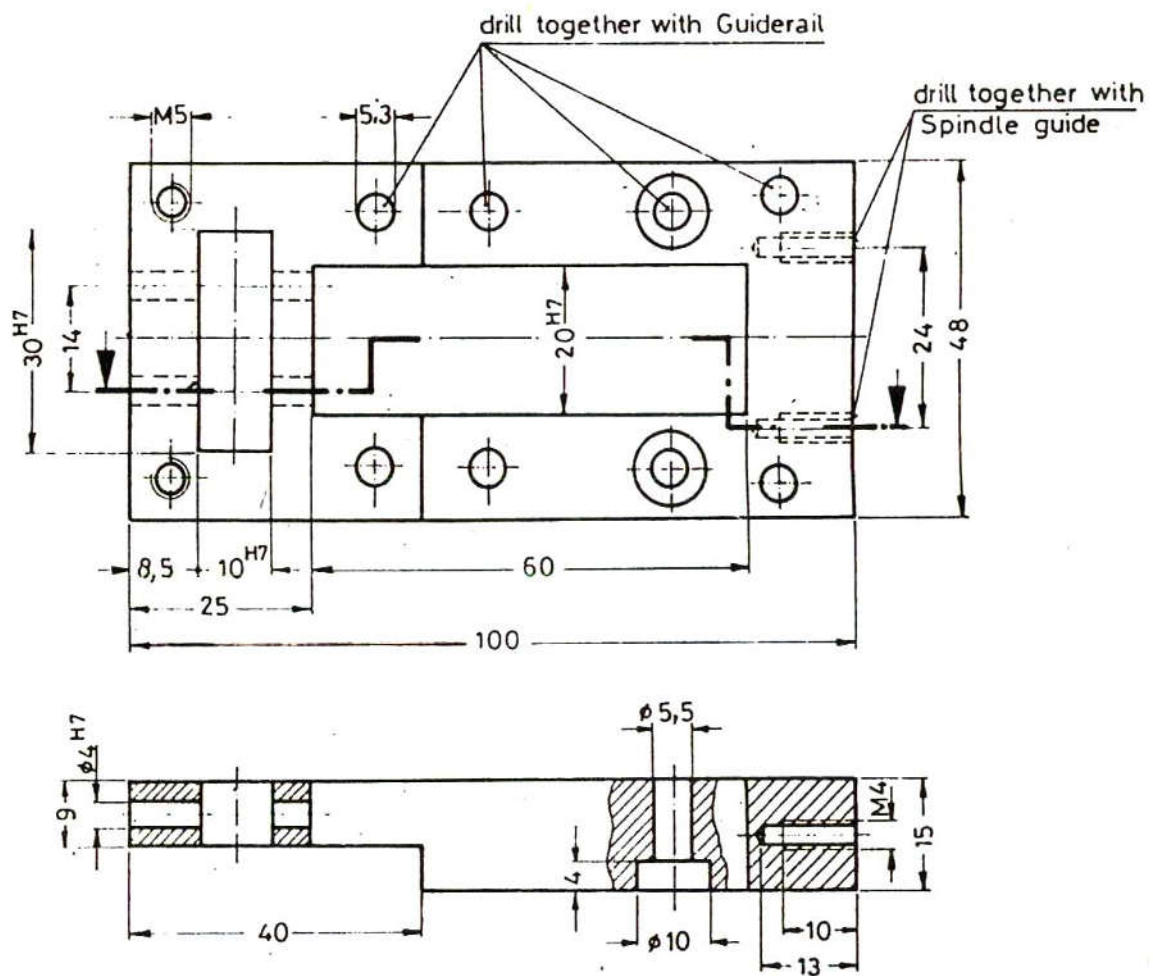
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



Tolerance ± 0.1
unless otherwise stated

5



4 H7	2
10 H7	+ 0,015 0
20 H7	+ 0,021 0
30 H7	+ 0,021 0

SCALE 1:1

MAT.: MILD STEEL

BASE PLATE

(FOR VICE)

MP/2.3/3.13.1/9

WORKSHOP PROJECT



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME