

BASIC TRAINING

TTC PROGRAMME

MILLWRIGHT

and

TOOL & DIE MAKER



GOVERNMENT OF THE PUNJAB
TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY
PUNJAB BOARD OF TECHNICAL EDUCATION
TRADE TESTING CELL, LAHORE.
Edition : 2004



Qty : 500

T. T. P. Series No.18

Price Rs. 15/-

BASIC TRAINING

1.0.1	BASIC FITTING	22 WEEKS
1.0.2	MEASURING I (bound separately)	2 WEEKS


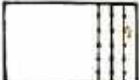



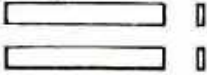
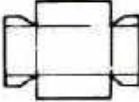
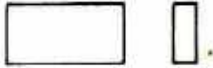
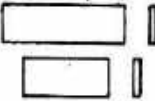
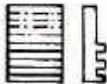
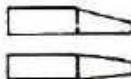
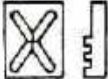
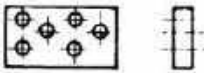



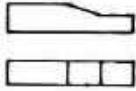


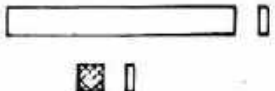
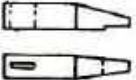
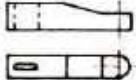
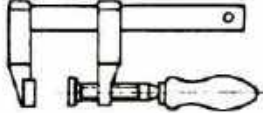
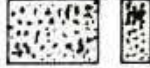
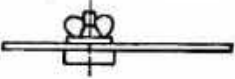
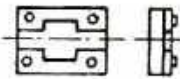
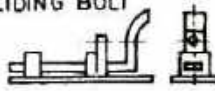
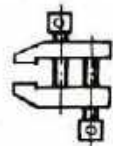
DURING THIS PRACTICAL TRAINING THE TRAINEE HAS TO ATTEND THEORY CLASSES 1 DAY A WEEK

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It may be ordered from:

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING
8/A, Abu Bakar Block, New Garden Town, Lahore-16

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<p>FILING EXERCISE I</p>  <p>Flat filing.</p> <p>1 → 4</p>	<p>MARKING EXERCISE</p>  <p>Flat filing, marking & centre punching.</p> <p>2 → 5</p>	<p>STRETCHING EXERCISE</p>  <p>Filing, marking & hammering.</p> <p>3</p>	<p>FILING EXERCISE II</p>  <p>Flat and square filing.</p> <p>4 → 26</p>
<p>SAWING EXERCISE</p>  <p>Sawing, square filing.</p> <p>2 → 5 → 10</p>	<p>FOR INSIDE CALIPER</p>  <p>Special filing operations.</p> <p>6 → 15</p>	<p>FOR SHEET-METAL BOX</p>  <p>Marking, shearing, filing.</p> <p>7 → 16</p>	<p>FOR DRILLING EXERCISE</p>  <p>Smooth filing acc. to given dimensions.</p> <p>8 → 13</p>
<p>FOR RIVETING EXERCISE</p>  <p>Filing.</p> <p>9 → 14</p>	<p>CHIPPING EXERCISE</p>  <p>Cross and flat chiselling.</p> <p>5 → 10 → 12</p>	<p>FIXED JAW</p>  <p>Marking, chiselling, radius filing.</p> <p>11 → 21</p>	<p>CHIPPING EXERCISE</p>  <p>Groove chiselling, chisel regrinding.</p> <p>10 → 12</p>
<p>DRILLING EXERCISE</p>  <p>Marking, drilling, drill regrinding.</p> <p>8 → 13 → 18</p>	<p>RIVETING EXERCISE</p>  <p>Marking, drilling, riveting.</p> <p>9 → 14</p>	<p>INSIDE CALIPER</p>  <p>Filing acc. to marking lines, assembling.</p> <p>6 → 15</p>	<p>SHEET-METAL BOX</p>  <p>Sheet-metal bending and folding.</p> <p>7 → 16</p>
<p>MOVEABLE JAW</p>  <p>Filing.</p> <p>17 → 22</p>	<p>DRILLING EXERCISE</p>  <p>Counter-boring, reaming, thread cutting.</p> <p>13 → 18</p>	<p>SPINDLE</p>  <p>External thread cutting, form filing.</p> <p>19 → 23</p>	<p>SLIDING BAR</p>  <p>Radius filing, stamping, notch filing.</p> <p>20 → 23</p>
<p>FIXED JAW</p>  <p>Slot filing.</p> <p>11 → 21 → 23</p>	<p>MOVEABLE JAW</p>  <p>Filing.</p> <p>17 → 22 → 23</p>	<p>SCREW CLAMP</p>  <p>Assembling.</p> <p>19, 20 → 23 → 22, 21</p>	<p>SCRAPING EXERCISE</p>  <p>Flat, square and parallel scraping.</p> <p>24 → 26</p>
<p>MARKING GAUGE</p>  <p>Assembling.</p> <p>25</p>	<p>FITTING EXERCISE</p>  <p>Fitting.</p> <p>4, 24 → 26</p>	<p>SLIDING BOLT</p>  <p>Assembling.</p> <p>27 → 27.1</p>	<p>PARALLEL CLAMP</p>  <p>TEST</p>
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

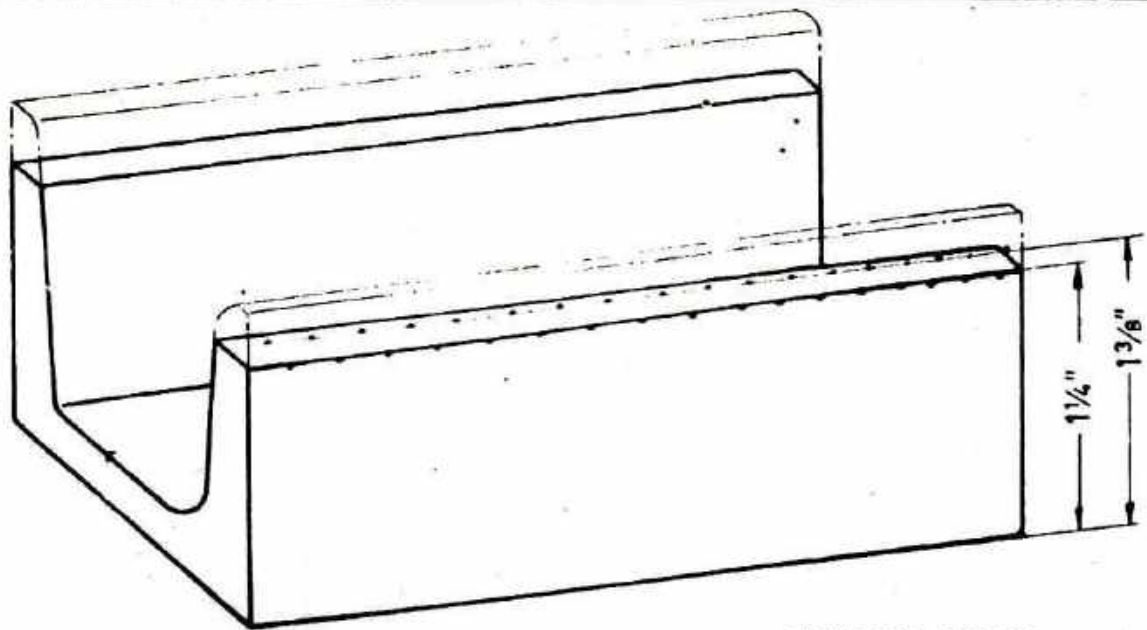
Fitting No. 1.0.1	Exercise No. (Length given in millimeter)										Length per trainee	Total length for a batch of 16 trainees						
	1	2	3	6	7	8	9	11	17	19			20	24	25	27	Test	
M/S Channel 75 x 38 mm (3 x 1 1/2)	100																100 mm	1,7 meter
M/S Flat 60 x 15 mm (2 1/2 x 5/8)	95					82						82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



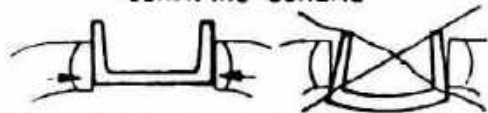
MATERIAL REQUIRED

Basic Training

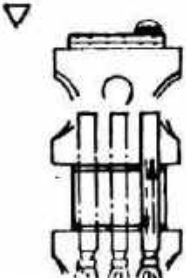

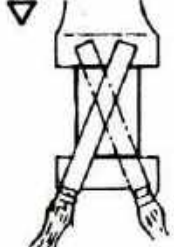
Fitting No. 1.0.1	Exercise No. (Quantity given in Numbers)										T-st	Total Nos. per trainee	Total numbers for a batch of 16 trainees	
	14	15	16	19	23	25	26							
M/S Rivet (Round head) ø 5 x 21 mm (3/16 x 7/8)	8												8	144
M/S Rivet (Round head) ø 5 x 19 mm (3/16 x 3/4)	2												2	40
M/S 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 (1/8 x 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	80
M/S Pins ø 4 x 40 mm												2	2	36



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

M.T.: ST. 37 - 1

FILING EXERCISE

NO: - 1.01/01

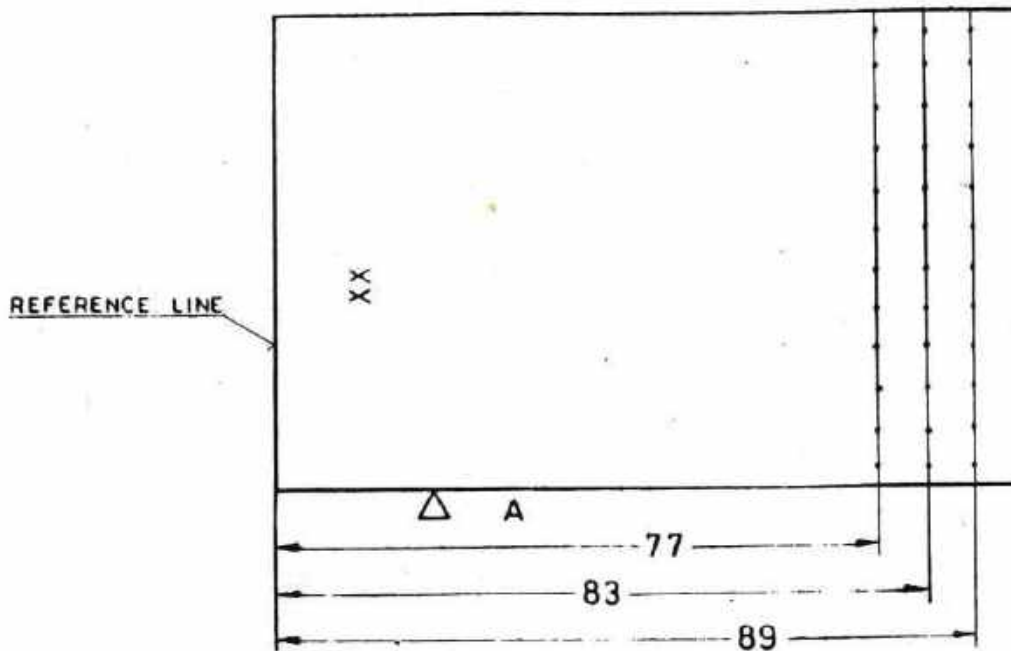
BASIC / FITTING




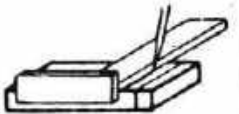
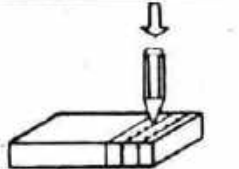
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

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SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		FLAT FILE 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

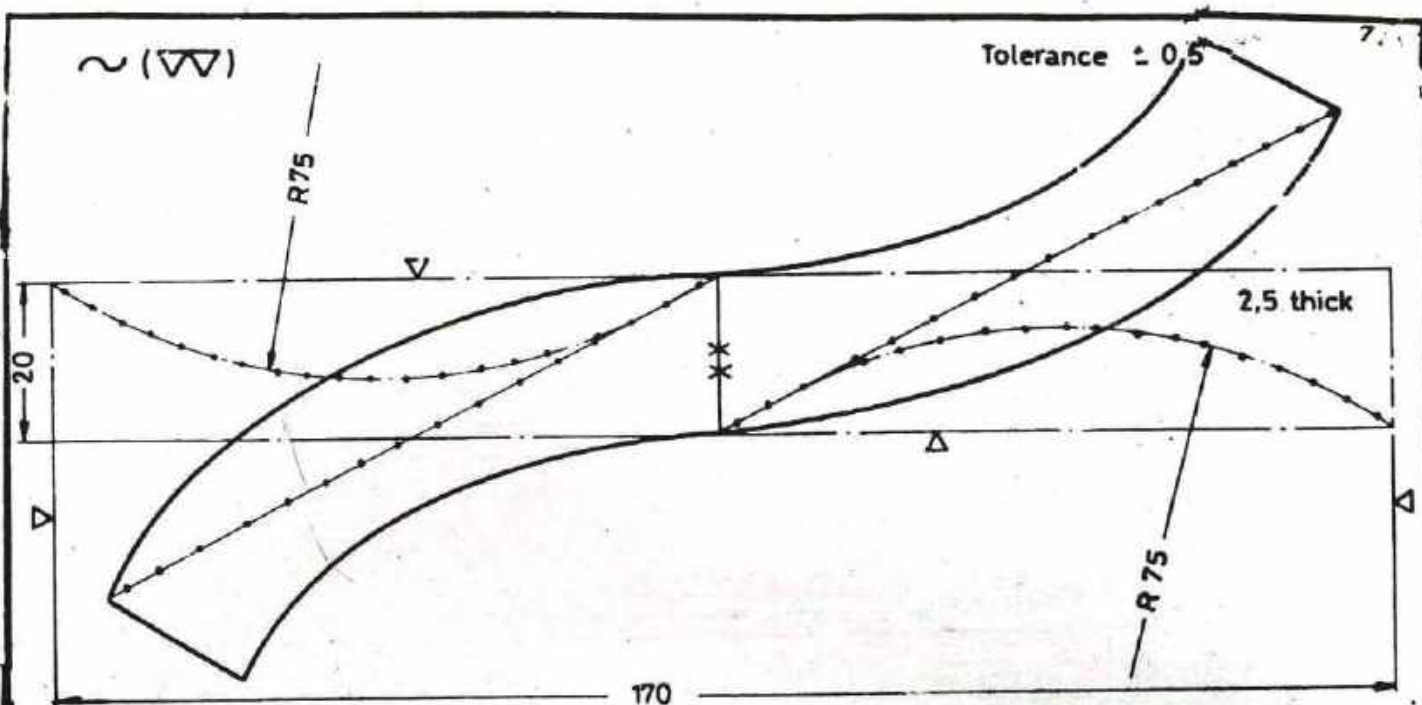
MARKING EXERCISE

NO :- 1.0.1/02

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

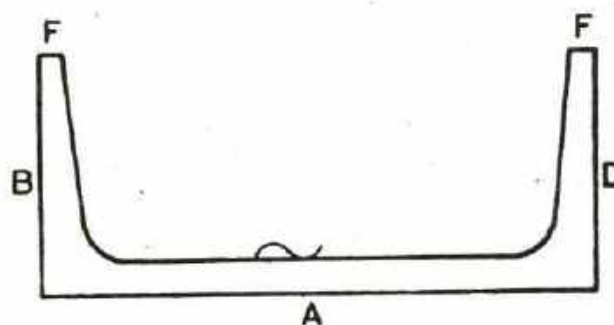
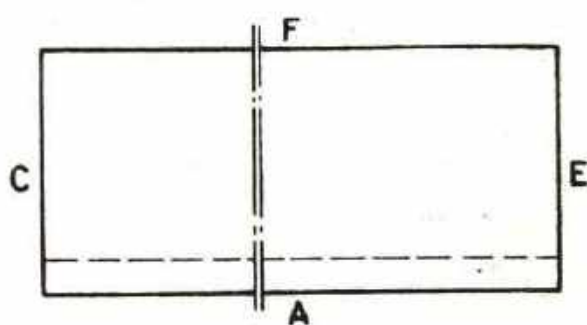
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BASIC FITTING


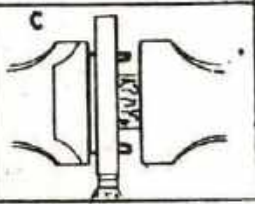
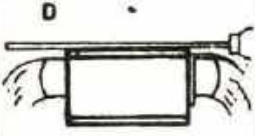
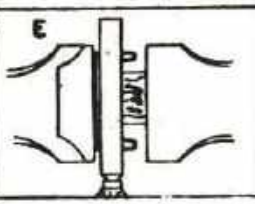
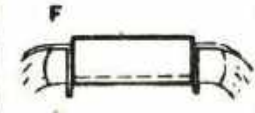


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		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

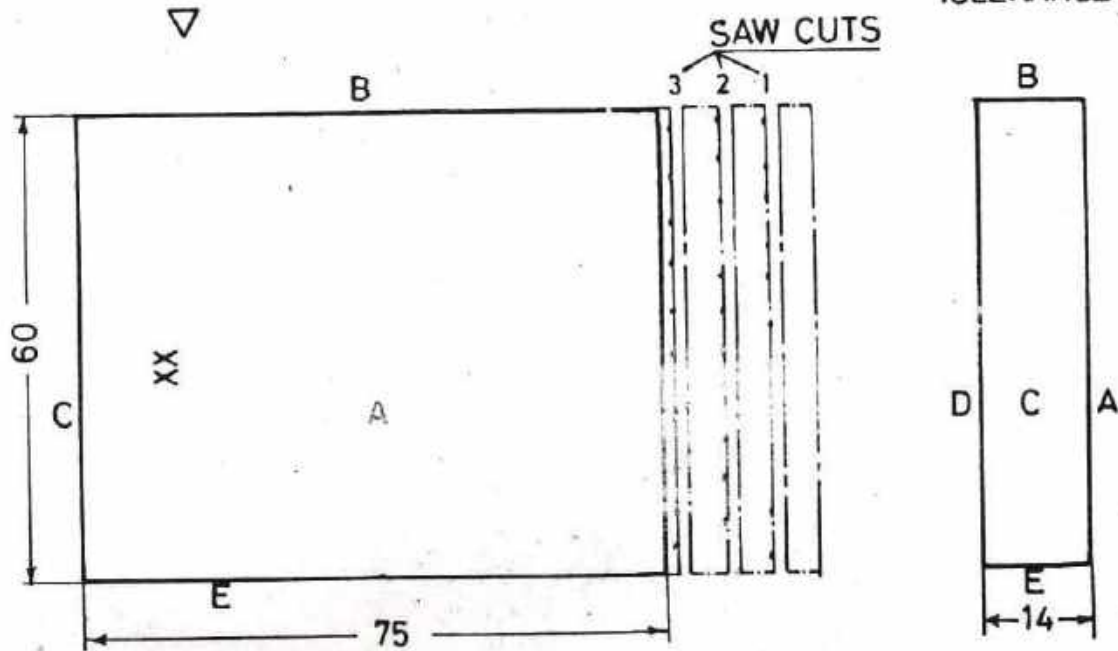
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BASIC / FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME





SEQUENCE OF OPERATIONS

NO	Symbol	Tools	Descriptions
1	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

MAT. of Ex. 02

SAWING EXERCISE

NO: - 1.0.1/05

BASIC / FITTING

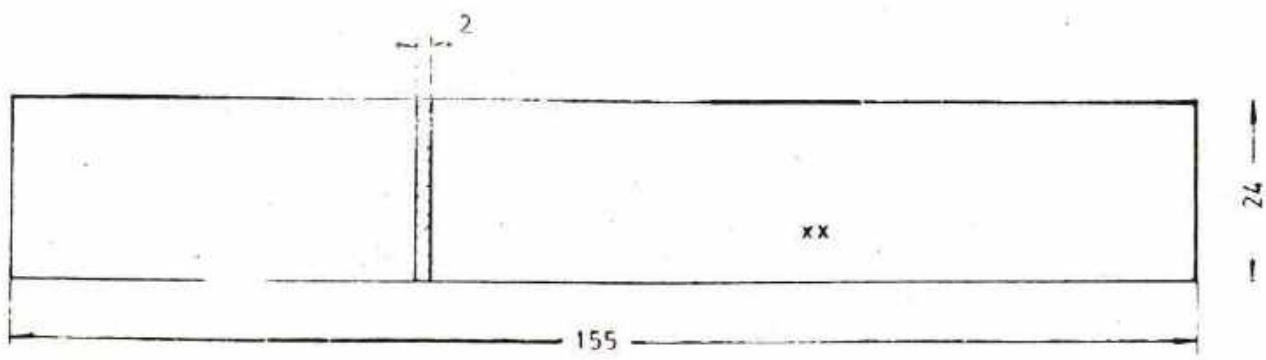


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME


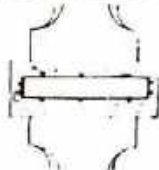



TOLERANCE ± 0.3



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

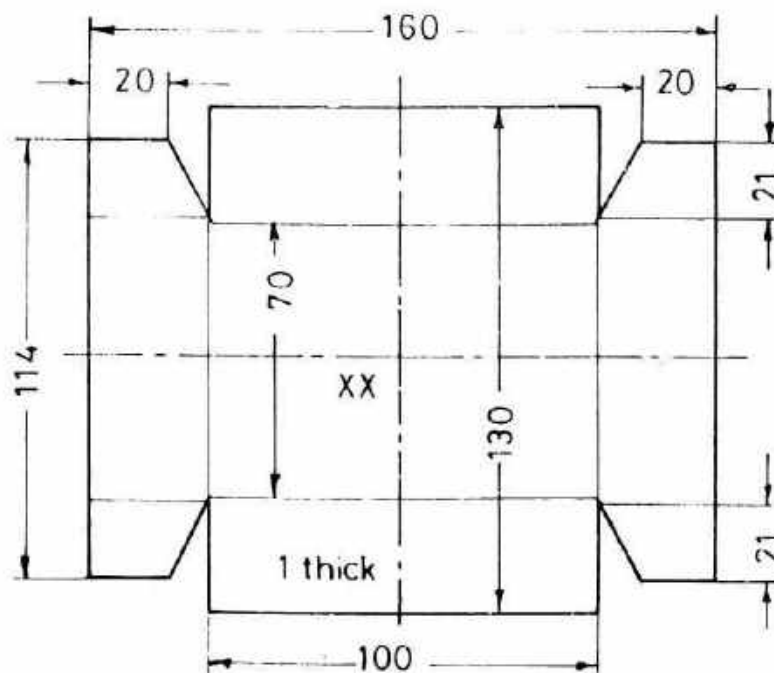
NO-101/06

BASIC/FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK 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

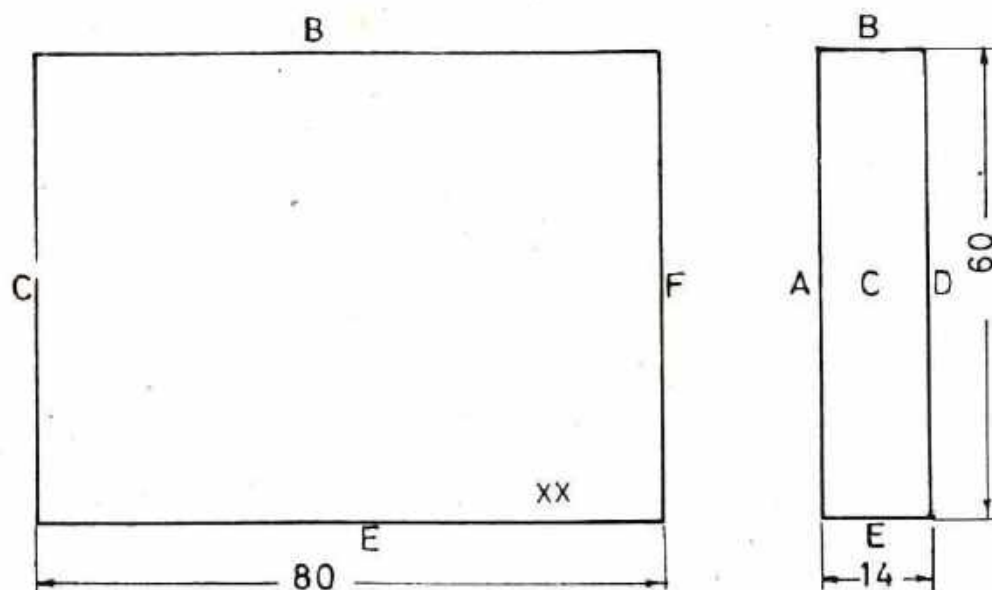
NO. - 1.01/07

BASIC/ FITTING

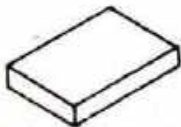
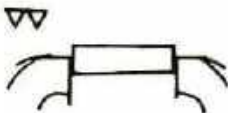
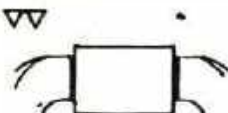



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FAK GERMAN 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

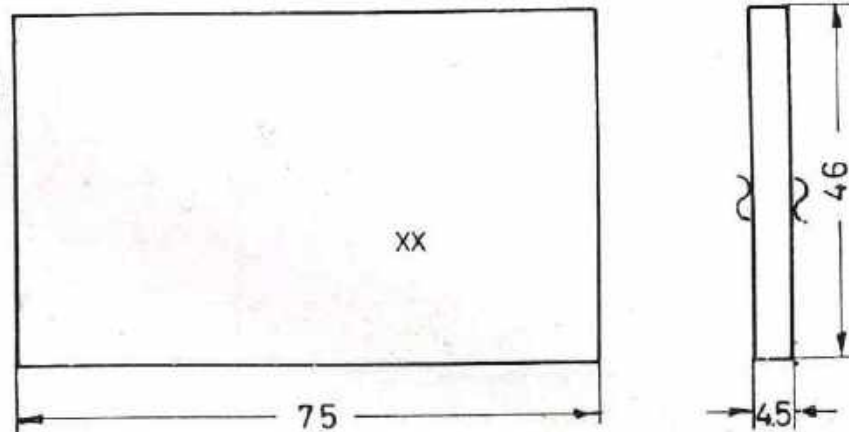
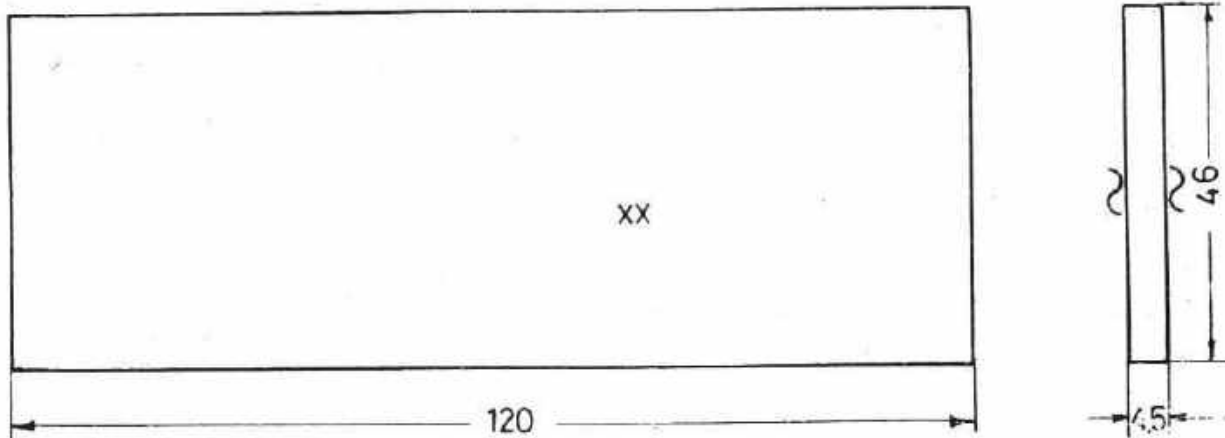
NO:- 1.01/08

BASIC / FITTING



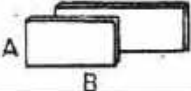
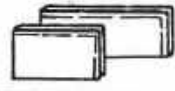
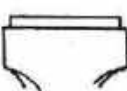
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME



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 & WIDTH MARKING. USE SURFACES A & B AS REFERENCE SURFACE.
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

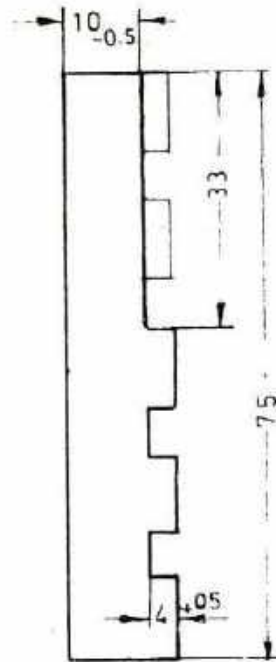
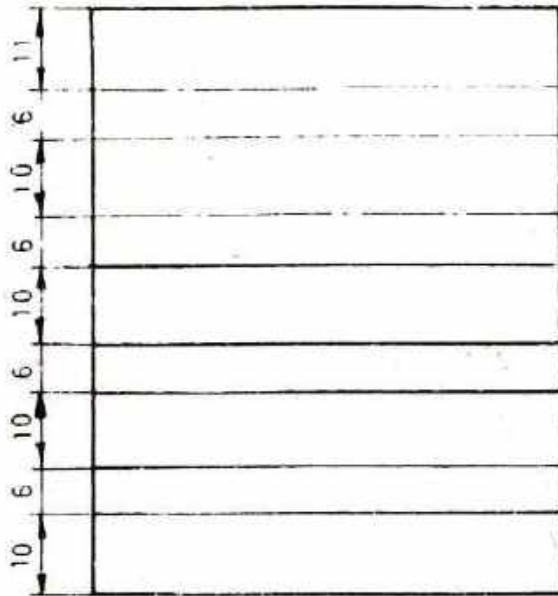
NO- 1.0.1/09

BASIC/FITTING

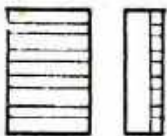
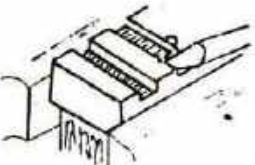
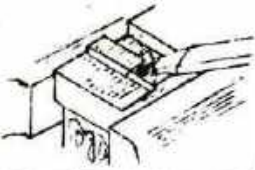


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

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

SCALE 1:1

MAT of Ex. 05

CHIPPING EXERCISE

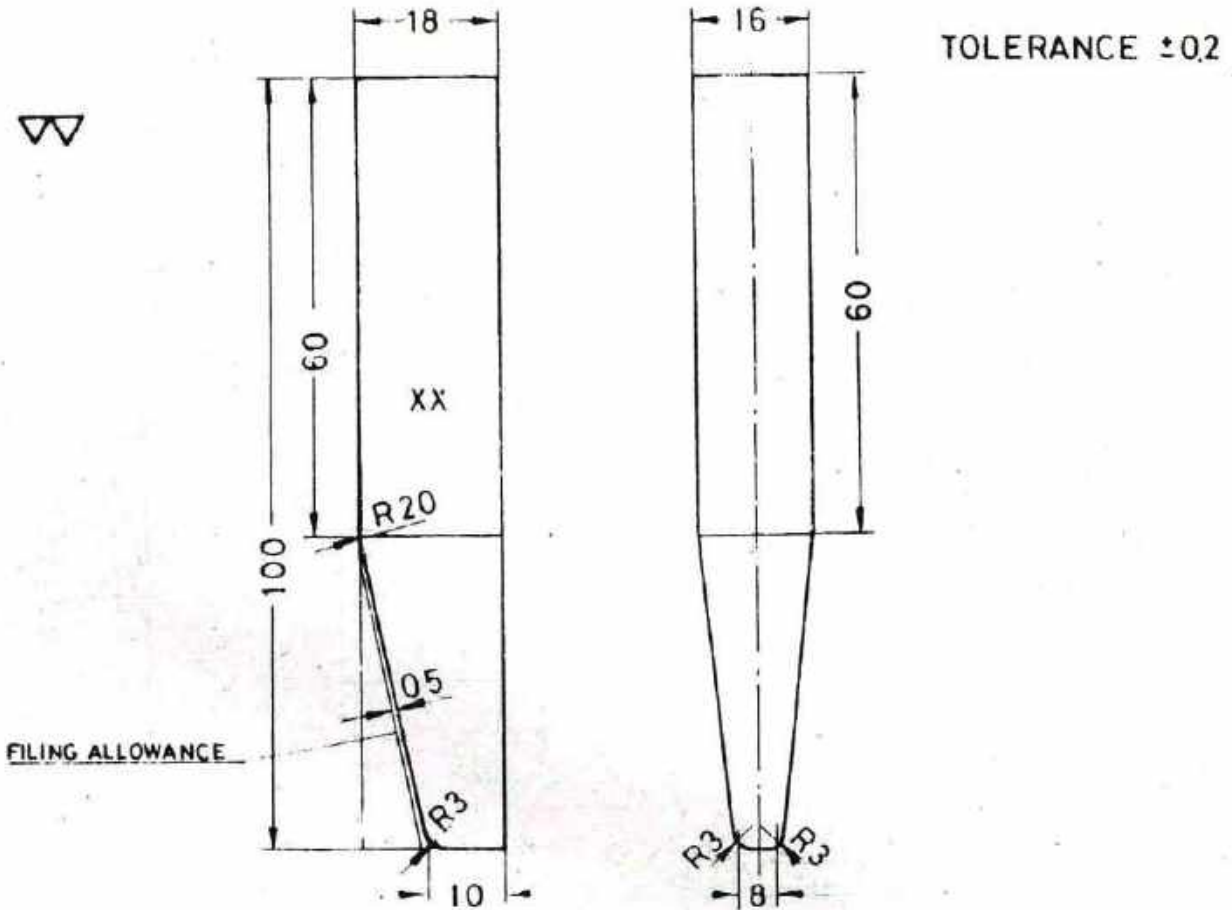
NO: - 1.01/10

BASIC / FITTING



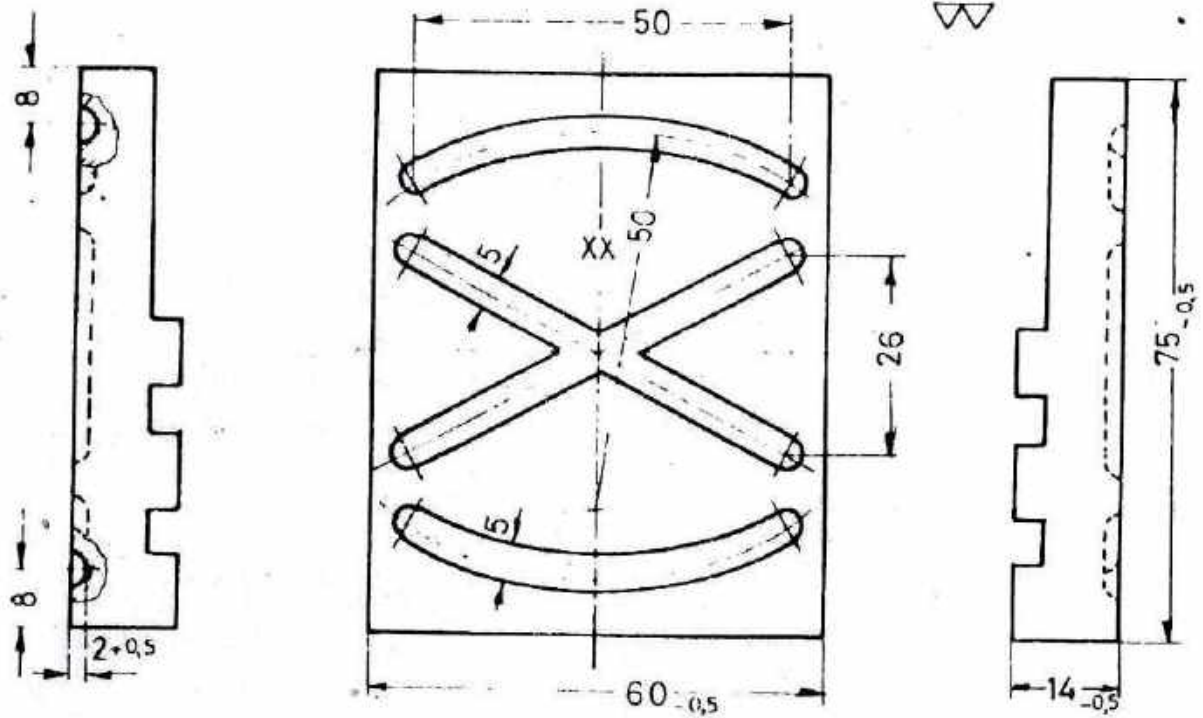
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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 DEBORRING ETC. FINAL WORK.		

SCALE 1:1	FIXED JAW for SCREW CLAMP	NO :- 1 01 / 11
MAT. ST 37-1		BASIC / FITTING
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING <small>FOR GERMAN TECHNICAL TRAINING PROGRAMME</small>		15



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

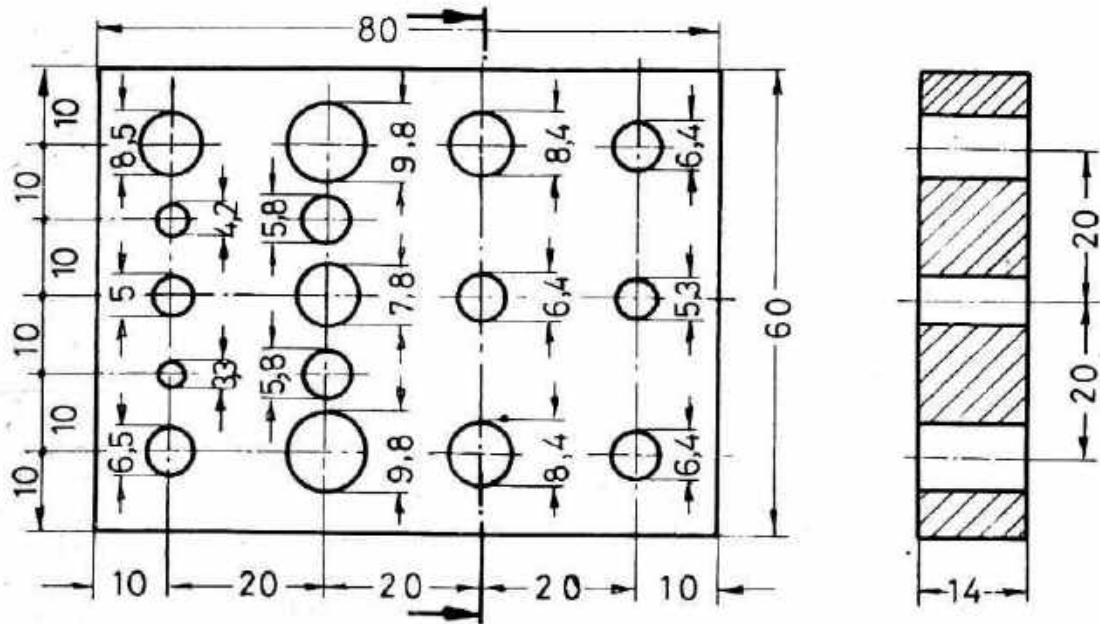
CHIPPING EXERCISE

NO.— 10/12
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 ALL CENTRE POINTS AND CONTROL CIRCLES
2		MACHINE VICE PARALLEL PIECLS	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

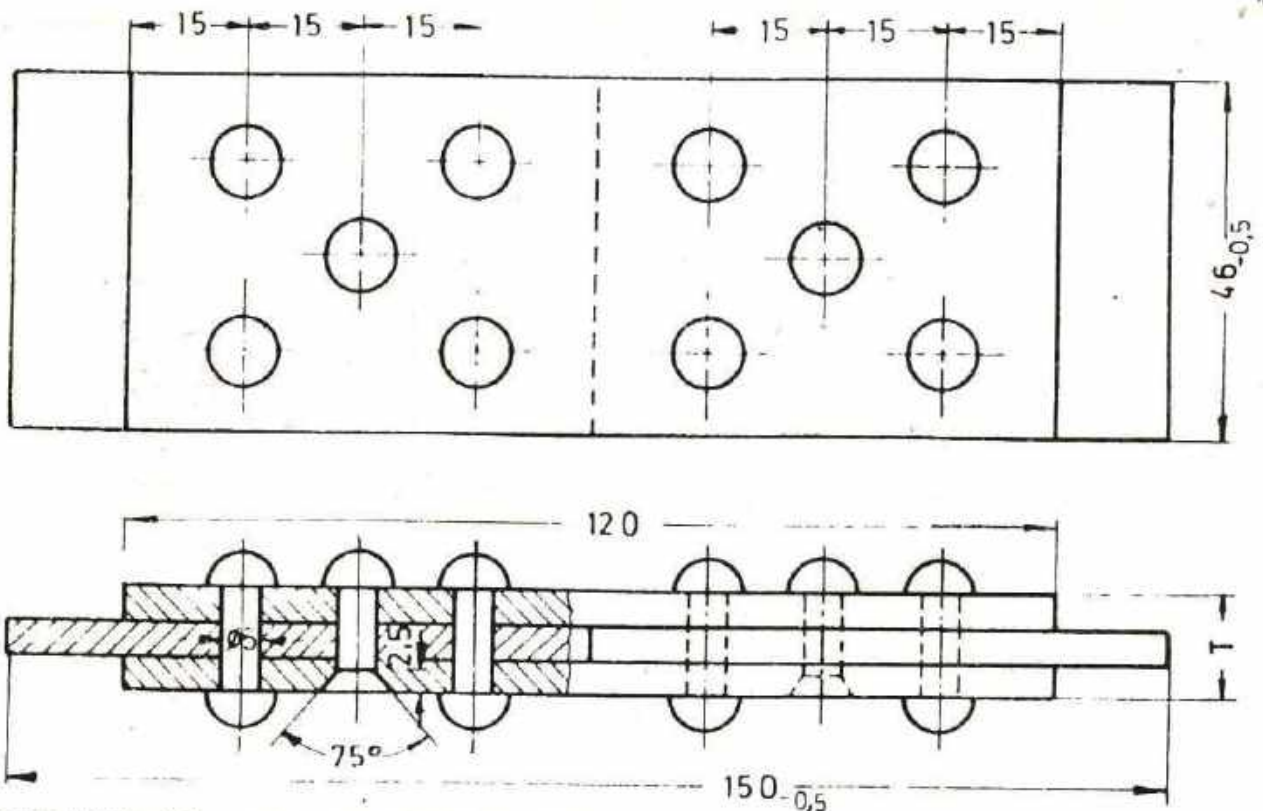
NO- 10.1/13

BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FAK GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		MARKING TOOLS 2 HAND VICES	MARKIN OF CENTRE POINTS CLAMPING TOGETHER OF ALL PARTS
2		TWIST DRILL 5,2 MM. C/SINK DRILL 90° C/SINK DRILL 75°	DRILLING COUNTER- SINKING AND DEBURING OF THE HOLES
3		RIVET SETTING TOOLS 5 HAND HAMMER 500g 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 x 1 d.

SCALE 1:1

MAT. of Ex.09

RIVETING EXERCISE

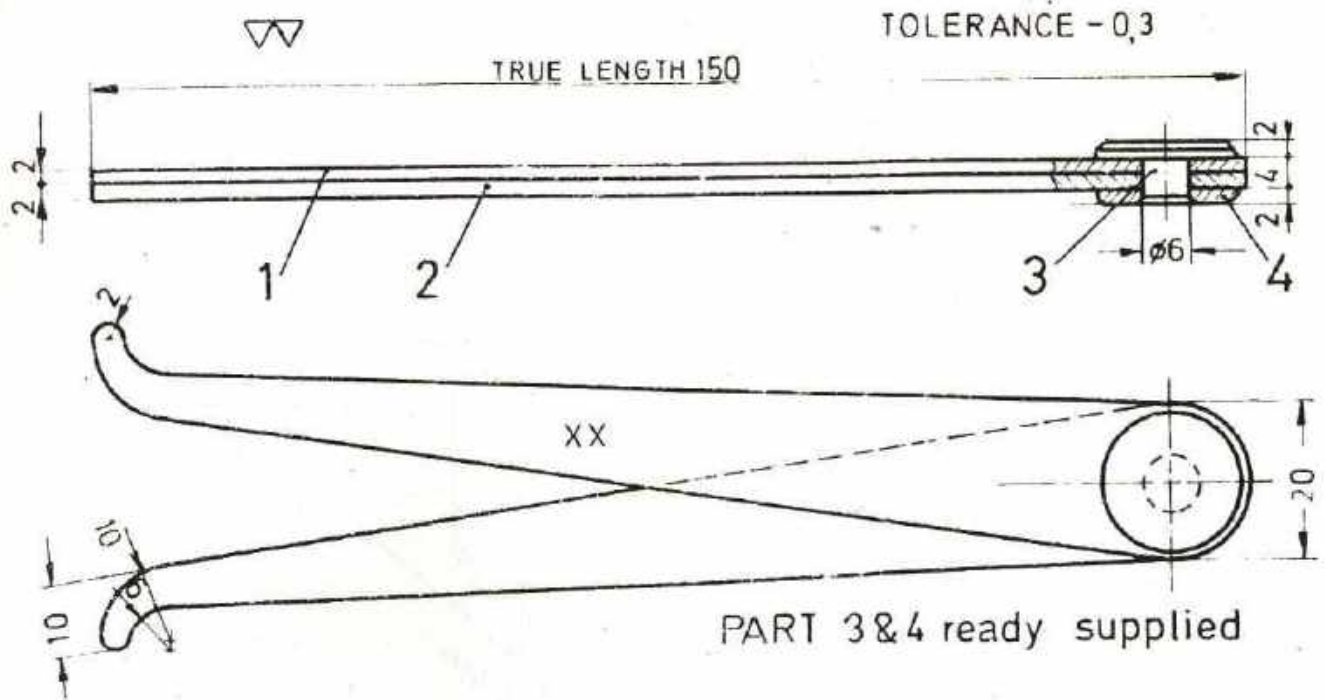
NO:— 10.1 / 14

BASIC / FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FAK GERMAN TECHNICAL TRAINING PROGRAMME





SEQUENCE OF OPERATIONS

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

SCALE 1:1

MAT. of Ex. 06

INSIDE CALIPER

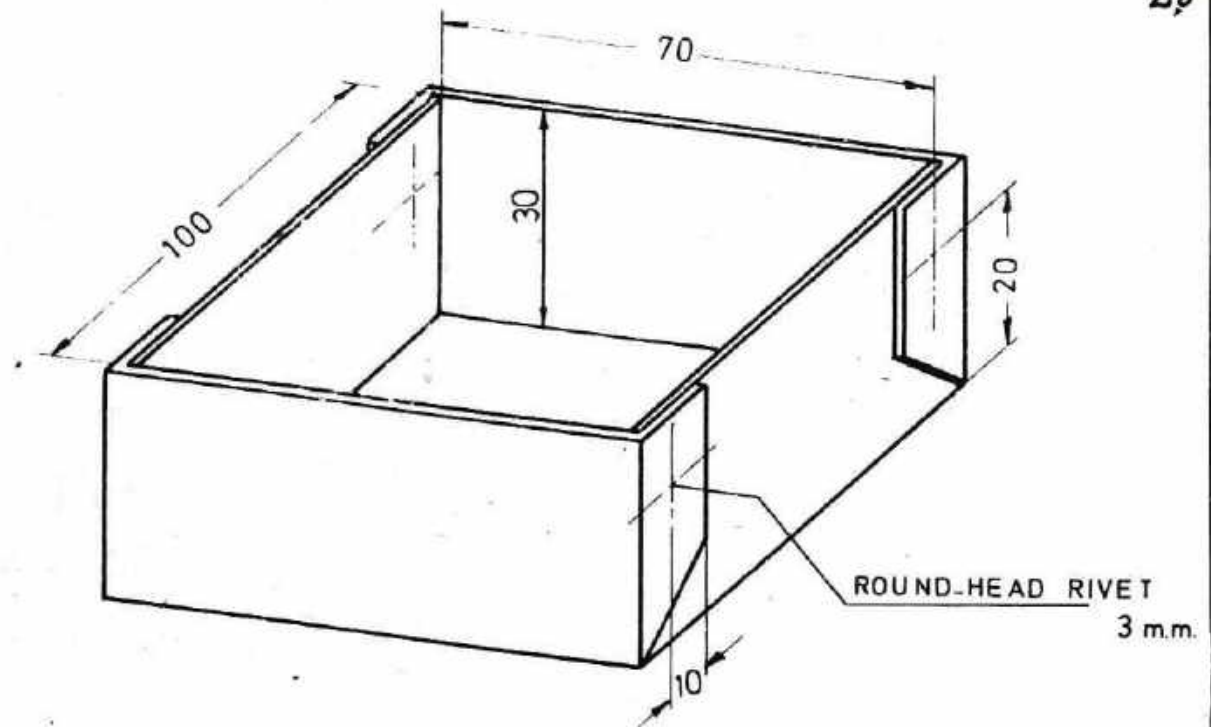
NO:— 10.1 / 15

BASIC / FITTING

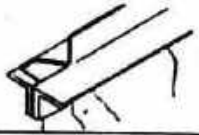


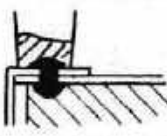



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FOR GERMAN TECHNICAL TRAINING PROGRAMME



SEQUENCE OF OPERATIONS

NO.	Symbol	Tools	Descriptions
1		HAND HAMMER 250g TWO ANGLE IRON	BENDING OF THE & 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

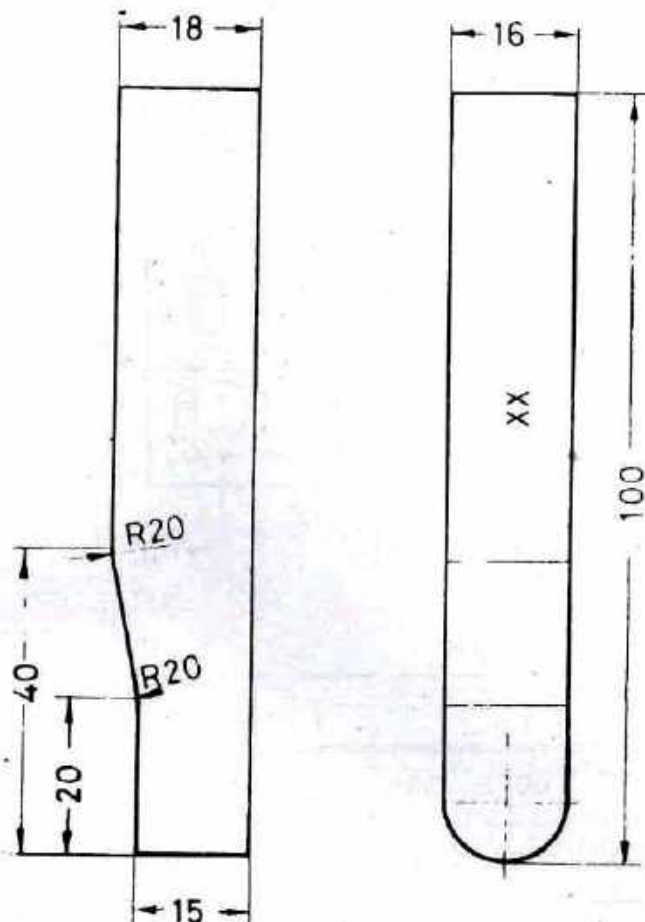
NO. - 101 / 16

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		COMPLETED		TIME USED
	DATE	TIME	DATE	TIME	
10 HRS.					

TIME MARKS + -

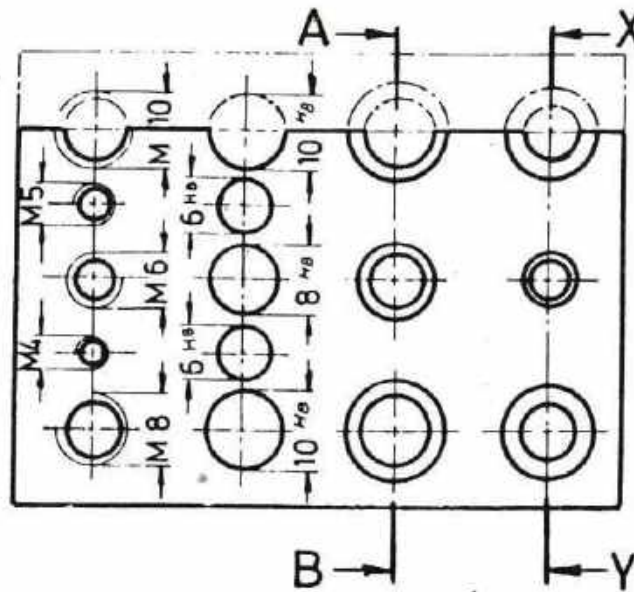
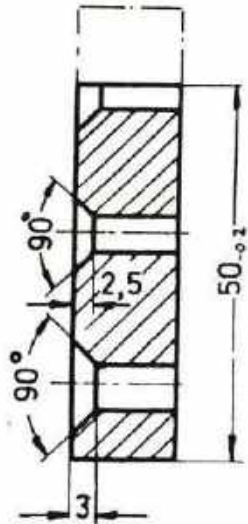
SCALE 1:1	MOVABLE JAW for SCREW CLAMP	NO :- 1.01/17
MAT. ST 37-1		BASIC / FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

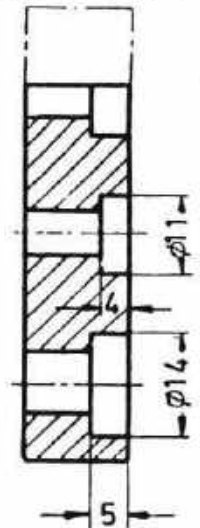


PAK GERMAN TECHNICAL TRAINING PROGRAMME

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 HACSAW FILES MEARING TOOLS	MARKING, FILING, FINAL WORK

SCALE 1:1

MAT. of Ex.13

DRILLIG EXERCISE

NO:— 1.01 / 18

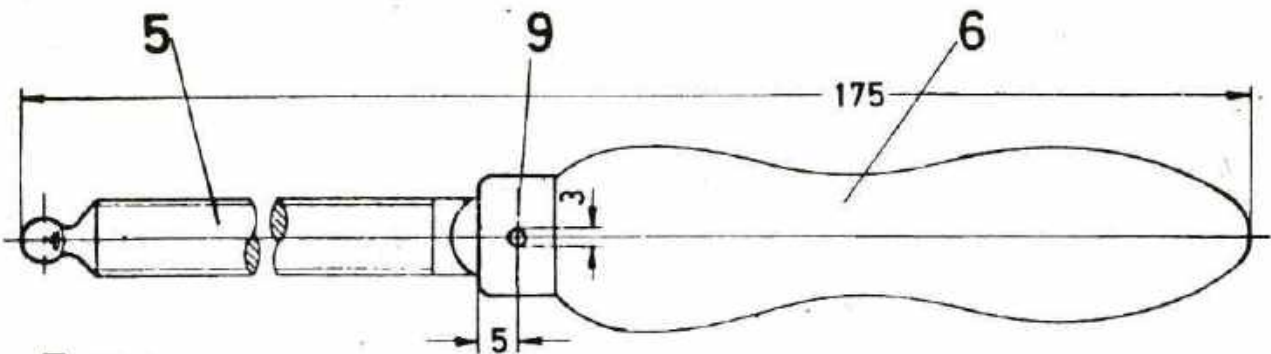
BASIC / FITTING



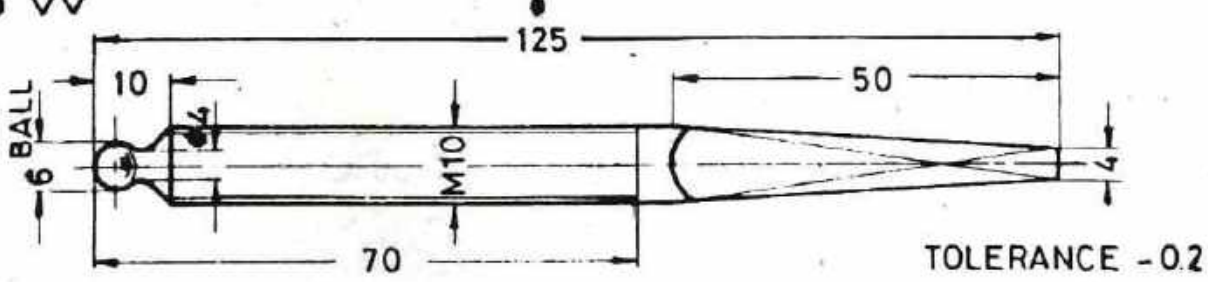
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

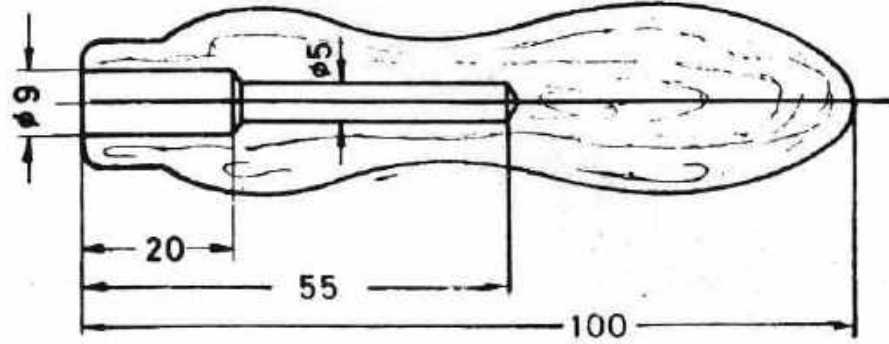
49



5 ▽



6 ▽



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 WOOD

THREAD BOLT
for SCREW CLAMP

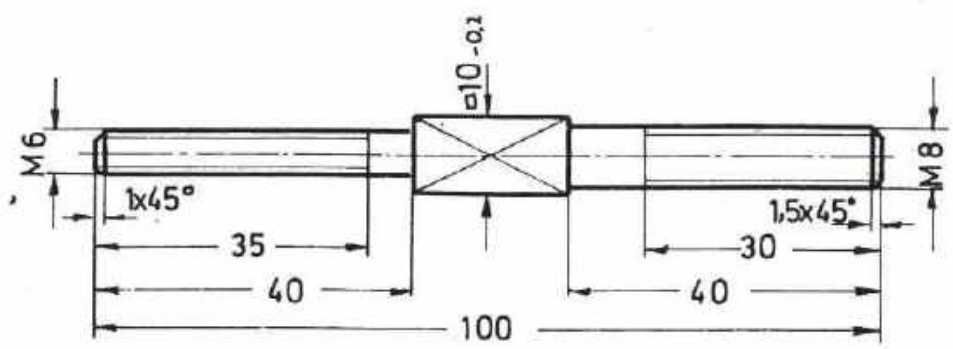
NO :- 1.01/19

BASIC / FITTING

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME





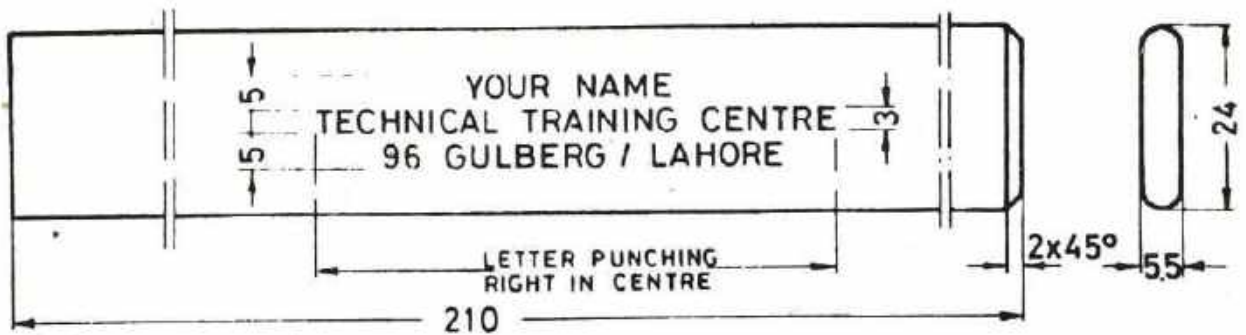
THE MATERIAL WILL BE SUPPLIED BY THE TURNER SECTION.


SEQUENCE OF OPERATIONS

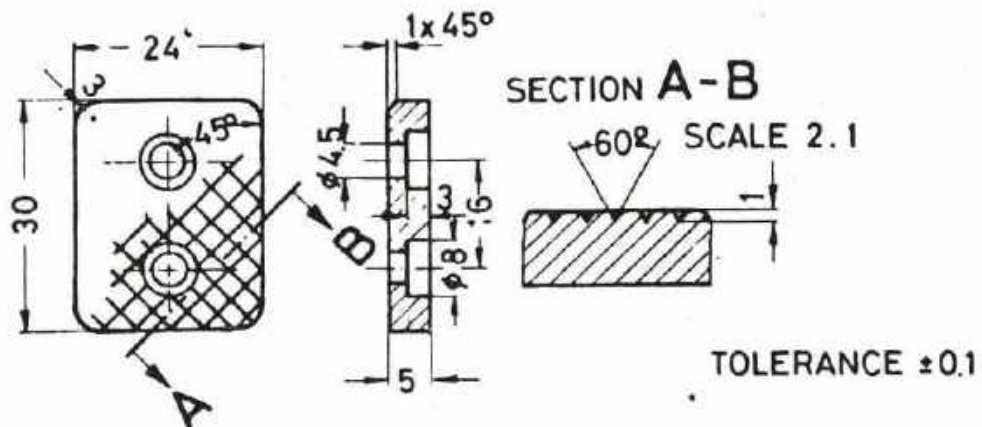
NO.	Symbol	Tools	Descriptions
1		FILES MEASURING AND CHECKED TOOLS	FILING OF SQUARING 10 MM
2		DIE M6	CUTTING OF OUTSIDE THREAD M6
3		DIE M8	CUTTING OF OUTSIDE THREAD M8

SCALE 1:1	THREAD BOLT FOR ELECTRICIAN ONLY	NO:— 1.01 / 19E
MAT. ST 37_1		BASIC / FITTING

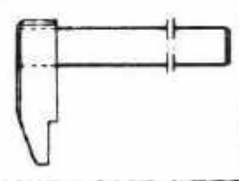
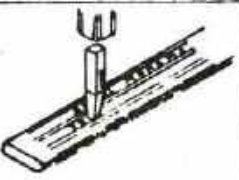

3 



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
M.A.T. ST. 37-1

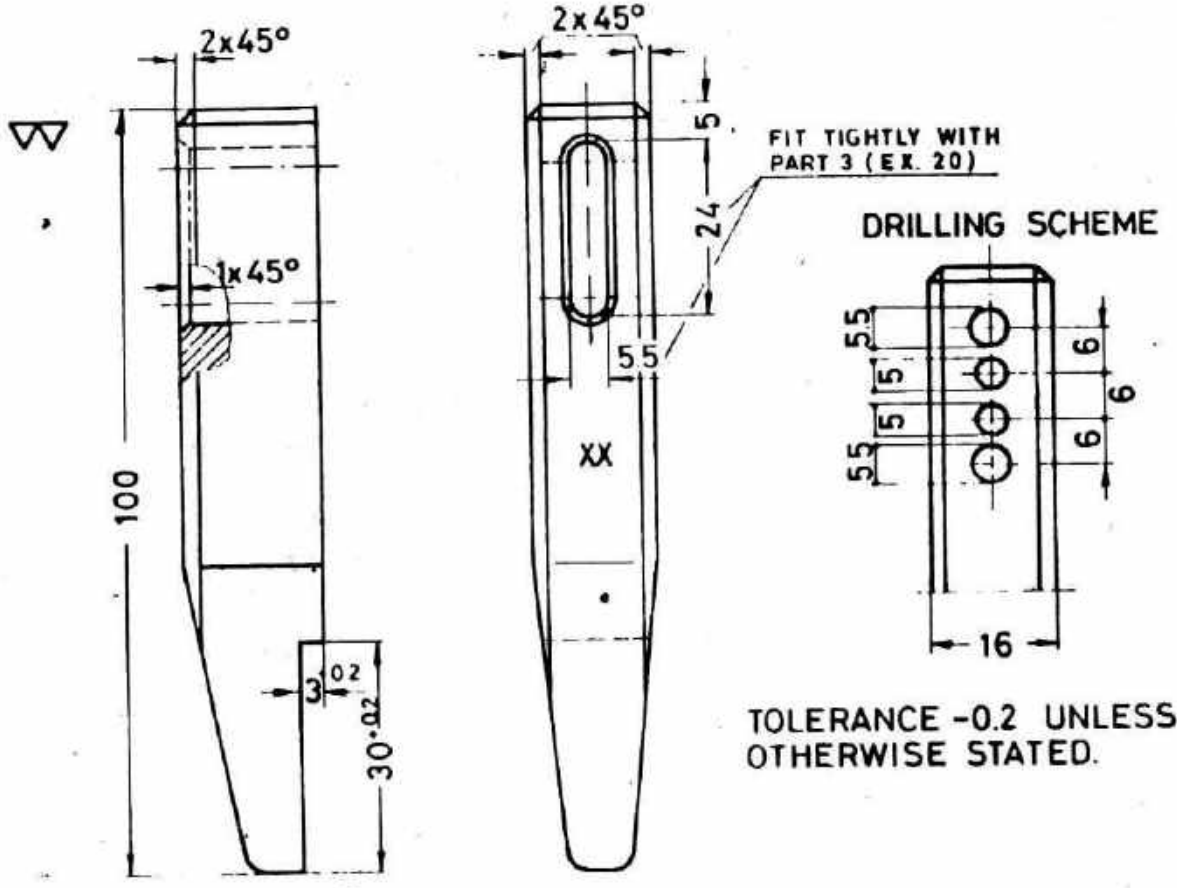
GUIDE BAR
for SCREW CLAMP

NO: - 1.0.1/20
BASIC / FITTING



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

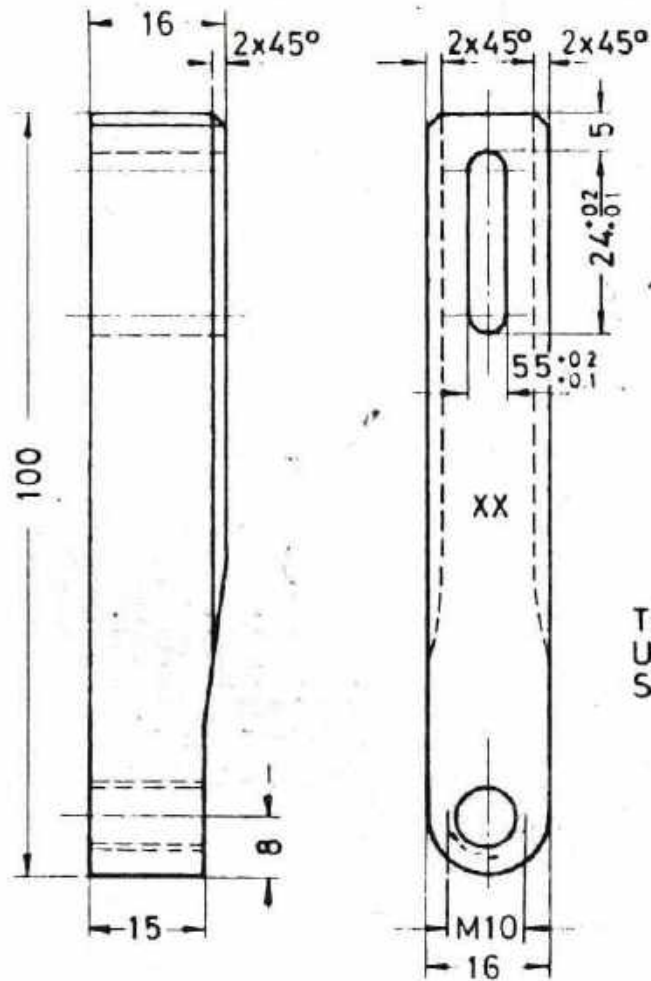

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



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	FIXED JAW for SCREW CLAMP	NO :- 1.01/21
MAT. of Ex. 11		BASIC / FITTER

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: - 101/22

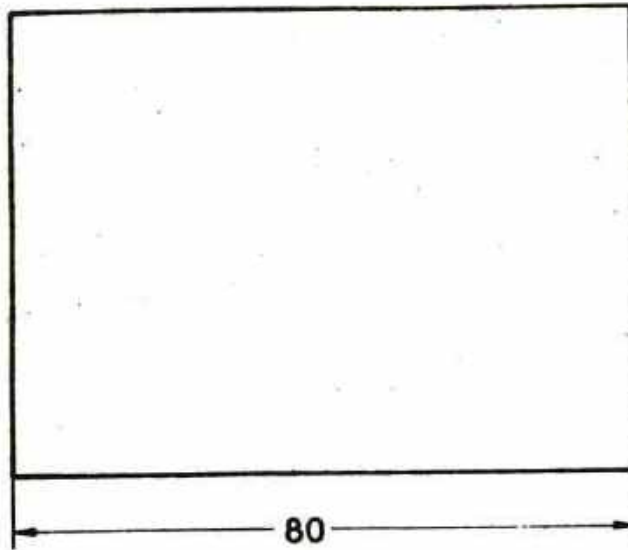
MAT. of Ex.17

BASIC/FITTING

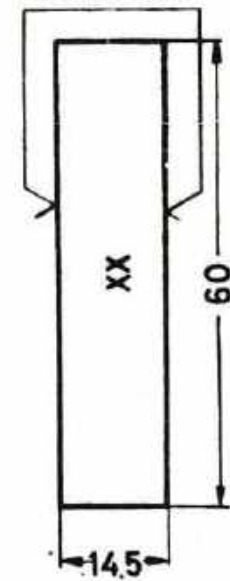


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME



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 C.I.-25
ST. 37-1

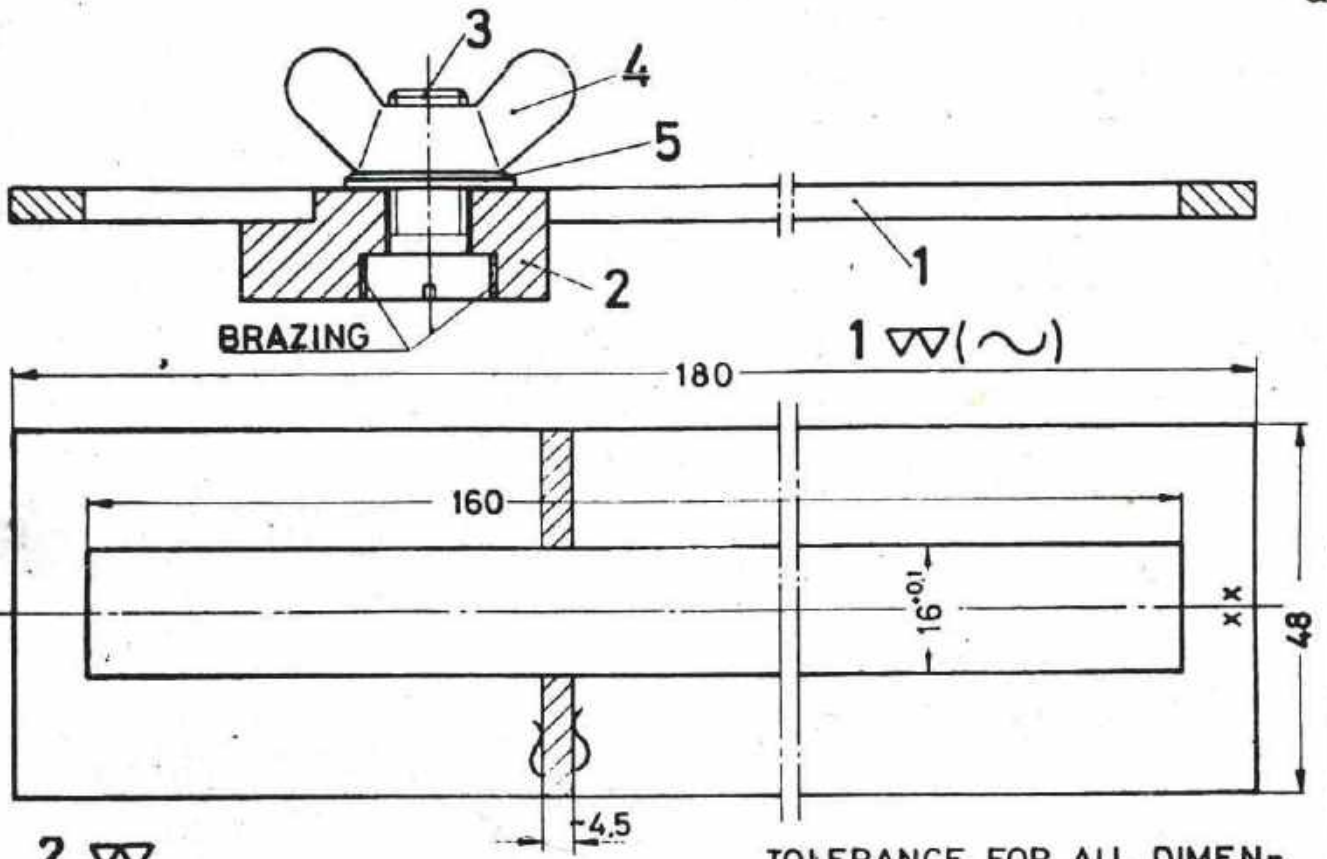
SCRAPING EXERCISE

NO:- 101/24

BASIC / FITTING

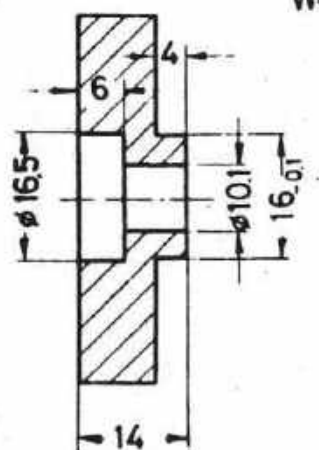
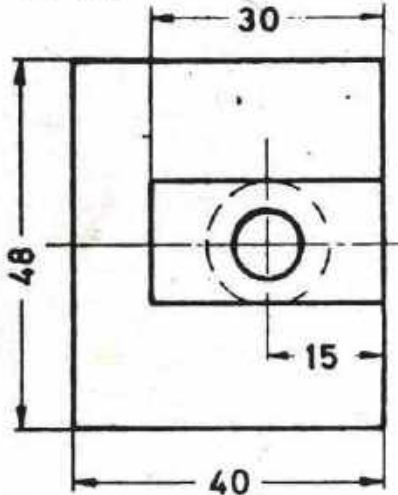
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

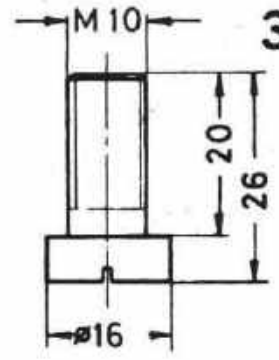


TOLERANCE FOR ALL DIMENSIONS ± 0.1 UNLESS OTHERWISE STATED.

2 ∇



3 ∇



SEQUENCE OF OPERATIONS

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

SCALE 1:1
MAT. ST. 37-1

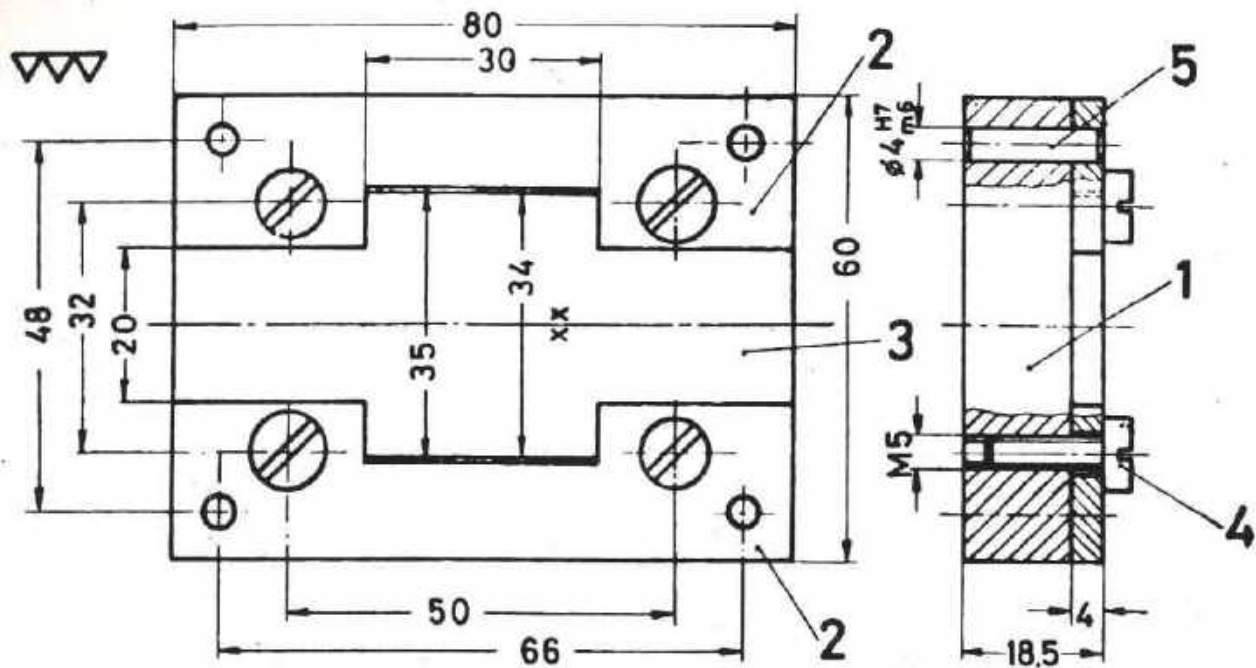
MARKING GAUGE

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, 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

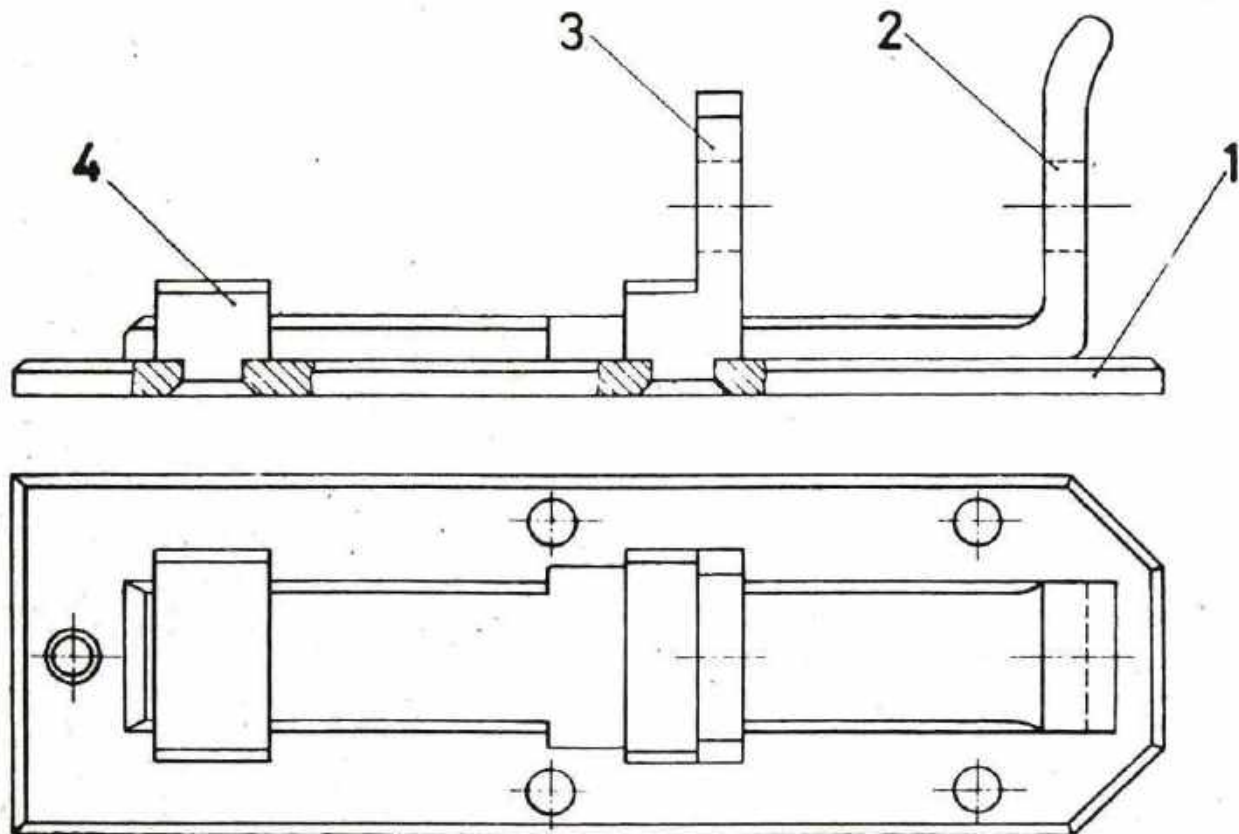
NO:- 1.01 / 26

BASIC / FITTING

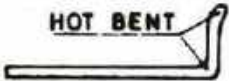
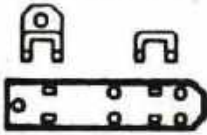



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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

SLIDING BOLT

NO :- 1.0.1 / 27

MAT.

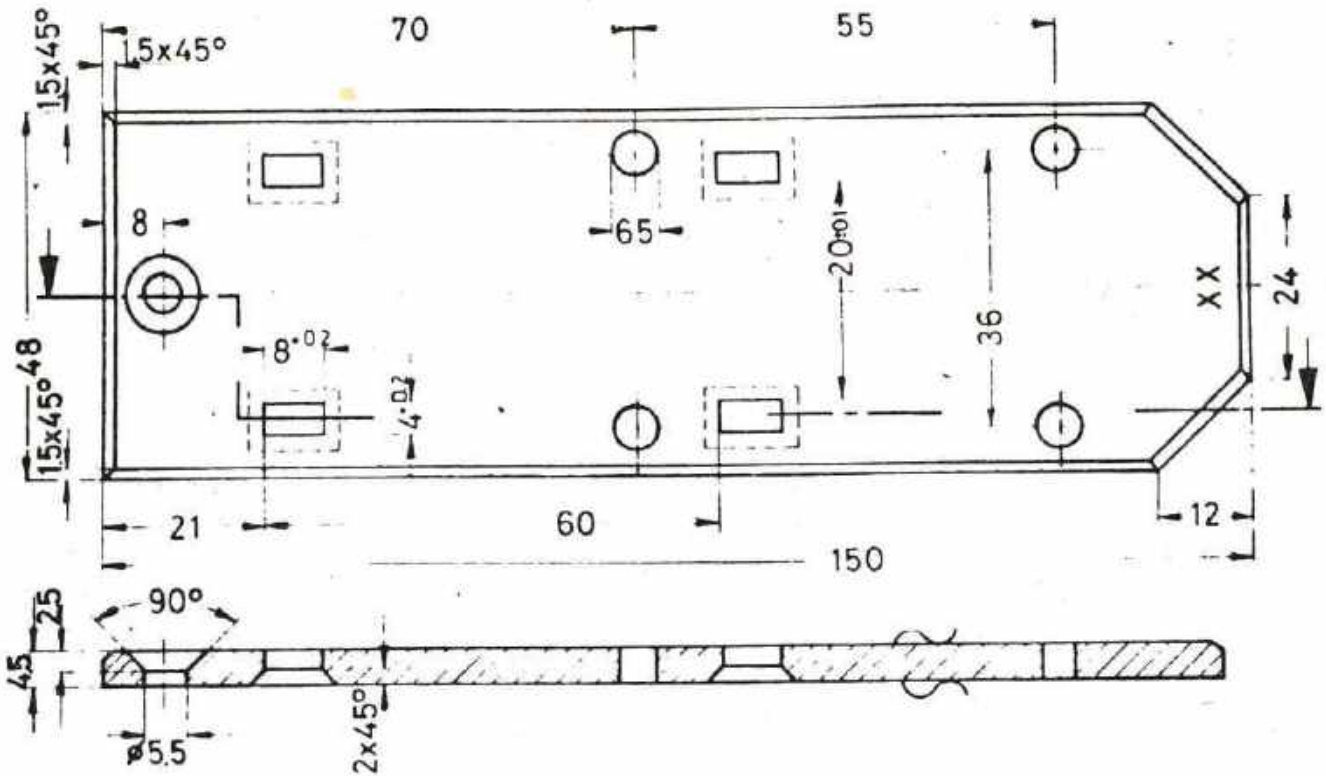
BASIC / FITTING



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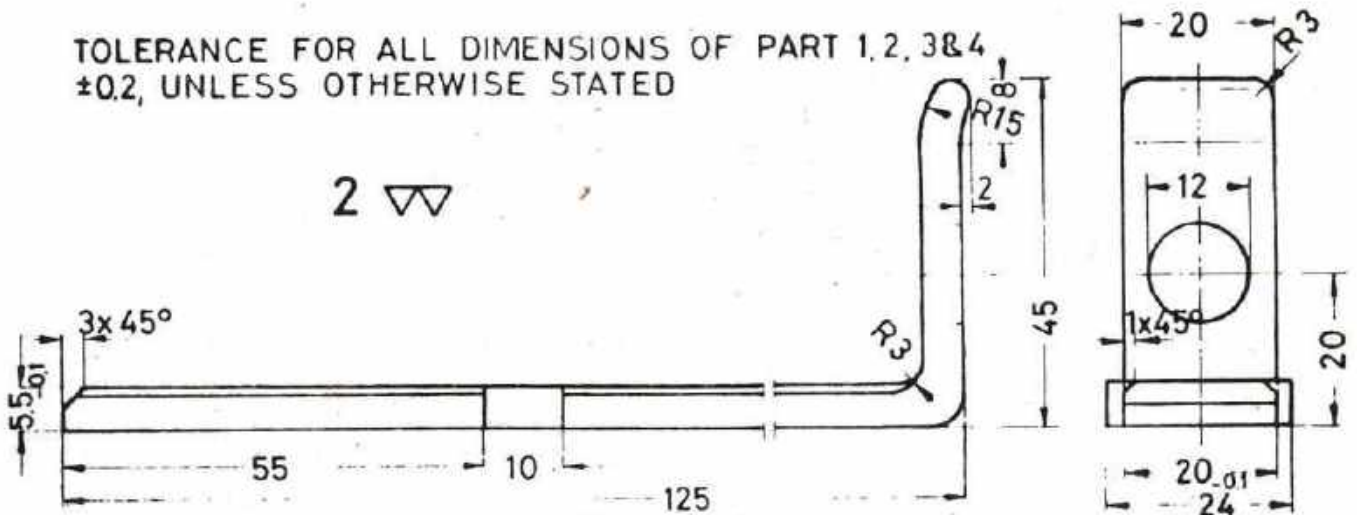
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1 W (~)

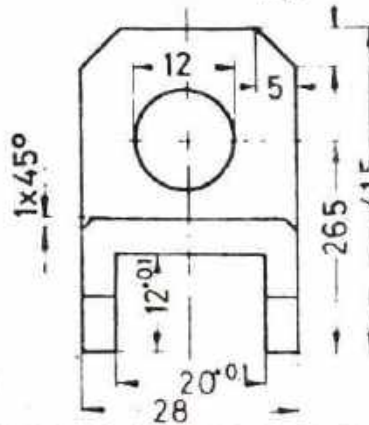
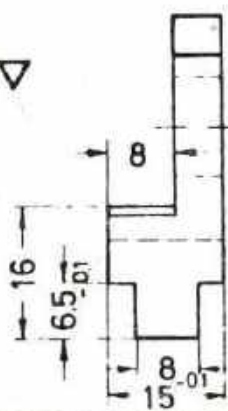


TOLERANCE FOR ALL DIMENSIONS OF PART 1, 2, 3 & 4
 ±0.2, UNLESS OTHERWISE STATED

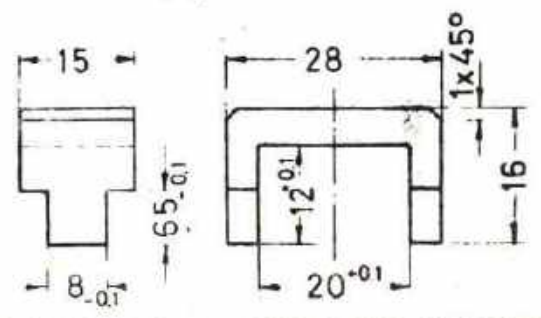
2 W



3 W



4 W



SCALE 1 : 1

MAT:

SLIDING BOLT

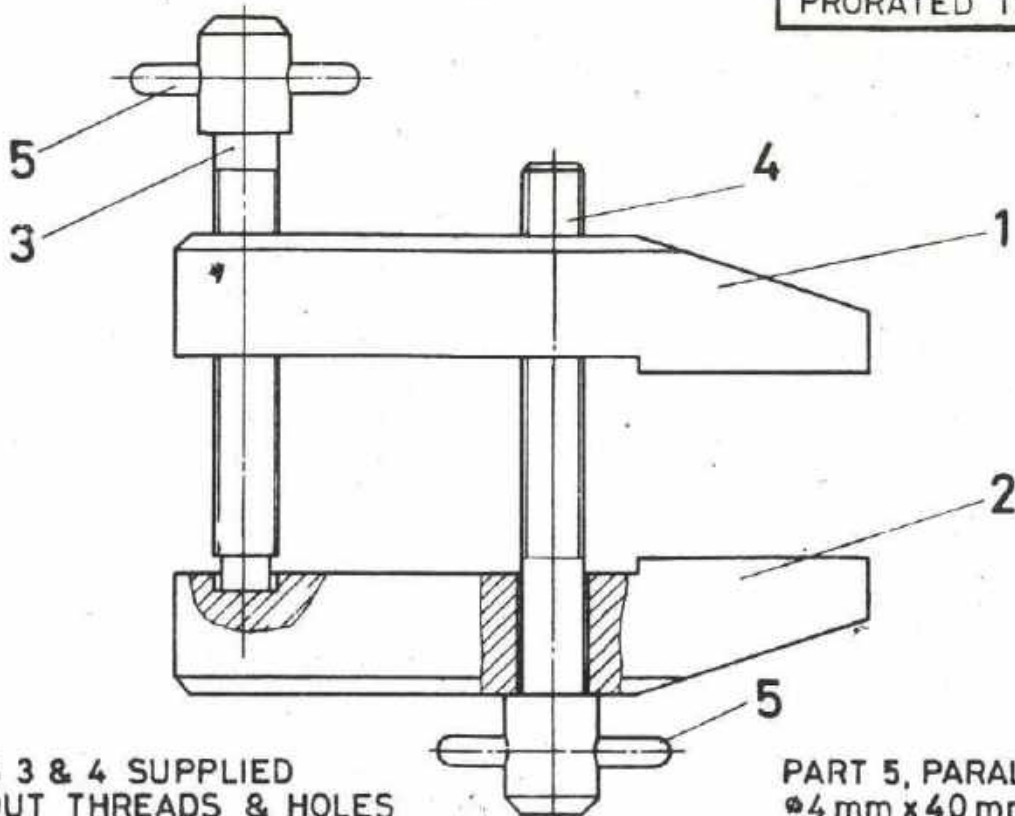
NO : - 10.1 / 27.1

BASIC / FITTING



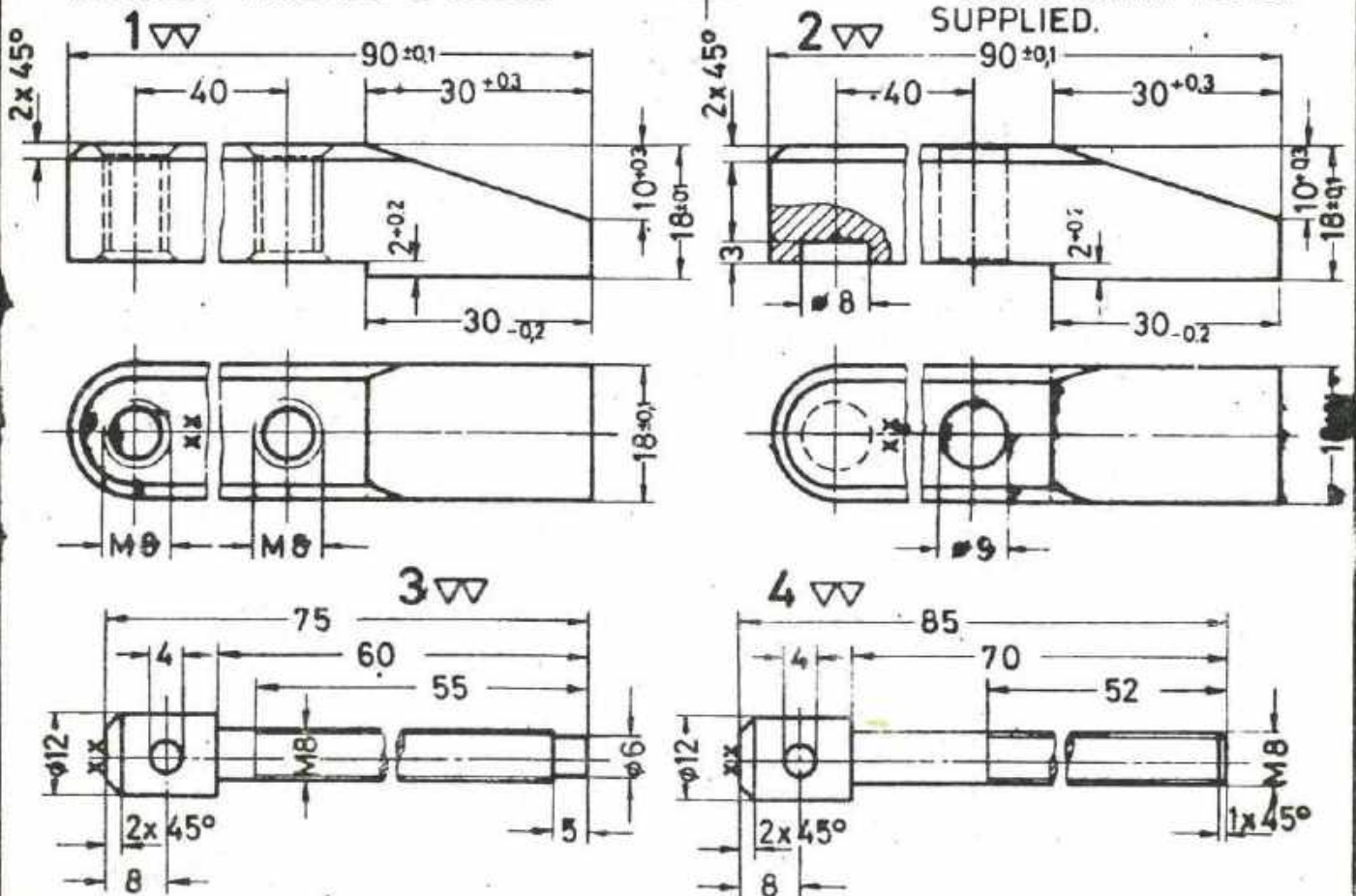
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PARTS 3 & 4 SUPPLIED WITHOUT THREADS & HOLES

PART 5, PARALLEL PIN $\phi 4$ mm x 40 mm READY SUPPLIED.



SCALE 1:1

MAT.: ST. 37-1

PARALLEL CLAMP

NO: - 1.01 / TEST

BASIC / FITTING



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MARKING SHEET for Exercise 101/TEST-FITTING

S-No	P-No	Points to be checked
1	1-5	IMPRESSION ALL-AROUND
2	1-5	FUNCTION
3	1	OUTSIDE DIMENSION 90 ±01
4	1	THICKNESS 16 ±01 (2x)
5	1	OUTSIDE DIMENSION 30 -02
6	1	DEPTH DIMENSION 2 ±02
7	1	RADIUS R9
8	2	OUTSIDE DIMENSION 90 ±01
9	2	DEPTH DIMENSION 2 ±02
10	2	THICKNESS 16 ±01 (2x)
11	2	OUTSIDE DIMENSION 30 -02
12	2	RADIUS R9
13	1	SMOOTHNESS
14	1	PROPER ANGLES
15	1	CHAMFERS
16	1	INSIDE THREADS
17	1	DEBURRING, NO -PUNCHING etc
18	2	SMOOTHNESS
19	2	PROPER ANGLES
20	2	CHAMFERS
21	2	HOLES, DEBURRING etc
22	3	OUTSIDE THREAD
23	3	SMOOTHNESS ALL-AROUND
24	4	OUTSIDE THREAD
25	4	SMOOTHNESS ALL AROUND
26		

NAME _____
R -NO _____

actual size	control I	control II	averg. marks	X MARKS
X				5
X				5
X				1
X				2
X				2
X				2
X				3
X				1
X				2
X				2
X				2
X				2
X				3
X				2
X				3
X				2
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				4
X				2
X				4
X				2

TOTAL MARKS = _____
 $\frac{\text{TOTAL MARKS} \times 09}{6.2}$ = _____
 TIME MARKS = _____
 FINAL MARKS = _____

NAME _____
R -NO _____

actual size	control I	control II	averg. marks	X MARKS
X				5
X				5
X				1
X				2
X				2
X				2
X				3
X				1
X				2
X				2
X				2
X				2
X				3
X				2
X				3
X				2
X				2
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				4
X				2
X				4
X				2

TOTAL MARKS = _____
 $\frac{\text{TOTAL MARKS} \times 09}{6.2}$ = _____
 TIME MARKS = _____
 FINAL MARKS = _____

NAME _____
R -NO _____

actual size	control I	control II	averg. marks	X MARKS
X				5
X				5
X				1
X				2
X				2
X				2
X				3
X				1
X				2
X				2
X				2
X				2
X				3
X				2
X				3
X				2
X				2
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				3
X				2
X				2
X				2
X				4
X				2
X				4
X				2

TOTAL MARKS = _____
 $\frac{\text{TOTAL MARKS} \times 09}{6.2}$ = _____
 TIME MARKS = _____
 FINAL MARKS = _____



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

CONTROLLER I _____
 CONTROLLER II _____
 DATE _____

