

TRADE TRAINING ATC PROGRAMME

TURNER

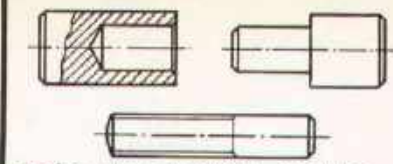
DEVELOPMENT CELL
FOR SKILLED LABOUR TRAINING
DIRECTORATE OF MANPOWER & TRAINING
GOVERNMENT OF THE PUNJAB
LAHORE



Retail Price Rs. 12.00

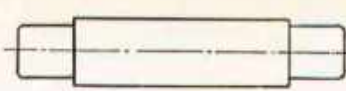
T.T.P. Series No. 16

TURNING 2.1.2/0.1-12



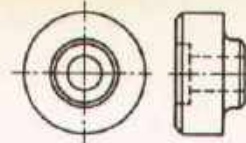
Facing, Thread-cutting, Drilling,

1



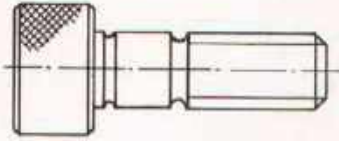
Turning between Centres

2



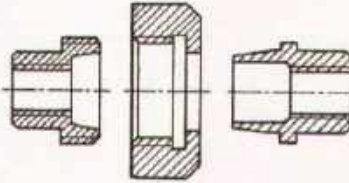
Mandrel Work, Boring

3 → 2.2.4/11



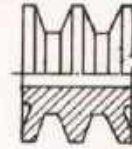
Knurling, Threading,

4



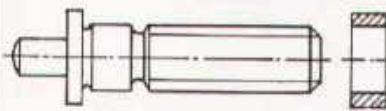
Taper Turning, Boring, Threading,

5



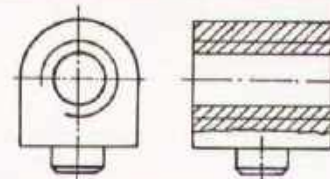
Form-Turning

6 → 2.3.5/4



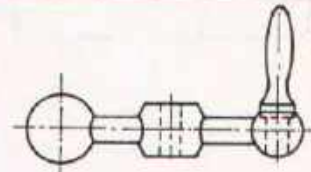
Turning to high Accuracy
Cutting of ACME-Thread

7 → 3.3.4/1



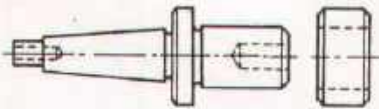
Work with Independent Chuck

8 → 3.3.4/1



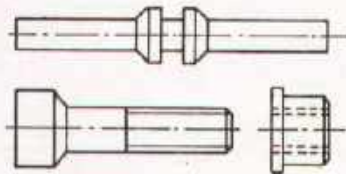
Form Turning

9



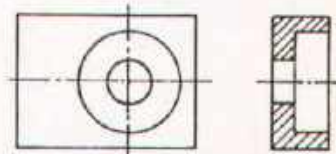
Taper - Turning

10



Thread - Turning

11 → 2.2.4/6



Face-Plate Work

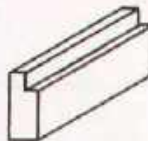
12

SHAPING 2.1.3/0.1-06



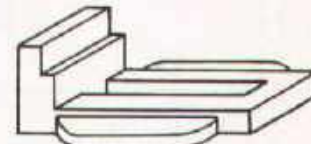
Parallel and Square Shaping

1 → 3.3.4/1



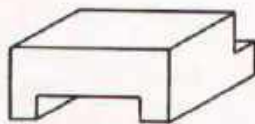
Step Shaping

2 → 3.3.4/1



Shaping Cast Iron

3 → 3.3.4/1



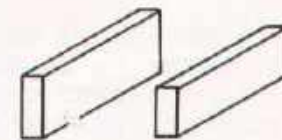
Parallel and Square Shaping

4 → 2.2.4/9



Form - Shaping

5 → 2.2.4/2



Parallel and Square Shaping

6

TRADE TRAINING

LAYOUT

No. 2.1.2

No. 2.1.3



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



MATERIAL REQUIRED

Trade Training for Turner

Turning No. 2.1.2	Exercise No. (Length given in millimeter)												Length per trainee	Total length for a batch of 16 trainees	
	1	2	3	4	5	6	7	8	9	10	11	12			
M/S Round ø 20 mm (7/8)	80													80 mm	1,4 meter
M/S Round ø 10 mm (3/8)	45													45 mm	0,8 meter
M/S Round 25 mm (1)	165	115						190						470 mm	7,8 meter
M/S Round 30 mm (1 1/4)					32		160							192 mm	3,2 meter
M/S Round 35 mm (1 1/2)					30						145			175 mm	2,9 meter
M/S Round 40 mm (1 5/8)				85										85 mm	1,5 meter
M/S Round 50 mm (2)					23									23 mm	0,5 meter
M/S Round 85 mm (3 1/4)			30						40					70 mm	1,3 meter
Low Carbon steel Round 35 mm (1 1/4)													130	130 mm	2,2 meter
Low Carbon steel Round 45 mm (1 3/4)													33	33 mm	0,6 meter
Carbon steel Round 15 mm (5/8)											110			110 mm	1,9 meter
Bronze according pattern															
Cast iron 90 x 32 (3 5/8 x 1 1/4) according pattern														110 mm	1,9 meter

X

MATERIAL REQUIRED

Trade Training for Turner

Exercise No. (Length given in millimeter)

Shaping No. 2.1.3	1	2	3	4	5	6	Length per trainee	Total length for a batch of 16 trainees
M/S Flat $2 \times \frac{3}{8}$ 50 x 10	40						40 mm	0,7 meter
M/S Flat 45 x 25 mm ($1\frac{3}{4} \times 1$)				125			125 mm	2,1 meter
M/S Flat 35 x 10 mm ($1\frac{1}{2} \times \frac{3}{8}$)					115		115 mm	2,0 meter
Carbon steel Flat 20 x 10 mm ($1 \times \frac{3}{8}$)		180					180 mm	3,0 meter
Cast iron according pattern			×					
			×					



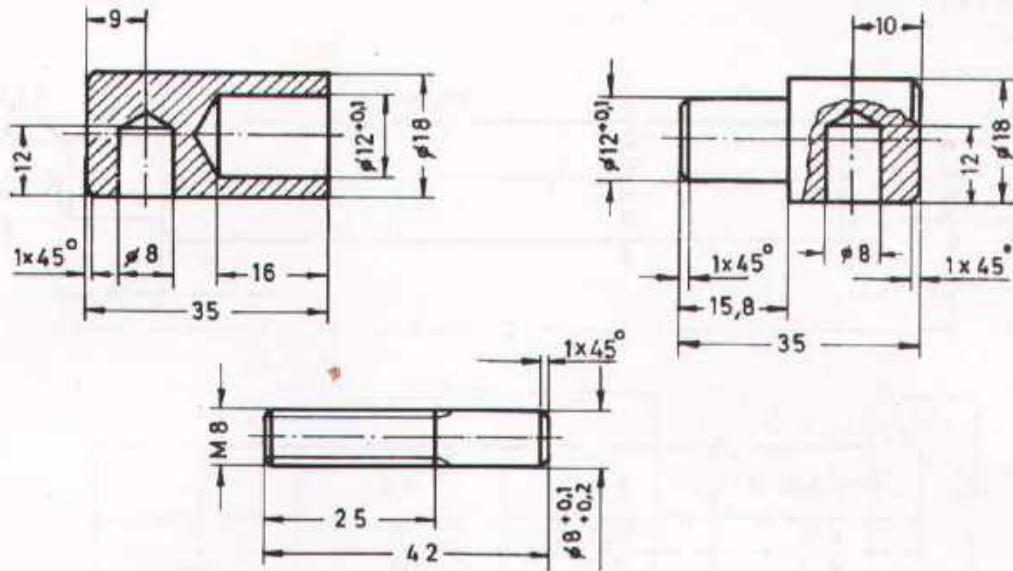
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		3-JAW CHUCK RIGHT HAND FACING TOOL CENTRE DRILL TWIST DRILL $\phi 12$	LONGITUDINAL TURNING FACING CENTERING DRILLING
2		RIGHT HAND FACING TOOL PARTING TOOL RIGHT HAND ROUGHING TOOL	STEP TURNING PARTING CHAMFERING
3		MARKING AND PUNCHING TOOLS TWIST DRILL $\phi 8$ DIE M8 FOR THREADED PIN	MARKING DRILLING ON THE DRILLING MACHINE THREAD CUTTING WITH DIE

SCALE 1:1

MAT.: MILD STEEL

HINGE

No. 2.1.2/1

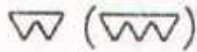
TURNING II



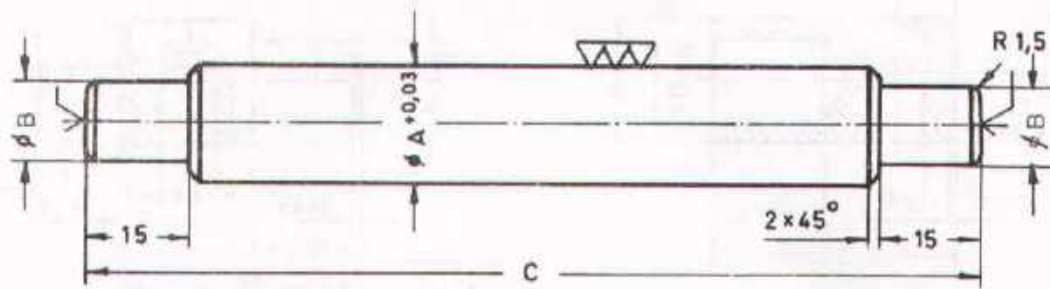
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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Tolerance $\pm 0,1$
unless otherwise stated



Nominal ϕ	ϕA	ϕB	C
$\phi 10$	10,3	8	95
$\phi 12$	12,3	10	115
$\phi 14$	14,3	10	115
$\phi 16$	16,3	12	130
$\phi 18$	18,3	12	130
$\phi 20$	20,3	14	160
$\phi 22$	22,3	14	160

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		3-JAW CHUCK CENTRE DRILL RIGHT HAND FACING TOOL	FACING CENTERING
2		DRIVE PLATE CENTRE POINTS LATHE DOG R. HAND ROUGHING TOOL ROUND NOSE SMOOTHING TOOL	LONGITUDINAL TURNING BETWEEN CENTRES TO MICROMETER SIZE
3		MICROMETER RADIUS FORM TOOL	RADIUS TURNING

SCALE 1:1

MAT.: LOW CARBON
STEEL

MANDREL

No. 2.1.2./2

TURNING II



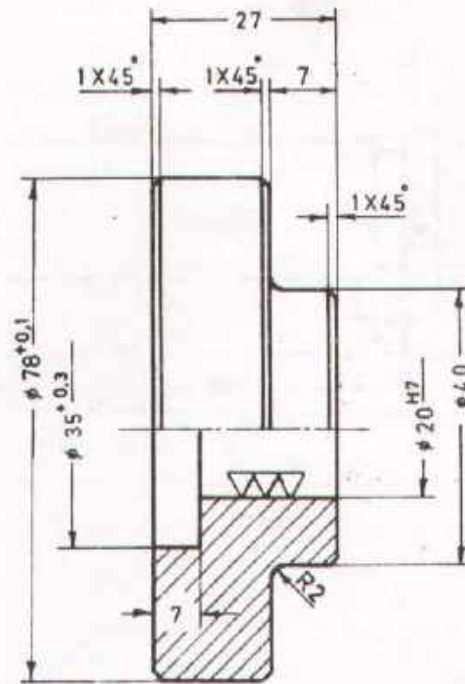
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

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Tolerance +0,1
unless otherwise stated.



SEQUENCE OF OPERATIONS

20 H7	+ 0,021 0
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No.	Symbol	Tools	Descriptions
1		4-JAW INDEPENDENT CHUCK RIGHT HAND FACING T. GROUND BORING TOOL DRILL $\phi 19,5$, REAMER 20^{H7} PLUG GAUGE 20^{H7}	FACING CENTERING, DRILLING REAMING, RECESSING
2		RIGHT HAND FACING TOOL	RECHUCKING TURNING $\phi 40$ TO A ROUGH SIZE OF 42 MM
3		MANDREL $\phi 20$ MM RIGHT HAND FACING TOOL RIGHT HAND ROUGHING TOOL	FITTING OF THE WORK- PIECE ON A MANDREL SETTING THE MANDREL BETWEEN CENTRES SMOOTH TURNING

SCALE 1:1

MAT.: CASE HARDEN-
ING STEEL

GEAR BLANK

No. 2.1.2 / 03

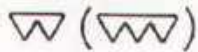
TURNING II



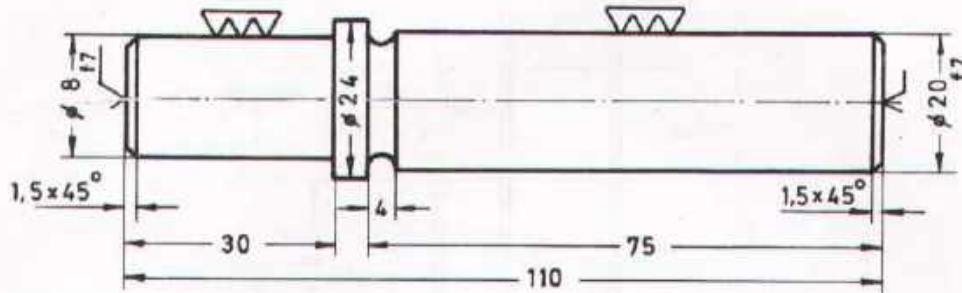
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

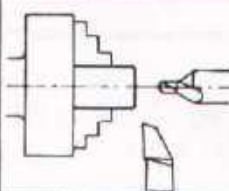
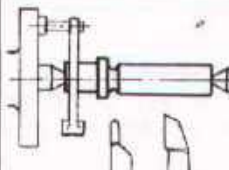


Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

18 - 20_{f7} - 0,020
- 0,041

No.	Symbol	Tools	Descriptions
1		3-JAW CHUCK RIGHT HAND FACING TOOL CENTRE DRILL	FACING CENTERING
2		RIGHT HAND ROUGHING AND FACING TOOL RADIUS FORM TOOL MICROMETER	LONGITUDINAL TURNING BETWEEN CENTRES TO MICROMETER SIZE (ISO- FITS) NECKING, CHAMPERING

SCALE 1:1

MAT.: MILD STEEL

SHAFT

No. 2.1.2 / 03a

TURNING II



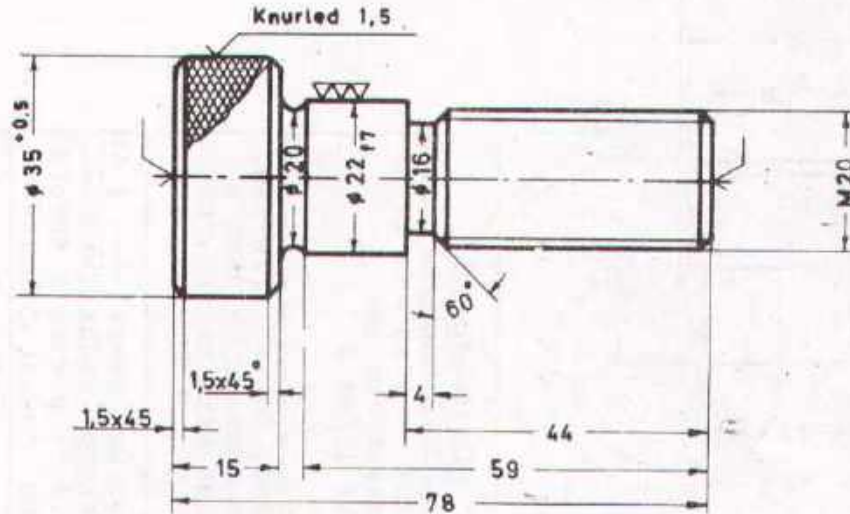
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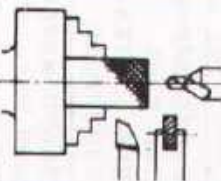
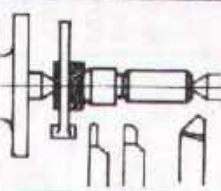
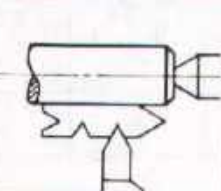
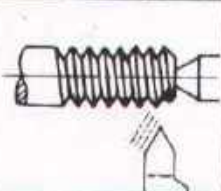


Tolerance $\pm 0,1$
unless otherwise stated



22_{f7} -0,020
-0,041

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		3-JAW CHUCK RIGHT HAND FACING TOOL CENTRE DRILL KNURLING TOOL	FACING AND LONGITUDINAL TURNING CENTERING KNURLING
2		RIGHT HAND ROUGHING AND FACING TOOL NECKING FORM TOOLS MICROMETER	LONGITUDINAL TURNING TO MICROMETER SIZE NECKING CHAMFERING
3		THREAD CUTTING TOOL CENTRE GAUGE 60°	SETTING OF THE MACHINE FOR THREAD CUTTING SETTING OF THREAD TOOL
4		THREAD RING GAUGE M20	CHECKING OF THE PITCH CUTTING OF V-THREAD CHECKING WITH THREAD RING GAUGE

SCALE 1:1

MAT.: MILD STEEL

KNURLED BOLT

No. 2.1.2 / 04

TURNING II

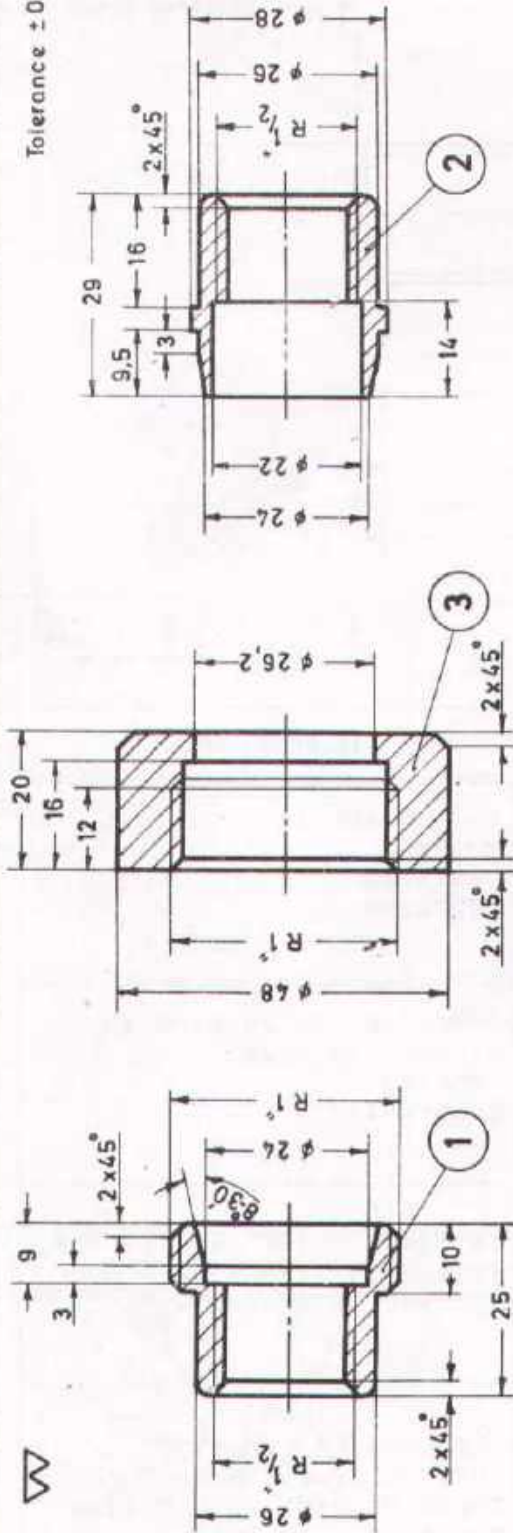


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

Tolerance $\pm 0,1$



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		R. HAND FACING TOOL TWIST DRILL, BORING & INTERN. THREAD CUTTING TOOL, THREAD PLUG GAUGE	DRILLING, BORING AND INTER- NAL THREAD CUTTING OF PART 1 AND 2
2		R. HAND FACING TOOL TWIST DRILL, BORING & INTERN. THREAD CUTTING TOOL	DRILLING, BORING & INTERN. THREAD CUTTING OF PART 3 CHECKING WITH THREAD PLUG GAUGE
3		THREADED MANDREL BORING TOOL EXTERN. THREAD CUTTING TOOL	HOLDING WORKPIECES 1 & 2 ON A THREADED MANDREL (WATER- PIPE 1/2"). BORING & EXTERN. TURNING. THREAD CUTTING
4		THREADED MANDREL R. HAND FACING TOOL RIGHT HAND ROUGHING TOOL	HOLDING WORKPIECE NO. 3 ON A THREADED MANDREL (WATER- PIPE 1") EXTERNAL TURNING

SCALE 1:1

MAT.: MILD STEEL

UNION NUT

No. 2.1.2 / 05

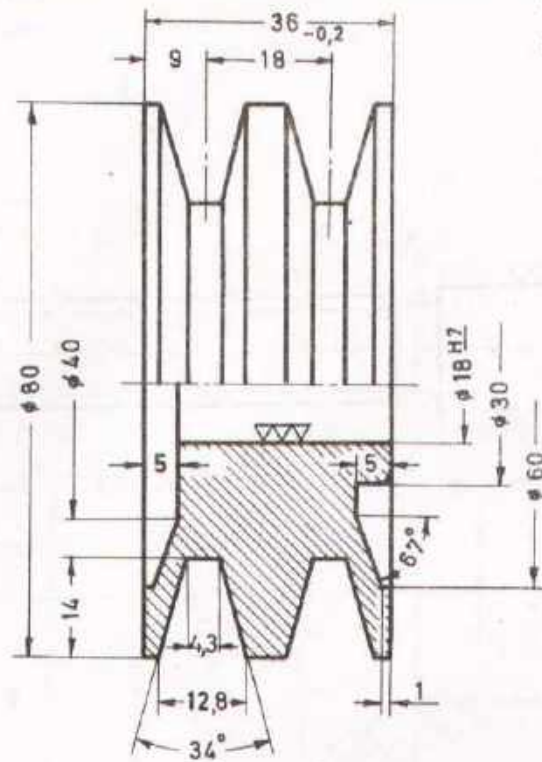
TURNING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

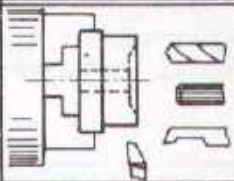
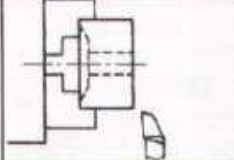
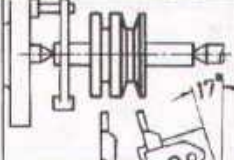
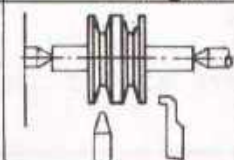
TURNER



Tolerance $\pm 0,1$
unless otherwise stated

$18^{H7} \begin{matrix} +0,018 \\ 0 \end{matrix}$

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		RIGHT H. FACING TOOL TWIST DRILL $\phi 17,8$ REAMER 18^{H7} GROUND BORING TOOL PLUG GAUGE	FACING, LONGITUDINAL ROUGH TURNING DRILLING AND REAMING RECESSING, HOLE CHECKING WITH PLUG GAUGE
2		RIGHT HAND FACING TOOL	FACING TO THE LENGTH OF 36 MM
3		MANDREL $\phi 18$ PARTING TOOL	HOLDING THE WORKPIECE ON A MANDREL BETWEEN CENTRES ROUGH TURNING OF V-GROOVES
4		FORM TOOL FOR V-BELT GROOVES INTERNAL RECESSING TOOL	FINISHING OF V-GROOVES AND $\phi 80$ RECESSING

SCALE 1:1

MAT: MILD STEEL

PULLEY

No. 2.1.2 / 06

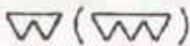
TURNING II



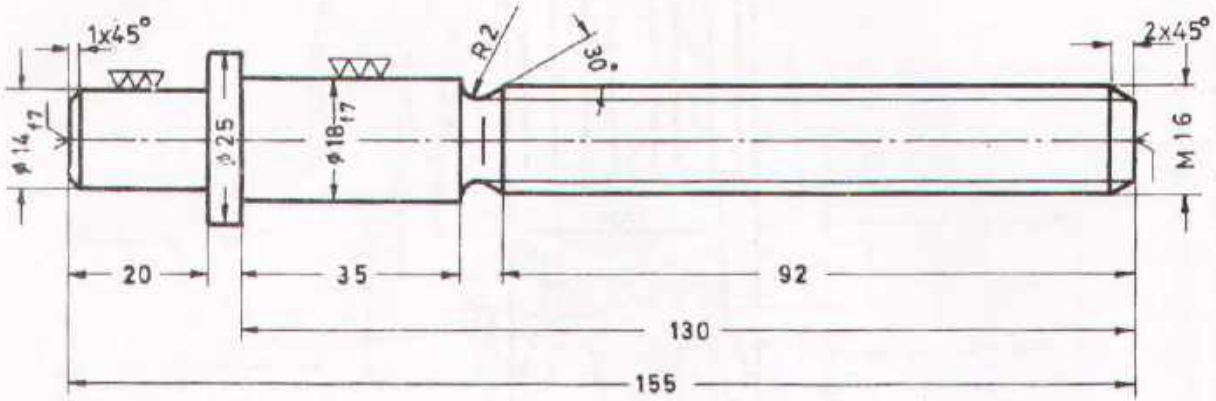
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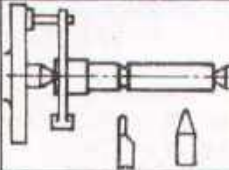
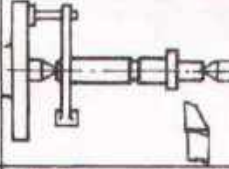
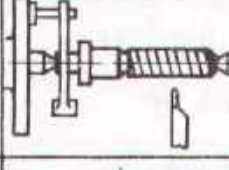
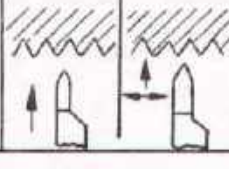
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unless otherwise stated



14 _{f7}	-0,016
18 _{f7}	-0,034

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		RIGHT H. FACING TOOL CENTRE DRILL ROUND NOSE SMOOTHING TOOL. NECKING TOOL MICROMETER	FACING, CENTERING LONGITUDINAL TURNING BETWEEN CENTRES TO MICROMETER SIZE. NECKING
2		RIGHT HAND ROUGHING TOOL RIGHT HAND FACING TOOL	STEP TURNING TO MICROMETER SIZE CHAMFERING
3		PARTING TOOL	SETTING THE LATHE TO REQUIRED PITCH VEE THREAD CUTTING
4		CENTER GAUGE FOR VEE THREAD TOOLS. VEE THREAD TOOL THREAD RING GAUGE M16	VEE THREAD FINISHING CHECKING WITH RING GAUGE

SCALE 1:1

MAT. : MILD STEEL

SPINDLE

(For machine vice)

No. 2.1.2 / 07

TURNING II



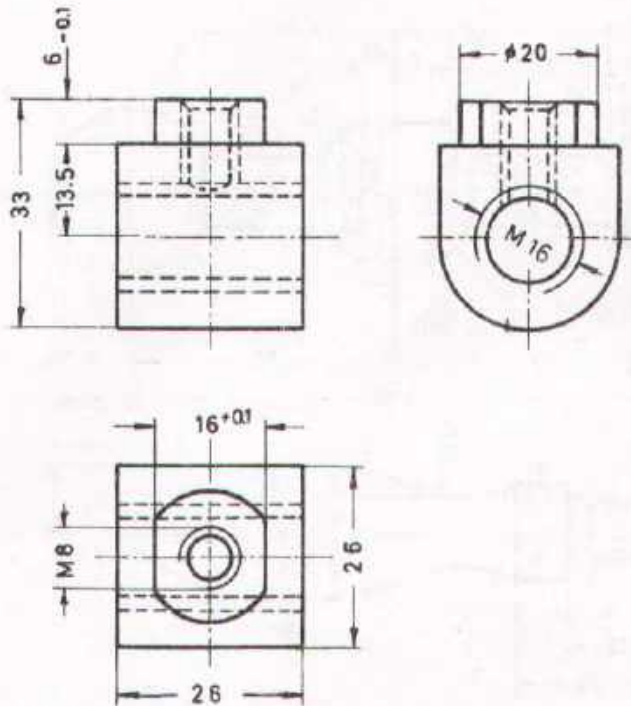
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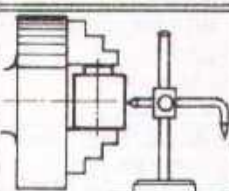
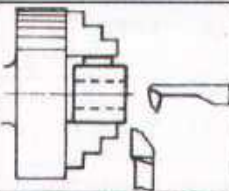
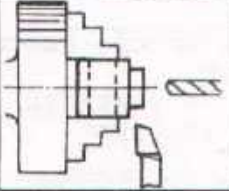
TURNER

5 

Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		4-JAW INDEPENDENT CHUCK MARKING TOOLS SURFACE GAUGE	CLAMPING OF A CAST WORK-PIECE IN THE INDEPENDENT CHUCK
2		RIGHT H. FACING TOOL CENTRE DRILL TWIST DRELL $\phi 11$ BORING TOOL INTERN. VEE THREAD CUTTING TOOL	FACING, DRILLING AND BORING. INTERNAL THREAD CUTTING OF VEE THREAD
3		RIGHT HAND FACING TOOL TWIST DRILL $\phi 6,4$ COUNTER SINK TAPS M8	RECHUCKING STEP TURNING DRILLING THREAD CUTTING BY TAPS

SCALE 1:1

NUT

No. 2.1.2 / 08

MAT.: BRONZE

(For machine vice)

TURNING II



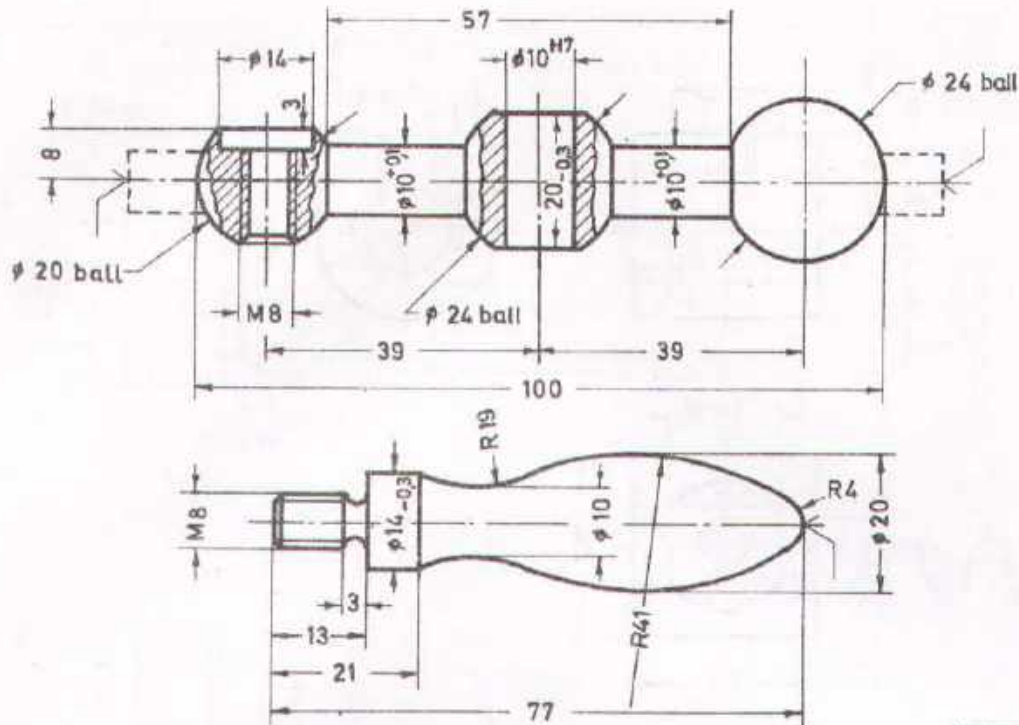
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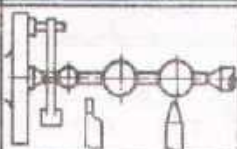

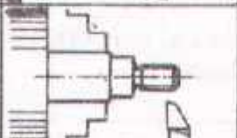
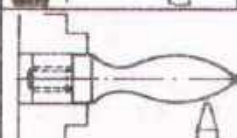


Tolerance : 0,1
unless otherwise stated



SEQUENCE OF OPERATIONS

10^{H7} $\begin{matrix} +0,015 \\ 0 \end{matrix}$

No.	Symbol	Tools	Descriptions
1		RIGHT H. FACING TOOL CENTRE DRILL, PARTING TOOL, ROUND NOSE TOOL, OFF-HAND FORMING TOOL, PROFILE GAUGE	FACING CENTERING HOLDING THE WORKPIECE BETWEEN CENTRES FORM TURNING
2		RIGHT HAND FACING TOOL RADIUS GAUGES	REMOVING THE CENTRES BY CLAMPING THE WORKPIECE IN THE CHUCK USING A PAIR OF AUXILIARY CUPS (SKETCH)
3		RIGHT HAND FACING TOOL NECKING TOOL DIE M8	TURNING OF STEPS AND DIA- METER FOR THREADING NECKING THREAD CUTTING WITH DIE
4		CENTRE DRILL ROUND NOSE TOOL OFF-HAND FORMING TOOL PROFILE GAUGE	FORM TURNING ACCORDING TO PROFILE GAUGE FOR CLAMPING A THREADED BUSH HAS TO BE USED

SCALE 1:1

MAT.: MILD STEEL

HANDLE

No. 2.1.2 / 09

TURNING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

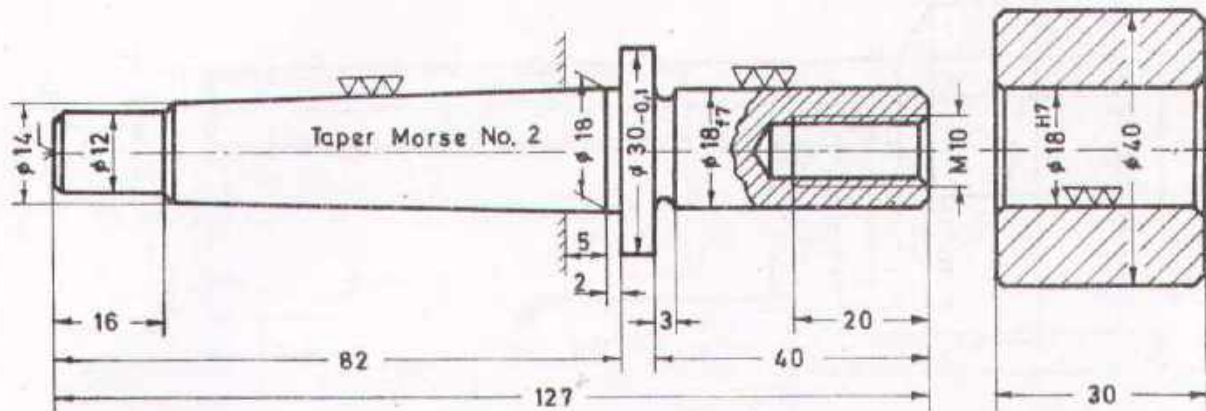
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

W (W)

Tolerance $\pm 0,1$
unless otherwise stated

All chamfers $1 \times 45^\circ$



18_{+7}	-0,016 -0,034
18^{H7}	+0,038 0

SEQUENCE OF OPERATIONS

No	Symbol	Tools	Descriptions
1		RIGHT HAND FACING TOOL CENTRE DRILL RIGHT HAND ROUGHING TOOL ROUND NOSE TOOL	FACING, CENTERING, SETTING OF LATHE CENTRE LONGITUDINAL TURNING SETTING OF THE COMPOUND REST AT THE REQUIRED ANGLE TAPER TURNING
2		TAPER RING GAUGE MORSE 2	CHECKING OF THE TAPER WITH TAPER RING GAUGE
3		RIGHT H. FACING TOOL NECKING TOOL DRILL $\phi 8,2$ COUNTERSINK TAPS M 8 MICROMETER	HOLDING THE WORKPIECE IN THE HEADSTOCK SPINDLE BY USING A TAPER SLEEVE LONGITUDINAL TURNING, NECKING, DRILLING, INTERN. THREAD CUTTING

SCALE 1:1

MAT: L.C. STEEL

ARBOR AND BUSH

No. 2.1.2 / 10

TURNING II



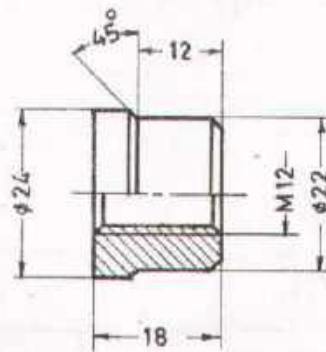
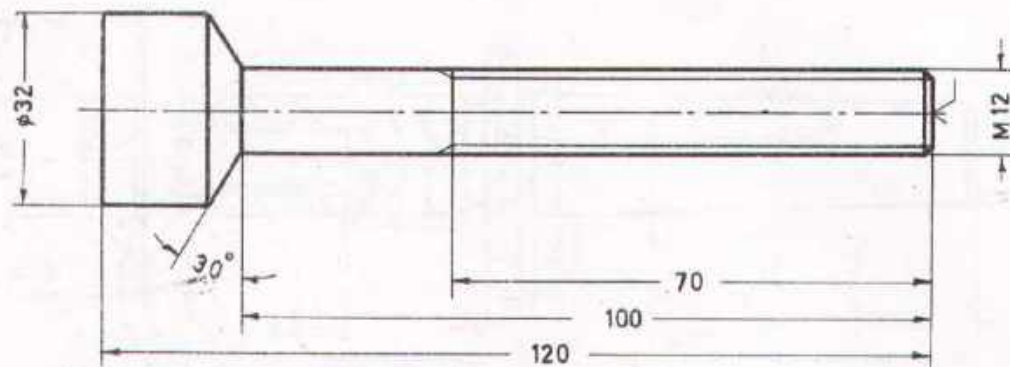
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

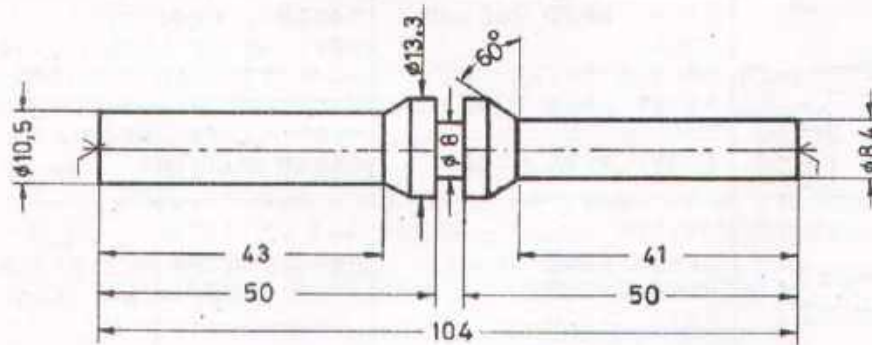
TURNER



Tolerance $\pm 0,1$
unless otherwise stated



MAT.: MILD STEEL



MAT.: HIGH CARBON STEEL

SCALE 1:1

BOLT AND PUNCH

No. 2.1.2 / 11

TURNING II



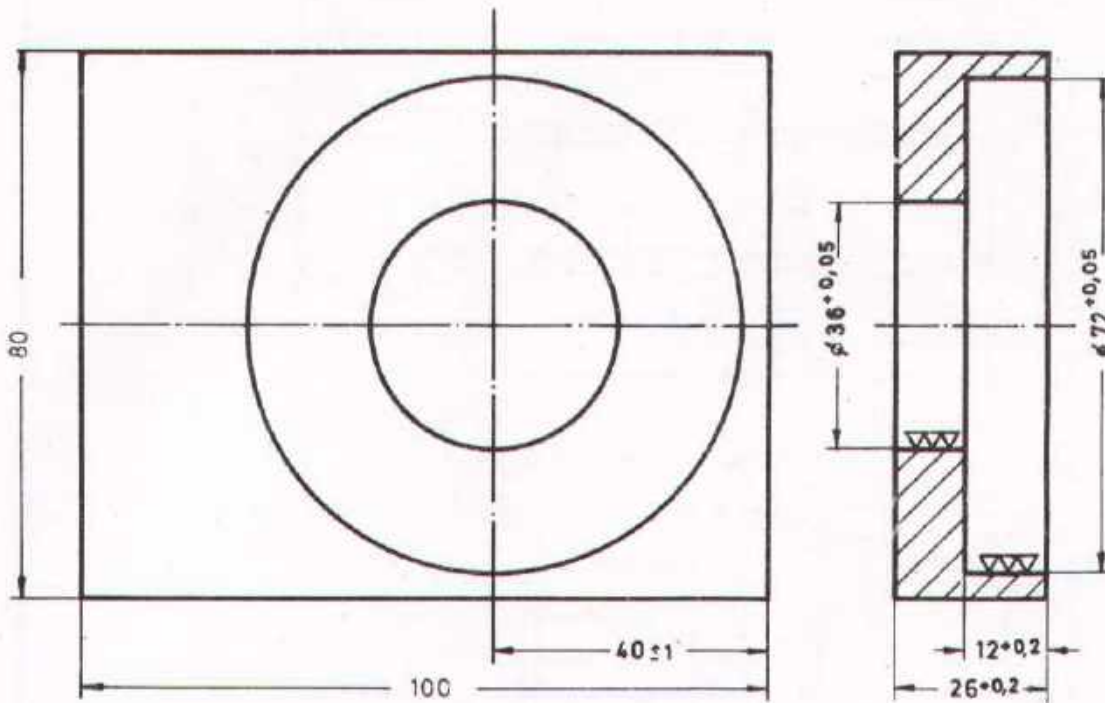
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

W (W)

Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		4-JAW INDEPENDENT CHUCK SURFACE GAUGE INSIDE CALIPER	CLAMPING OF A RECTANGULAR PLATE AND TRUING UP
2		RIGHT HAND ROUGHING AND FACING TOOL CENTRE DRILL, TWIST DRILL, BORING TOOL INTERNAL MICROMETER	FACING, CENTERING, DRILLING, BORING INTERNAL MEASURING WITH MICROMETER
3		RIGHT HAND ROUGHING AND FACING TOOL (CARBIDE-TIPPED)	RECLAMPING OF THE WORKPIECE, TRUING UP FACING

SCALE 1:1

MAT: CAST IRON

ECCENTRIC BORING PLATE

form Mach: / Shap. II

No. 2.1.2 / 12

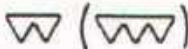
TURNING II



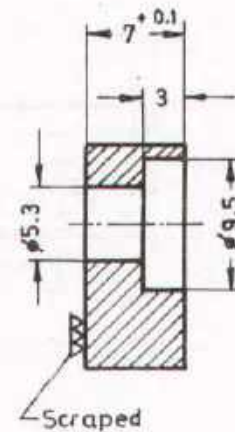
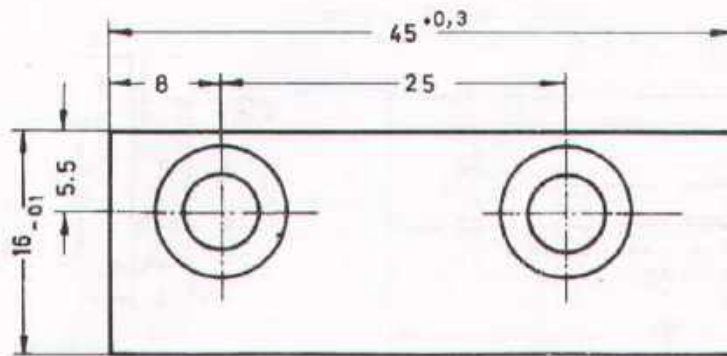
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER


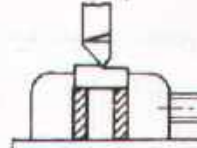
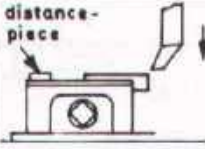
8 

Tolerance ± 0.1
unless otherwise stated



2 Pieces (one reverse view)

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		STRAIGHT LEFT HAND CUTTING TOOL PARALLEL VERNIER CALIPER	SQUARE AND PARALLEL SHAPING TO SIZE 16 MM
2		STRAIGHT LEFT HAND CUTTING TOOL PARALLEL	SQUARE AND PARALLEL SHAPING OF THICKNESS 7 MM
3		SIDE CUTTING TOOL PARALLELS TRY SQUARE	SHAPING IN VERTICAL DIRECTION USING A DISTANCE PIECE FOR PROPER CLAMPING
4		AFTER EACH OPERATION DEBURR THE WORKPIECE BY USING A SMOOTH FLAT FILE. NUMBER PUNCHING.	

SCALE 2:1

MAT.: MILD STEEL

GUIDE PLATE

(For machine vice)

No. 2.1.3 / 01

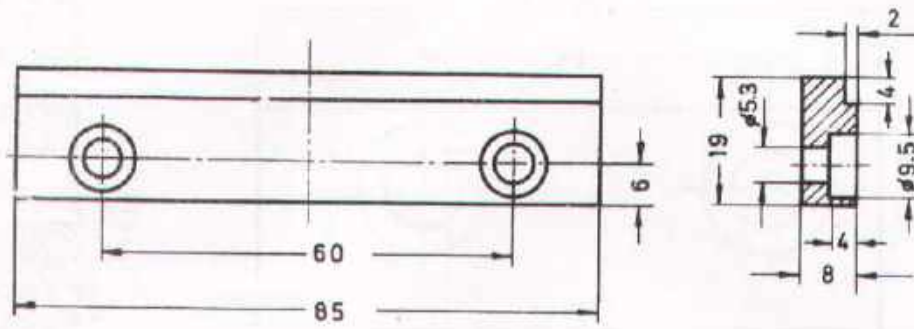
SHAPING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

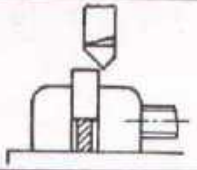
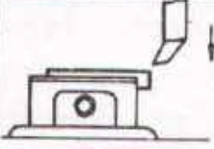
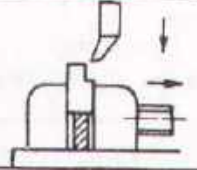
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



2 Pieces

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		STRAIGHT LEFT HAND CUTTING TOOL PARALLEL	SQUARE AND PARALLEL SHAPING TO SIZE 19 x 8 MM
2		SIDE CUTTING TOOL PARALLEL	SHAPING IN VERTICAL DIRECTION LENGTH OF 85 MM
3		SIDE CUTTING TOOL PARALLEL DEPTH GAUGE	STEP SHAPING

SCALE 1:1

MAT: CARBON ST.

JAW INSERT

(For machine vice)

No. 2.1.3 / 02

SHAPING II

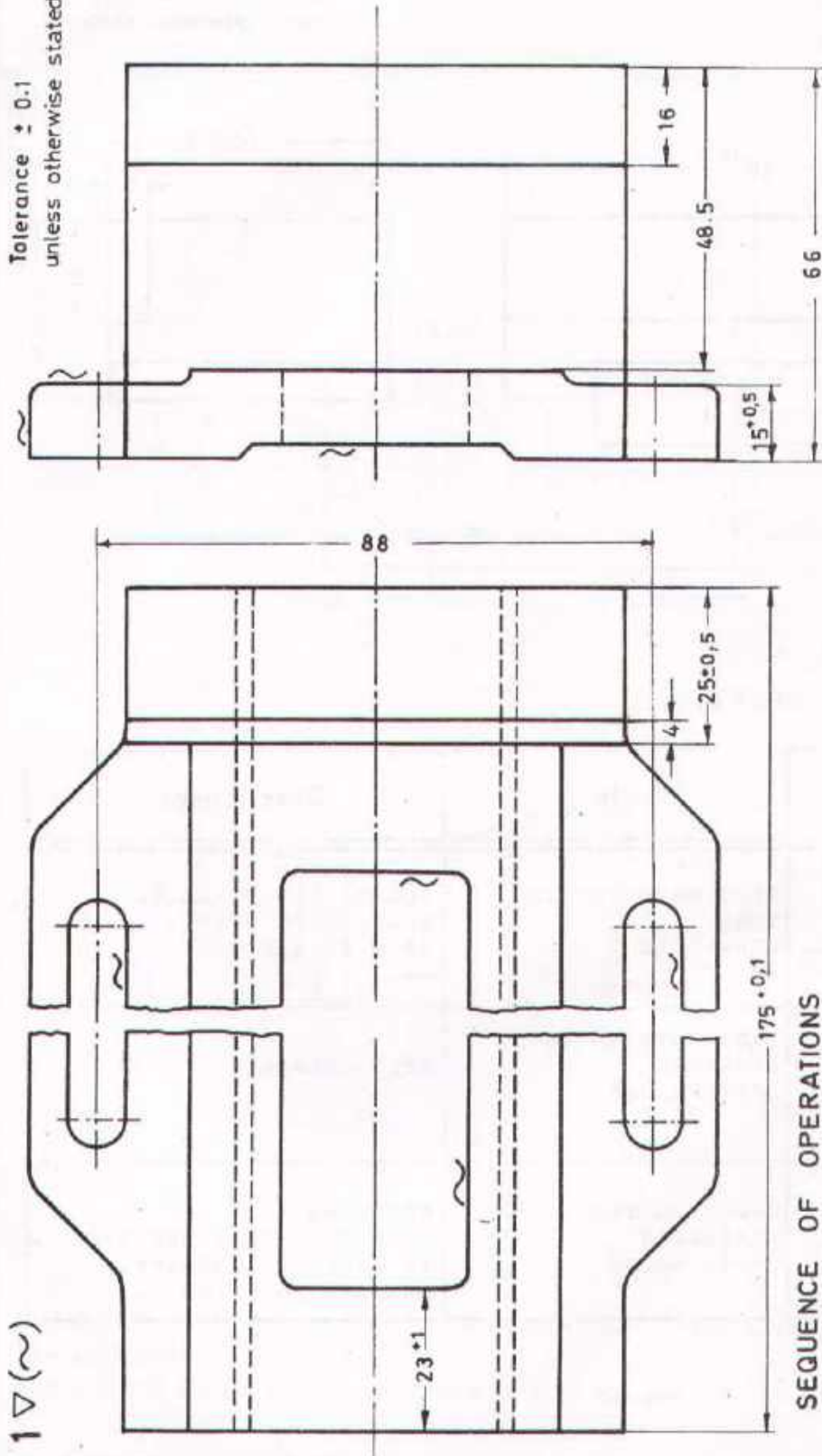


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

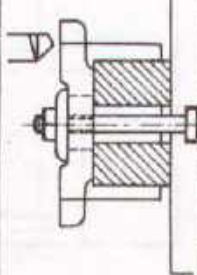
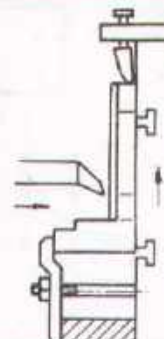
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

Tolerance ± 0.1
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Descriptions
1		PLAN SHAPING OF BASE SURFACE THE WORKPIECE WILL BE CLAMPED DIRECTLY ON THE MACHINE TABLE
2		RECLAMPING BY USING THE BASE SURFACE AS REFERENCE FACE HORIZONTAL AND VER- TICAL SHAPING TO GIVEN DIMENSIONS

SCALE 1:1

MAT.: CAST IRON

VICE BASE

No. 2.1.3 / 03

SHAPING II



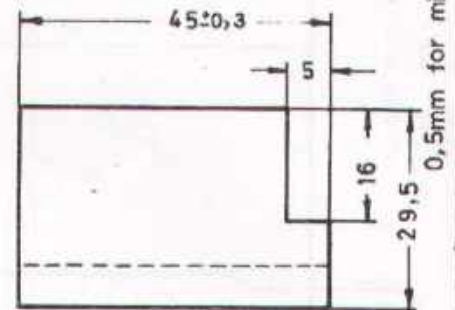
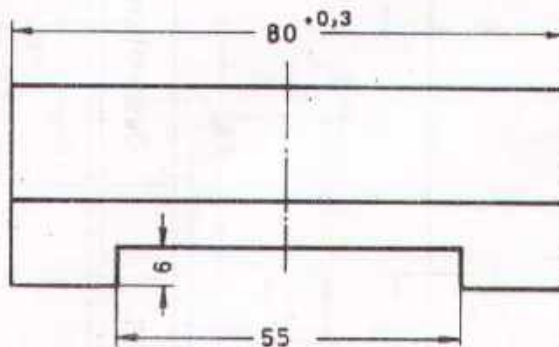
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

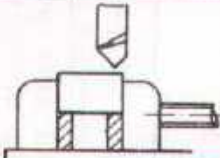
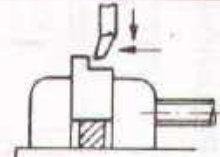

TURNER

3 

Tolerance ± 0.1
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		LEFT HAND CUTTING TOOL PARALLELS	SQUARE AND PARALLEL SHAPING TO SIZE 45 x 29 x 80
2		SIDE CUTTING TOOL PARALLEL DEPTH GAUGE	STEP SHAPING
3		GROOVING TOOL PARALLELS DEPTH GAUGE	GROOVING MAKE SURE THAT THE VICE IS FIXED IN CORRECT ANGULAR POSITION

SCALE 1:1

MAT: CAST IRON

MOVEABLE JAW

(For machine vice)

No. 2.1.3 / 04

SHAPING II.



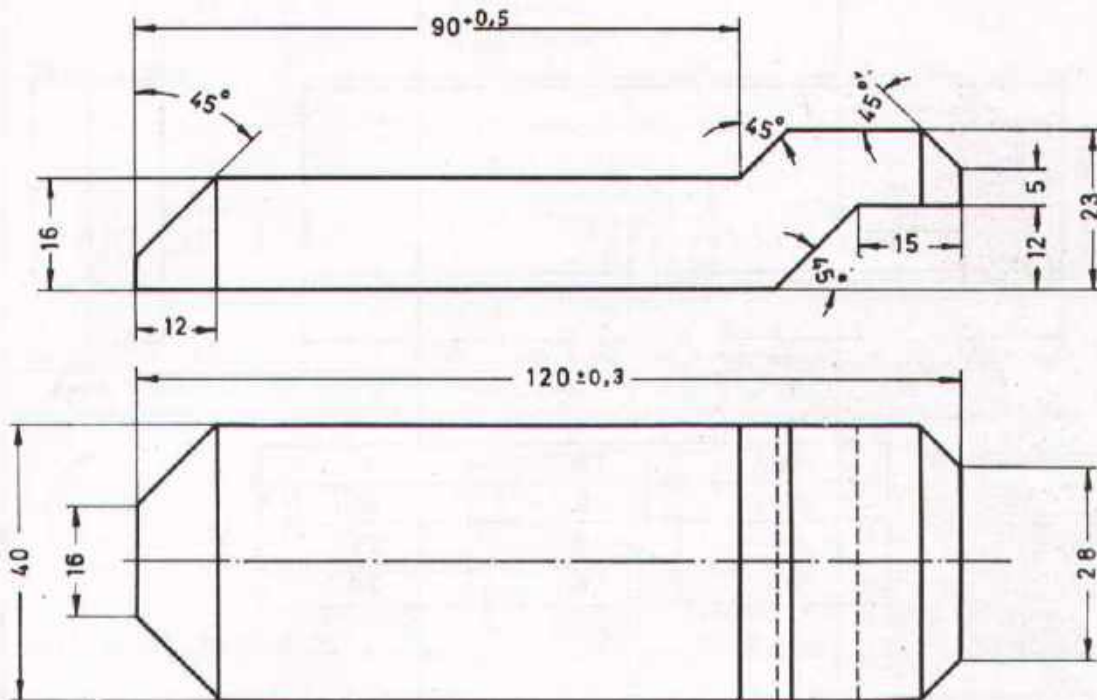
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		LEFT HAND CUTTING TOOL TOOL PARALLELS	SQUARE AND PARALLEL SHAPING TO SIZE 40 x 23 x 120
2		RIGHT HAND CUTTING TOOL TOOL MARKING TOOLS PARALLELS BEVEL PROTRACTOR	FORM SHAPING
3		LEFT HAND CUTTING TOOL TOOL MARKING TOOLS BEVEL PROTRACTOR	SHAPING OF CHAMFERS

SCALE 1:1

CLAMP

No. 2.1.3 / 05

MAT: MILD STEEL

SHAPING II



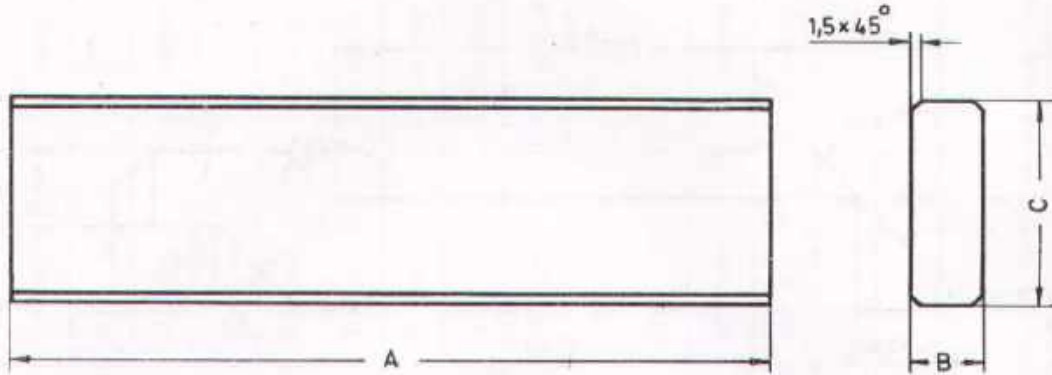
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$



2 Pieces

A	B	C
110	8	30
110	8	25
110	6	20

SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		LEFT HAND CUTTING TOOL PARALLELS	SQUARE AND PARALLEL SHAPING TO REQUIRED DIMENSIONS
2		LEFT HAND CUTTING TOOL PARALLEL BEVEL PROTRACTOR	SHAPING OF CHAMPERS

SCALE 1:1

MAT.: CASE HARDENING STEEL

PARALLELS

No. 2.1.3 / 06

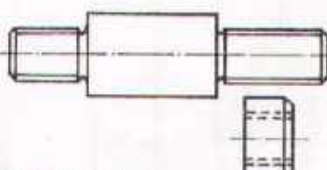
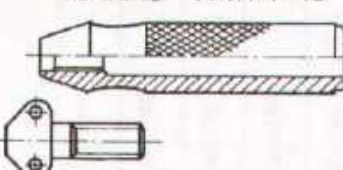
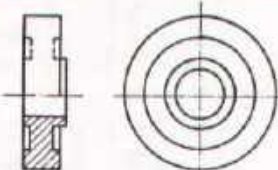
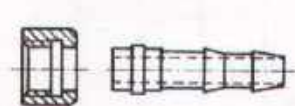
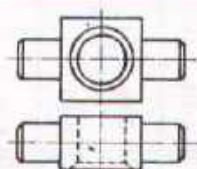
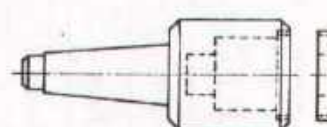
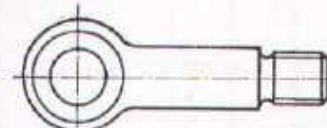
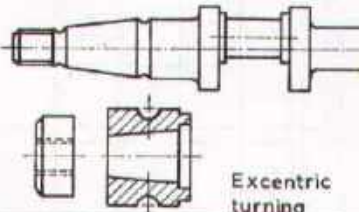
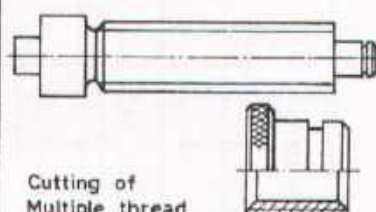
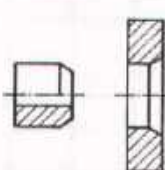
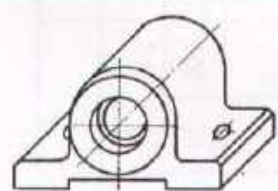
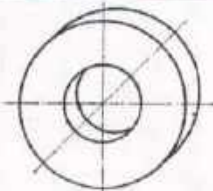
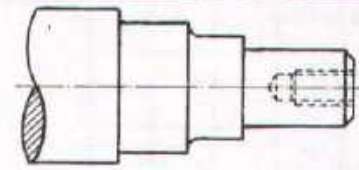
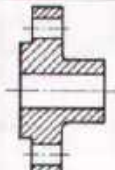
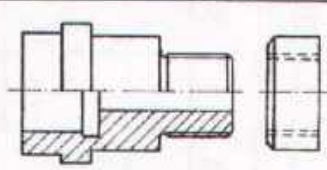
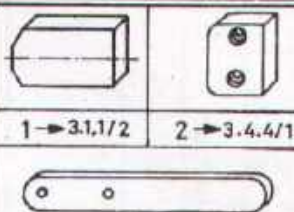
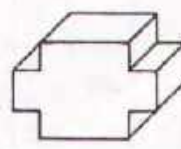
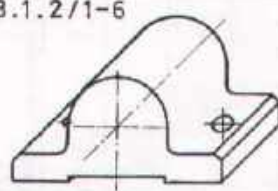
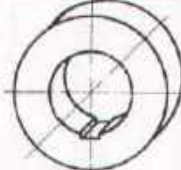

SHAPING II



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

 <p>Thread cutting 1 → 3.4.4/1</p>	<p>TURNING 3.1.1/1-15</p>  <p>Knurling, Form turning 2 → 3.4.4/4</p>	 <p>Mandrel work 3 → 3.2.2/7</p>	
 <p>Turning of Brass 4</p>	 <p>Work with 4 jaw independent chuck 3.1.2/4 → 5</p>	 <p>Taper turning, Boring 6</p>	
 <p>Thread cutting, Form turning 7</p>	 <p>Excentric turning 6</p>	 <p>Cutting of Multiple thread 9</p>	
 <p>Chucking of big diameter, Boring 10 → 3.1.1/14</p>	 <p>Work with face and angle plate 3.1.2/5 → 11</p>	 <p>Facing, Boring, Grooving 12</p>	
 <p>Work with Steadyrest 13 → 3.1.1/15</p>	 <p>Facing, Drilling, Reaming 3.1.1/10 → 14</p>	 <p>Left hand thread cutting 3 1 1/13 → 15</p>	
 <p>1 → 3.1.1/2 2 → 3.4.4/1 3 → 3.3.4/2</p>	<p>SHAPING 3.1.2/1-6</p>  <p>Parallel and Step shaping 4 → 3.1.1/5</p>  <p>Form shaping 5 → 3.1.1/11</p>  <p>Slotting 3.1.1/14 → 6</p>		
<p>TRADE TRAINING</p>	<p>LAY OUT</p>		<p>No. 3.1.1 No. 3.1.2</p>
 <p>DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING PAK-GERMAN TECHNICAL TRAINING PROGRAMME</p>		<p>TURNER</p>	

MATERIAL REQUIRED

Trade Training for Turner

Exercise No. (Length given in millimeter)

Turning No. 3.1.1	Exercise No. (Length given in millimeter)										Length per trainee	Total length for a batch of 16 trainees		
	1	1a	2	3	4	6	7	8	9	10			12	13
M/S Round 35mm (1 1/4")	118												118 mm	2 meter
M/S Round 50mm (2")	30				145		190	35	45		1000		1450 mm	23,2 meter
M/S Round 25mm (1")		115											115 mm	2 meter
Cast iron Round 100mm (4")			25										25 mm	
Brass Round 15mm (5/8")						55							55 mm	1 meter
Brass Round 25mm (1")						20		185					210 mm	3,5 meter
M/S Round 40mm (1 3/4")					10	100	20						130 mm	3 meter
M/S Round 130mm (5 1/4")									25				25 mm	0,5 meter
M/S Round 70mm (3")										10			10 mm	0,2 meter

Shaping No. 3.1.2

Shaping No. 3.1.2	Exercise No. (Length given in millimeter)										Length per trainee	Total length for a batch of 16 trainees		
	1	2	3	4	5									
M/S Flat 50 x 20 (2" x 5/8")	70	120											190 mm	3,2 meter
M/S Flat 25 x 10 (1" x 3/8")			210										210 mm	3,5 meter
Cast iron according pattern				×	×									

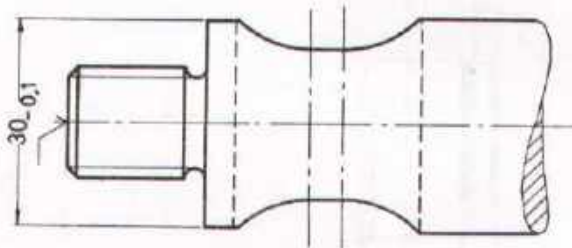
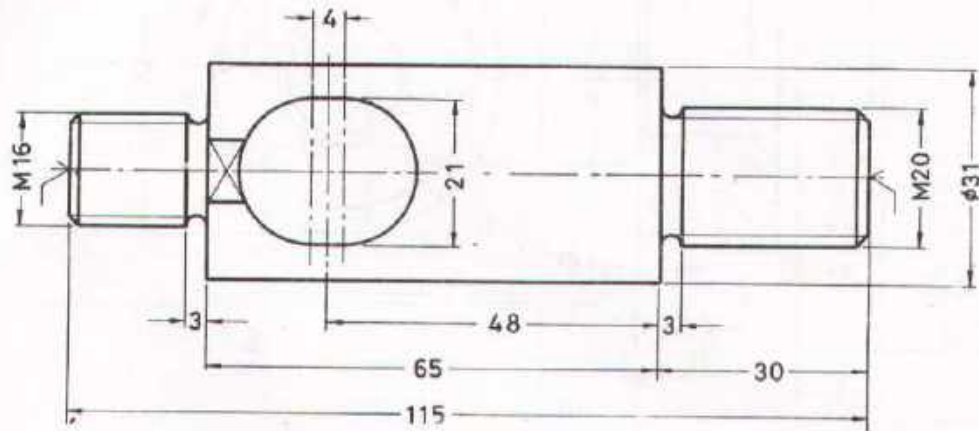
For details please see Layout



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



The hole 21 x 25 mm has to be made by Tool & Die Maker during assembling.

Check the threads with the Thread ring gauges.

SCALE 1:1	SPINDLE (For tool post)	No. 3.1.1 / 1 -1
MAT.:MILD STEEL		TURNING III



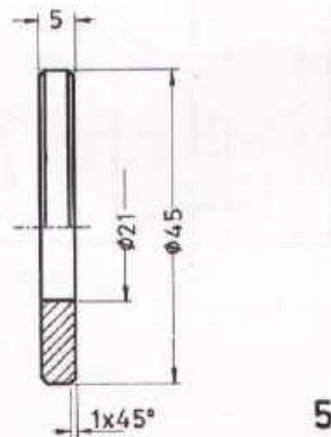
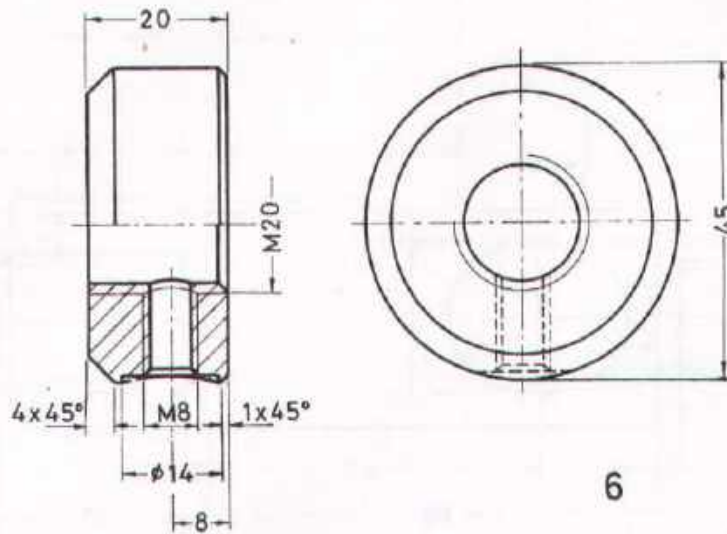
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$ mm
unless otherwise stated.



Make sure that the faces of part 6 are at right angles to the thread
The thread hole M8 has to be made by Tool & Die Maker during assembling.

SCALE 1:1

MAT. MILD STEEL

NUT & WASHER

(For tool post)

No. 3.1.1 / 1 - 2

TURNING III



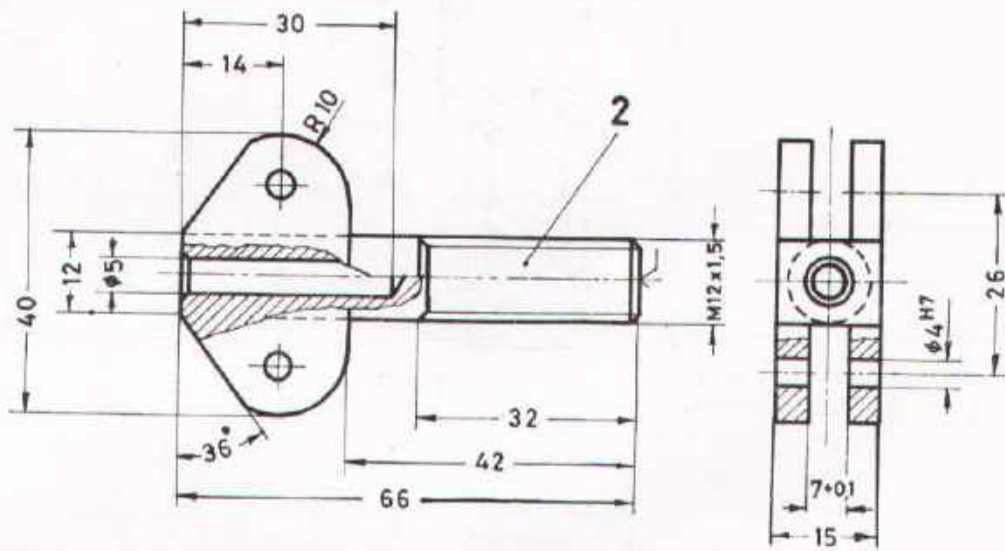
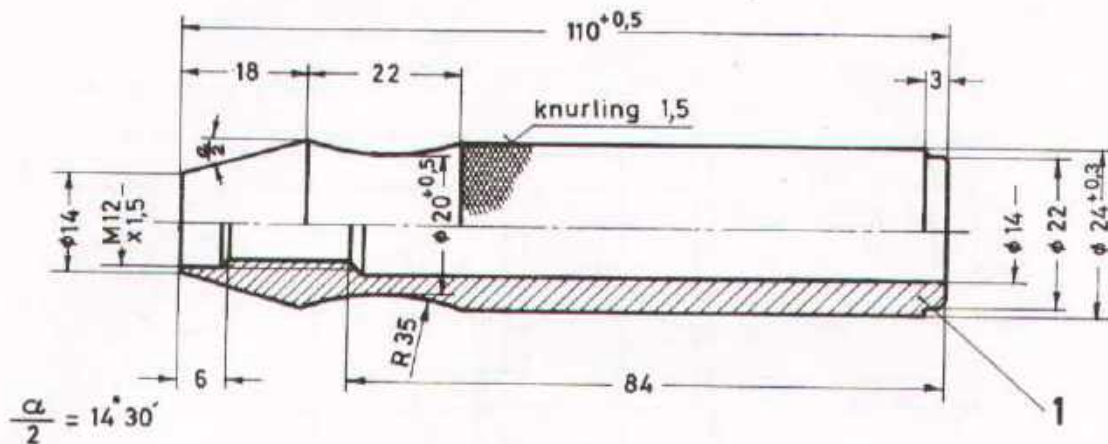
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		CENTRE DRILL RIGHT HAND FACING TOOL DIE M12 x 1.5	AFTER COMPLETION OF PART NO. 1 MARKING AND DRILLING OF CENTRE HOLE ON PART NO.2 CLAMPING IN FOUR JAW CHUCK AND SETTING OF CENTRE POINT.
2		COLLET CHUCK FOR ϕ 12 TWIST DRILL ϕ 5 COUNTER SINK	TURNING OF ϕ 12, THREAD CUTTING. CLAMPING IN COLLET CHUCK DRILLING OF HOLE ϕ 5

SCALE 1:1

MAT. MILD STEEL

HANDLE & LINK

Part 2 from Turner/Shap III (For hand vice)

No. 3.1.1/2

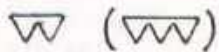
TURNING III



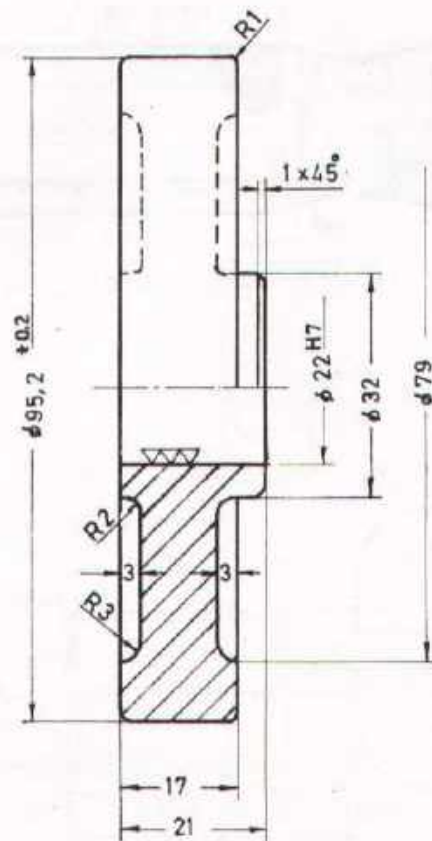
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated.



22^{H7}	$\begin{matrix} +0,021 \\ 0 \end{matrix}$
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Check the hole 22^{H7} with a plug gauge.

SCALE. 1:1

MAT. CAST IRON

GEAR BLANK

NO 3.1.1/3

TURNING III



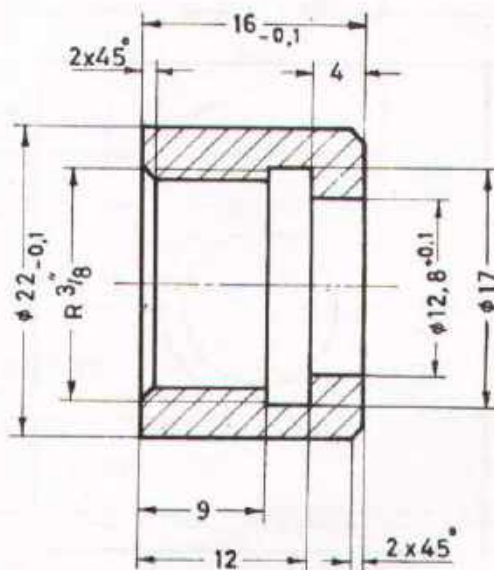
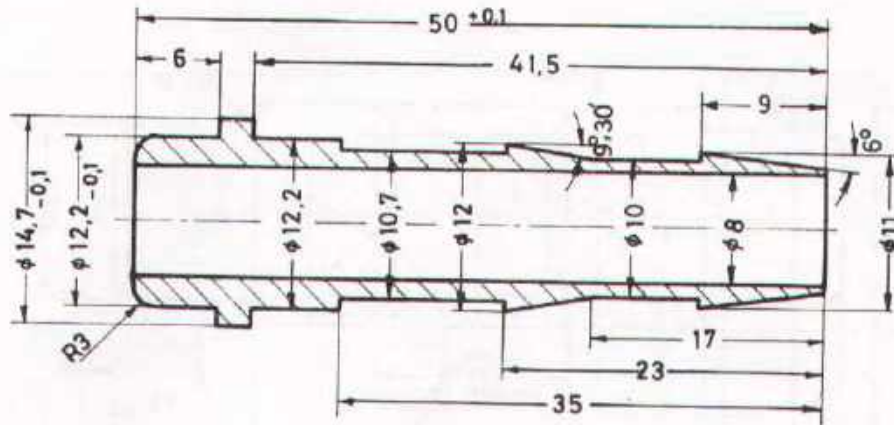
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FACING TOOL CENTRE DRILL TWIST DRILL $\phi 8$	CLAMPING IN 3 JAW CHUCK TURNING TO $\phi 12,2$ AND RADIUS 3 DRILLING THE HOLE $\phi 8$
2		COLLET CHUCK FACING TOOL GROOVING TOOL ROUGHING TOOL	CLAMPING THE $\phi 12,2$ IN COLLET CHUCK, SETTING OF LATHE CENTRE TURNING $\phi 12,2$, GROOVING, TAPER TURNING

SCALE 2:1

MAT. BRASS

RUBBER PIPE CONNECTION

No. 3.1.1/4

TURNING III



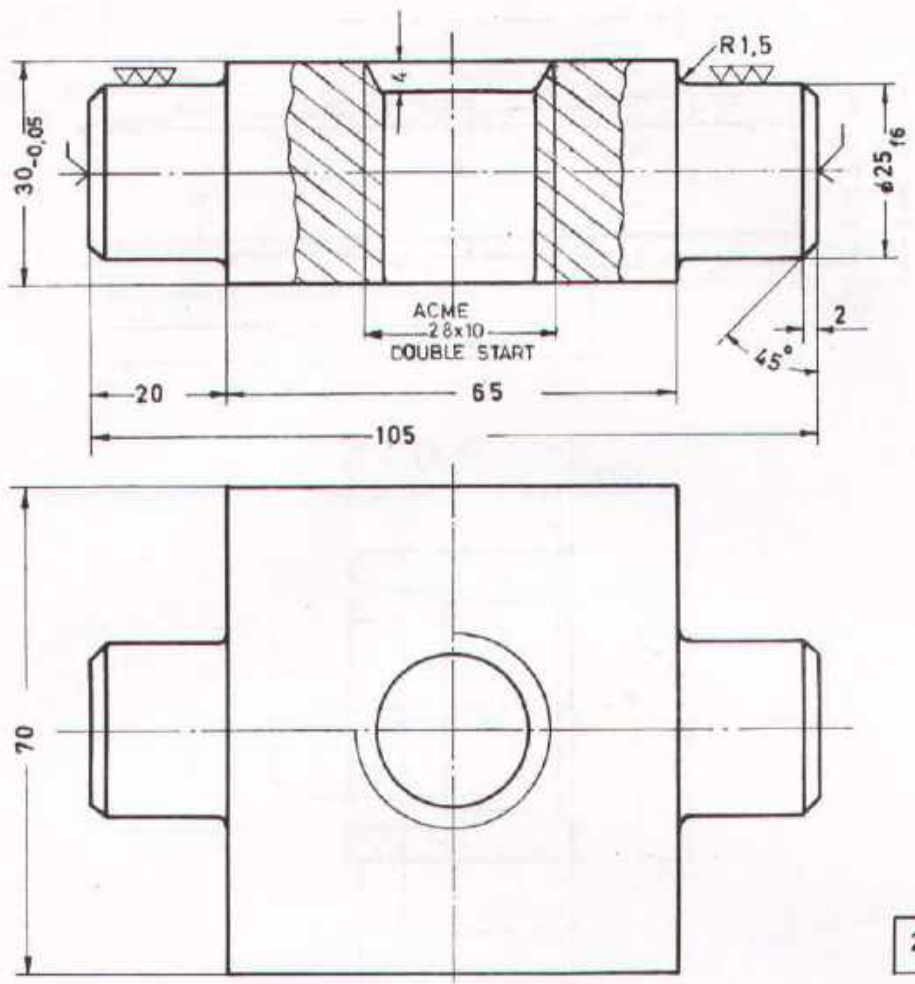
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated.



25 f6	-0,02 -0,04
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SEQUENCE OF OPERATIONS

No	Symbol	Tools	Descriptions
1		MARKING INSTRUMENTS CENTRE DRILL LATHE DOG SIDE CUTTING TOOL MICROMETER	MARKING AND DRILLING OF CENTRE HOLES HOLDING BETWEEN CENTRES TURNING OF DIAMETERS 25f6 LENGTH & CHAMFER
2		4 JAW CHUCK CENTRE DRILL TWIST DRILL ϕ 20 BORING, FACING TOOL & INT. THREADING TOOL	CLAMPING IN 4 JAW CHUCK ALIGNING, CENTERING, FACING, DRILLING, BORING & THREADING, RECLAMPING, TURNING TO THICKNESS

SCALE 1:1

MAT. CAST IRON

MOVEABLE NUT

From Turner/ Shaping III

No. 3.1.1/ 5

TURNING III



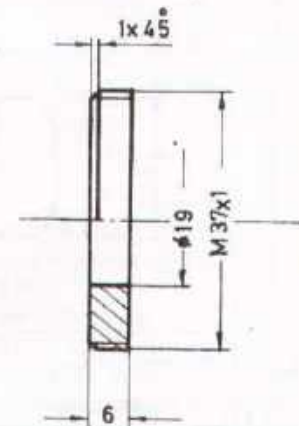
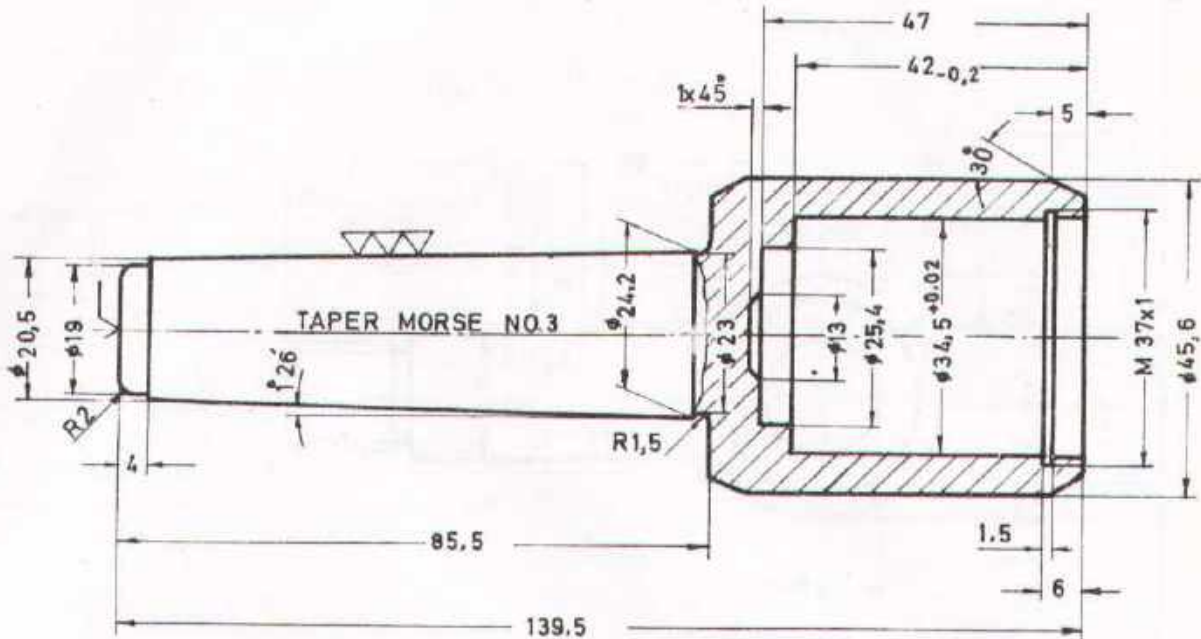
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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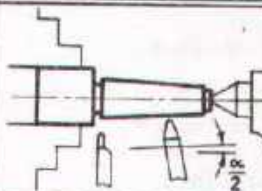
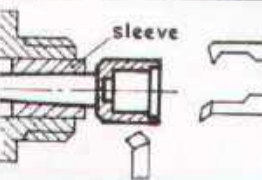
TURNER

W (W)

Tolerance ± 0.1
unless otherwise stated.



SEQUENCE OF OPERATIONS

No.	Symbol	Tools	Descriptions
1		FACING TOOL CENTRE DRILL ROUND NOSE TOOL NECKING TOOL TAPER RING GAUGE	FACING, CENTERING SETTING OF LATHE CENTRE LONGITUDINAL AND TAPER TURNING. CHECKING OF THE TAPER WITH TAPER RING GAUGE.
2		BENT RIGHT HAND ROUGHING TOOL. TWIST DRILLS. BORING AND THREADING TOOL. INTERNAL DIAL TEST INDICATOR.	HOLDING THE WORKPIECE IN THE HEADSTOCK SPINDLE. LONGITUDINAL TURNING, BORING, INTERNAL THREAD CUTTING.

SCALE 1:1

MAT: MILD STEEL

DETAIL OF REVOLVING CENTRE

NO. 3.1.1/6

TURNING. III



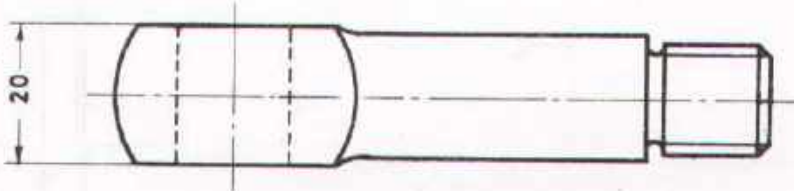
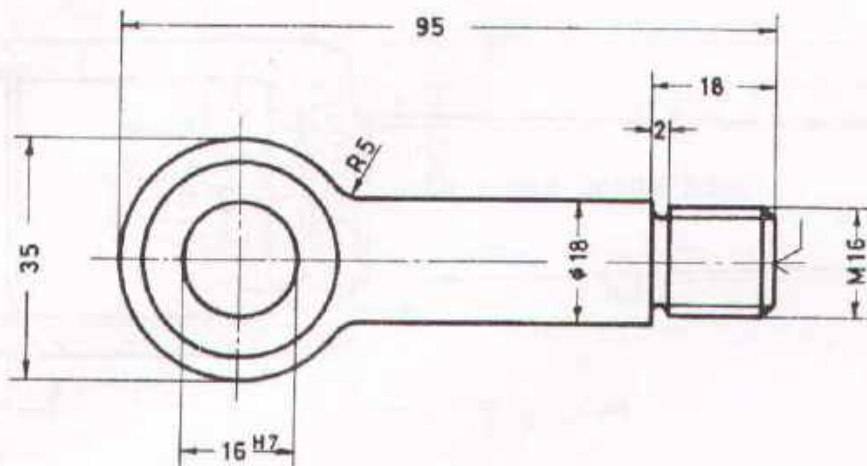
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER



Tolerance ± 0.1
unless otherwise stated



16^{H7} +0.018
0

No	Symbol	Tools	Description
1		R.-HAND FACING TOOL R.-H.ROUGHING TOOL NECKING AND THREADING TOOL. THREAD RING GAUGE.	FACING, CENTERING SETTING OF LATHE CENTRE LONGITUDINAL TURNING NECKING THREAD CUTTING
2		ROUND NOSE TOOL OFF HAND FORMING TOOL RADIUS GAUGE	RECLAMPING USING A CLAMPING BUSH FORM TURNING

Mat. : Alloy steel with
80kg Tensile strength
but for Training purpose
Mild steel will be used.

SCALE 1:1

CONNECTING ROD

No. 3.1.1 / 7

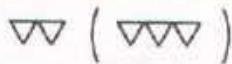
TURNING III



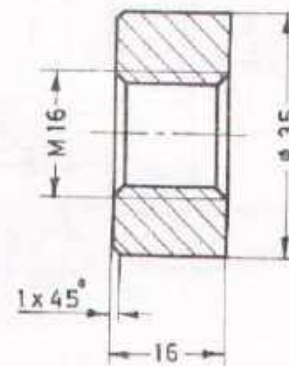
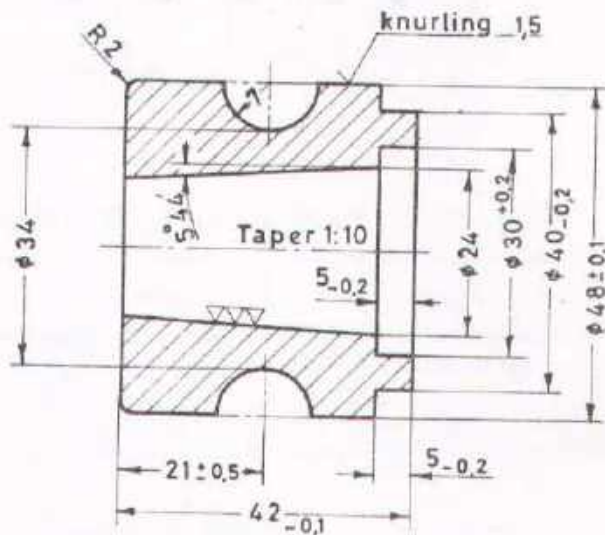
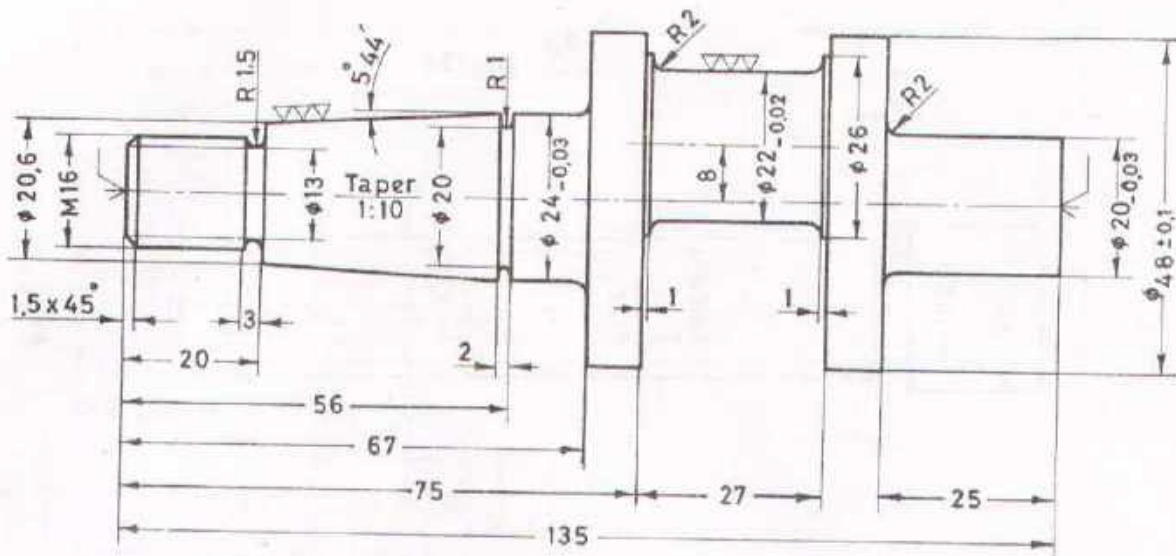
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,1$
unless otherwise stated

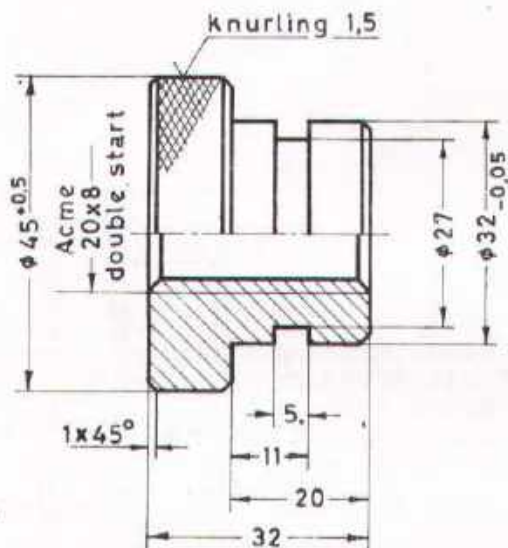
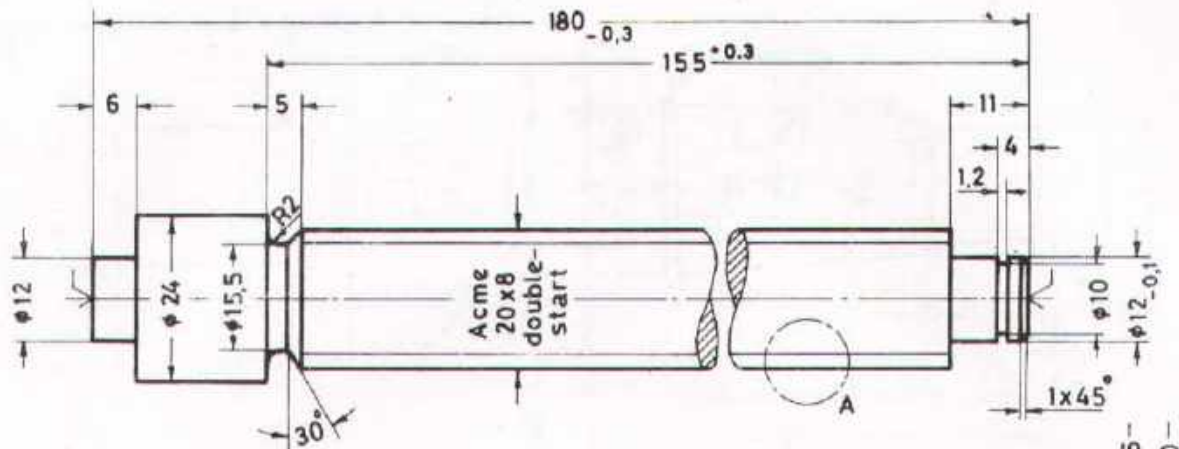


Symbol	Descriptions
	<p>FACING AND CENTERING OF THE RAW MATERIAL TO A LENGTH OF 145 MM. LONG. TURNING TO A ϕ OF 49. MARKING, CENTERPUNCHING AND DRILLING THE CENTERHOLES OF THE CRANKSHAFT. HOLDING BETWEEN CENTRES EXCENTRICALLY. TURNING OF CRANKSHAFT. RESETTING CONCENTRICALLY. MACHINING ALL OTHER DIAMETERS. TAPER AND THREAD. FACING TO THE REQUIRED LENGTH.</p>

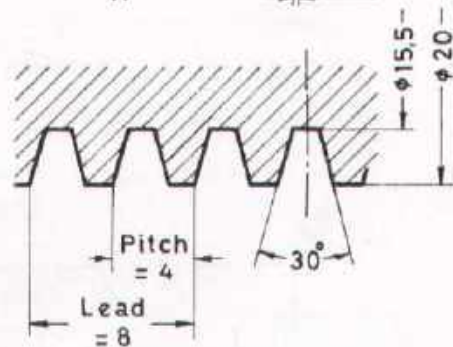
SCALE 1:1	CRANKSHAFT WITH BUSH	No. 3.1.1/ 8
MAT. MILD STEEL		TURNING III



Tolerance $\pm 0,1$
unless otherwise stated



Detail A



No.	Symbol	Descriptions
1		CUTTING A MULTIPLE THREAD, PROCEED AS IF CUTTING A SINGLE THREAD OF THE REQUIRED LEAD BY USING A TOOL ACCORDING TO THE GIVEN PITCH.
2		AFTER CUTTING THE FIRST THREAD GROOVE, IT IS NECESSARY TO GIVE THE WORK EXACTLY HALF A TURN WITHOUT TURNING THE LEAD SCREW. USE THE METHOD TO DISENGAGE THE INTERMEDIATE GEAR FROM THE SCREW GEAR TO MOVE THE LATHE SPINDLE ONE HALF TURN.

SCALE 1:1

MAT. MILD STEEL

SPINDLE AND NUT
(with double thread)

No. 3.1.1/9

TURNING III



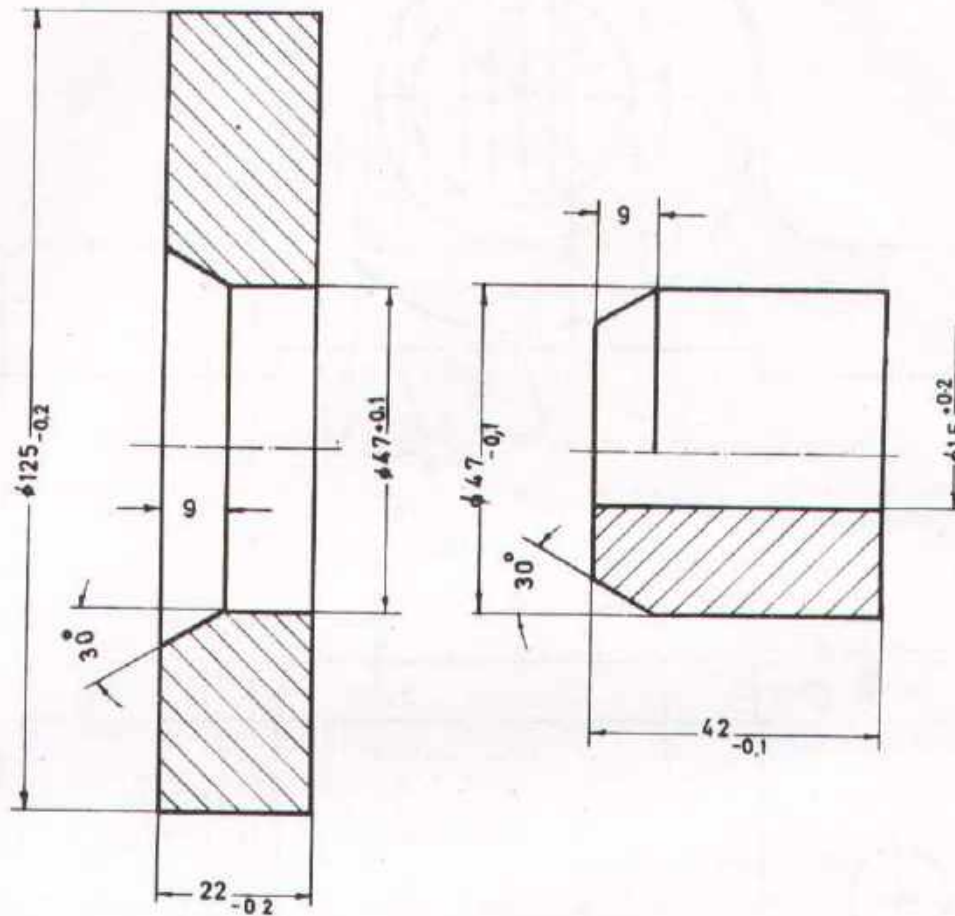
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance ± 0.2
unless otherwise stated



No.	Symbol	Tools	Descriptions
1		BENT ROUGHING TOOL CENTRE DRILL TWIST DRILL ϕ 15 AND ϕ 25 BORING TOOL	SETTING OF THE JAW SET FOR CHUCKING BIG DIA- METER FACING, DRILLING, BORING
2			RECHUCKING TURNING TO THICKNESS AND OUTSIDE DIAMETER CHAMFERING

SCALE 1:1

MAT. MILD-STEEL

FLANGE

No. 3.1.1/10

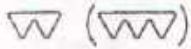
TURNING III



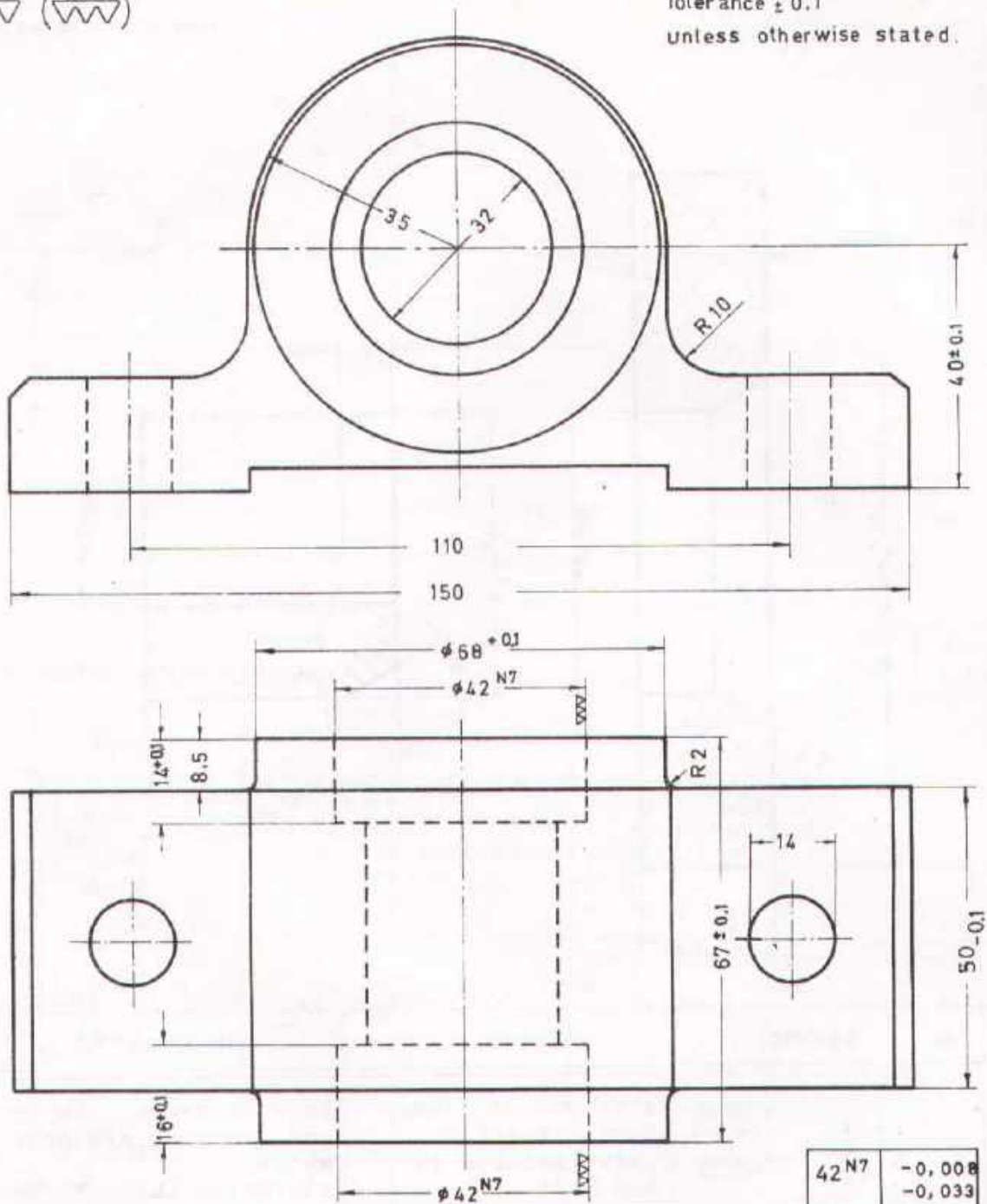
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance ± 0.1
unless otherwise stated.



No.	Symbol	Tools	Descriptions
1	<p>Counter weight Angle-plate</p>	HEIGHT GAUGE SIDE CUTTING TOOL TWIST DRILL $\phi 20$ BORING TOOLS INTERNAL DIAL IN- DICATOR	CLAMPING OF THE WORK- PIECE ON A FACE PLATE BY THE HELP OF AN ANGLE PLATE. ALIGNING. TURNING OF THE WIDTH & INTERN. DIAMETERS.

SCALE 1:1

MAT: CAST-IRON

CAST IRON BEARING

From Turner/ Shaping III

No. 3.1.1/ 11

TURNING III



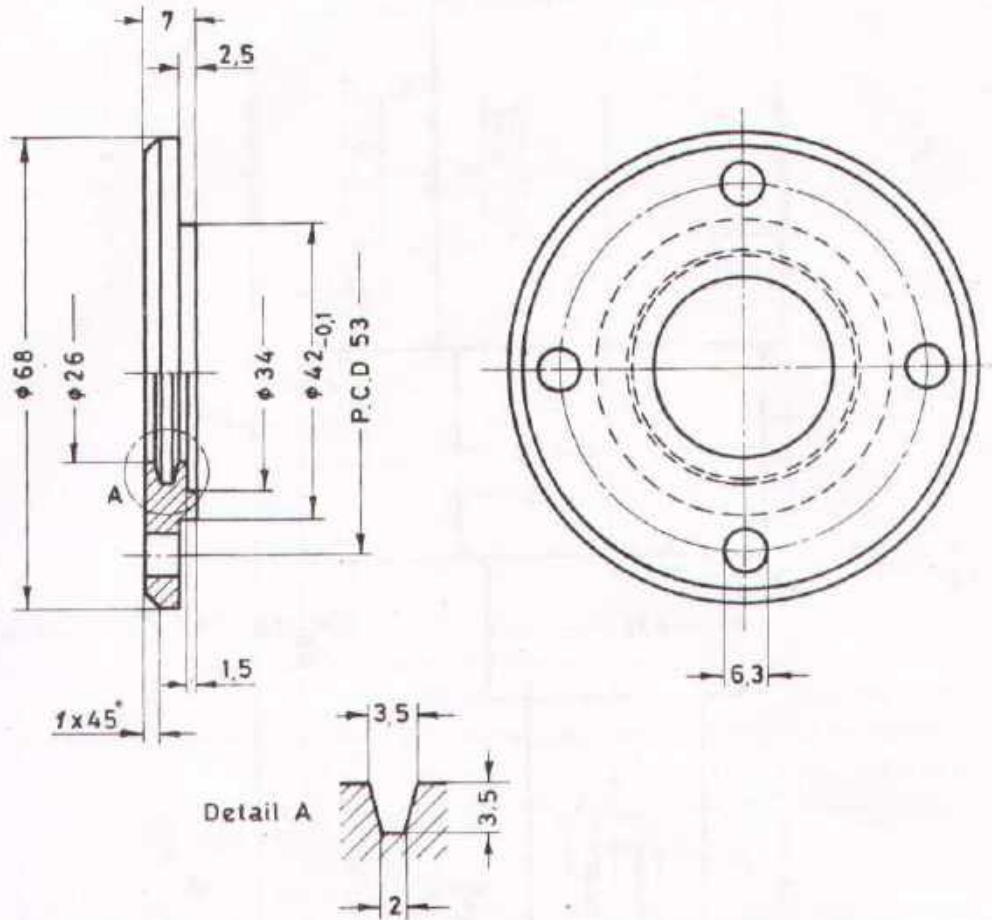
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

W

Tolerance $\pm 0,1$
unless otherwise stated



No	Symbol	Tools	Descriptions
1		BENT ROUGHING TOOL	CHUCK THE WORKPIECE IN 3 JAW CHUCK FOR THE FIRST FACING OPERATION
2		RIGHT-HAND SIDE BORING TOOL FORM GROOVING TOOL	RECHUCK, USE A CLAMPING BUSH TO ENSURE PARALLEL FACES. FACING, STEP TURNING, BORING, GROOVING.
3			HOLD THE WORKPIECE ON A MANDREL TO MACHINE THE OUTSIDE DIAMETER.

SCALE 1:1

MAT. MILD STEEL

BEARING COVER

No. 3.1.1 / 12

TURNING III



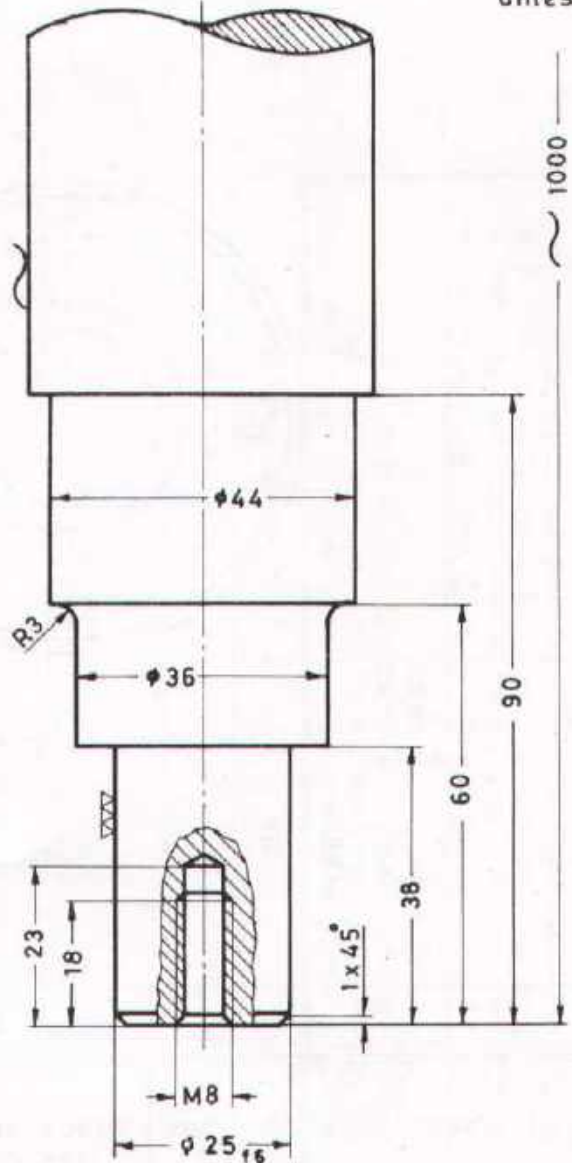
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER

W (W)

Tolerance $\pm 0,1$
unless otherwise stated.



25 _{f6}	-0.020
	-0.033

No.	Symbol	Description
1		<p>MARK AND PUNCH FOR CENTRE HOLE. DRILL CENTRE HOLE WITH THE HELP OF A DRILLING MACHINE. CHUCK THE WORK & SET THE LATHE CENTRE. MACHINE A SPOT FOR THE JAWS OF THE STEADY. SET THE STEADY AND REMOVE THE LATHE-CENTRE AS SHOWN IN THE SKETCH. DRILLING, THREAD CUTTING AND TURNING OF THE REQUIRED DIAMETERS</p>

SCALE 1:1	SHAFT	No. 3.1.1/13
MAT. MILD STEEL		TURNING III



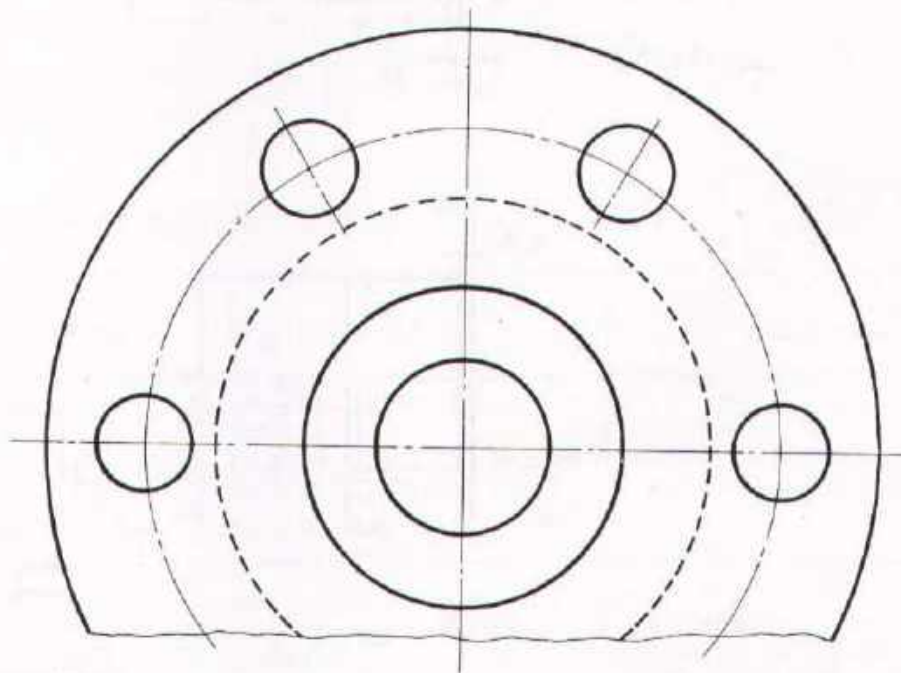
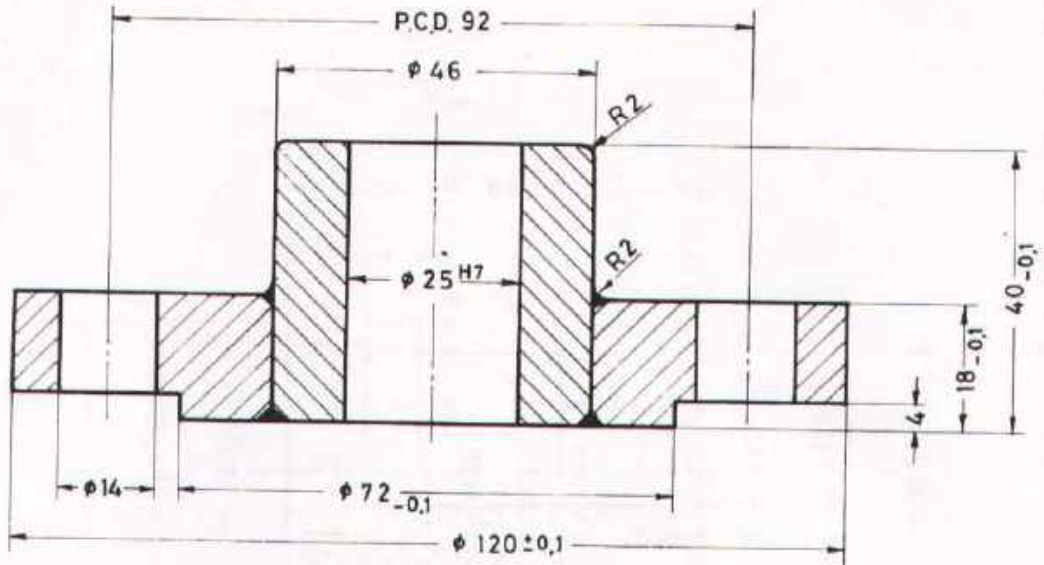
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TURNER



Tolerance $\pm 0,2$
unless otherwise stated



25^{H7} $+0,021$
0

Symbol	Tools	Descriptions
	R.-HAND SIDE CUTTING TOOL BORING TOOL REAMER $\phi 25^{H7}$ PLUG GAUGE 25^{H7} MANDREL $\phi 25$ ROUND NOSE TOOL	CHUCK THE WORKPIECE ON THE ROUGH MACHINED $\phi 47$ FOR MACHINING THE HOLE 25^{H7} , $\phi 120$ AND THE FLANGE FACE. HOLD THE WORKPIECE ON A MANDREL TO FINISH THE $\phi 46$ AND RADIUS.

SCALE 1:1

MAT. MILD STEEL

FLANGE

From Turner/ Turning III

No. 3.1.1/14

TURNING III



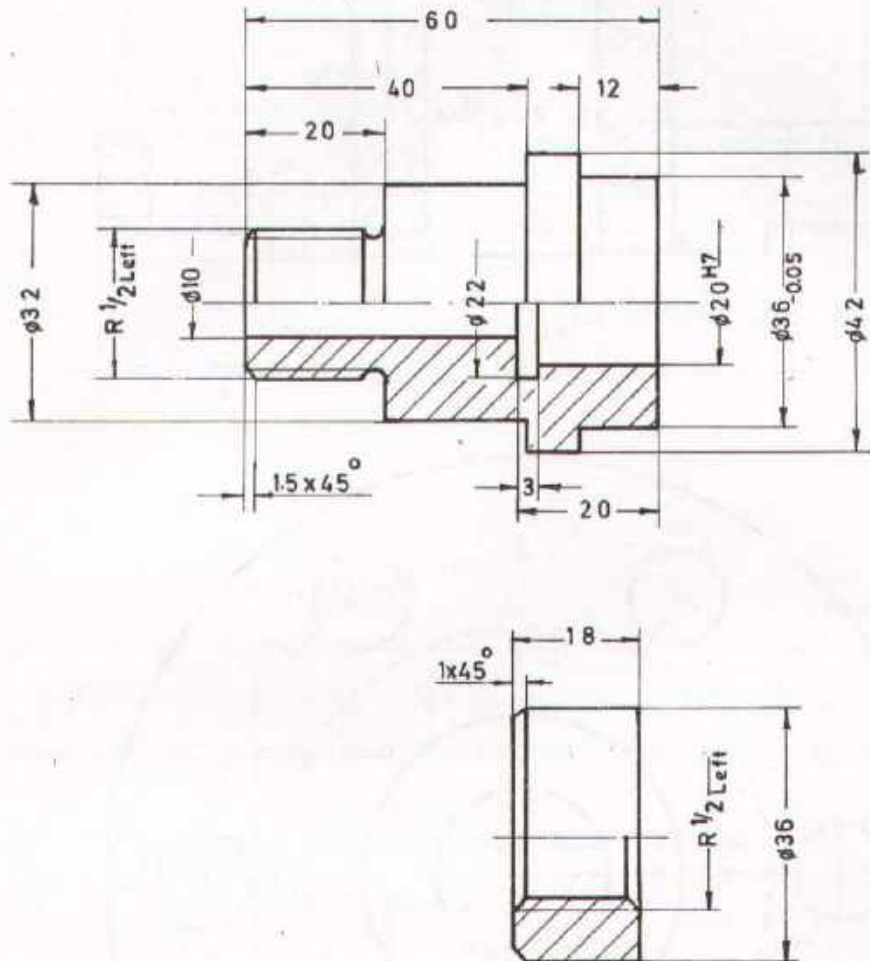
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER



Tolerance ± 0.1
unless otherwise stated



20 ^{H7}	.0,021 0
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SCALE 1:1

LEFT HAND THREAD EXERCISE

No. 3.1.1 / 15

MAT. MILD-STEEL

From Turner/ Turning III

TURNING III



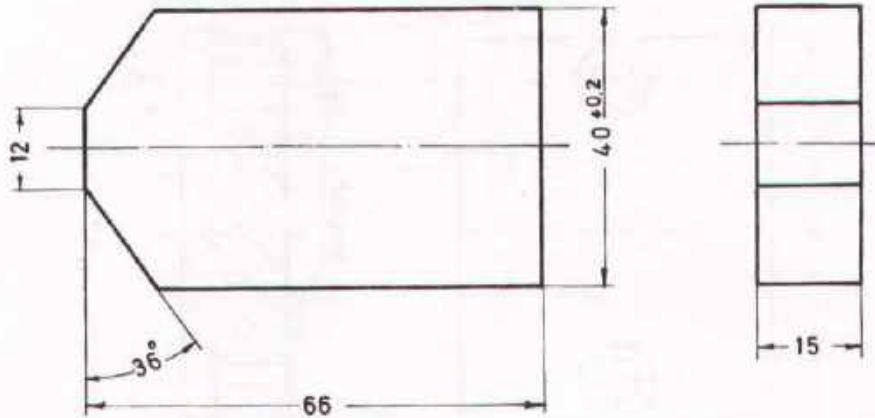
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER



Tolerance ± 0.1
unless otherwise stated



SEQUENCE OF OPERATIONS

No.	Symbol	Tool	Description
1		STRAIGHT RIGHT-HAND CUTTING TOOL BEVEL PROTRACTOR MARKING EQUIPMENT	SHAPING OF THE WORKPIECE TO THE DIMENSIONS 66 x 40 x 15. MARKING OF THE TWO 36° SIDES. CLAMPING OF THE WORKPIECE SO THAT THE MARKING LINE IS PARALLEL TO THE JAWS. SHAPING ACC. TO MARKING LINE.

SCALE 1:1

MAT. MILD-STEEL

LINK

(For hand vice)

No. 3.1.2 / 1



SHAPING III



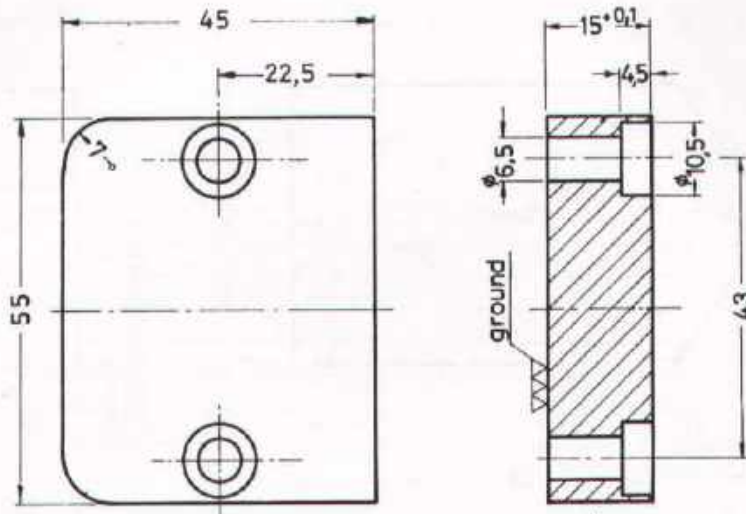
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TURNER

11  ()

Tolerance $\pm 0,1\text{mm}$
unless otherwise stated



2 Pieces

Note: Radii and holes to be done
by Tool and Diemaker during assembly.

SCALE 1:1

MAT. MILD STEEL

GUIDE PLATE

(For tool post)

No. 3.1.2/2

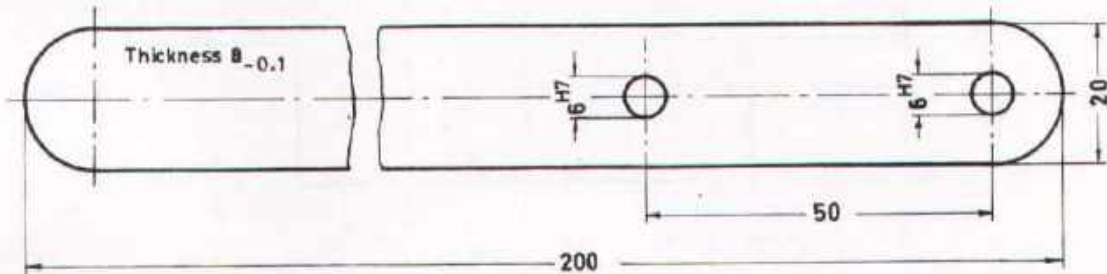
SHAPING III



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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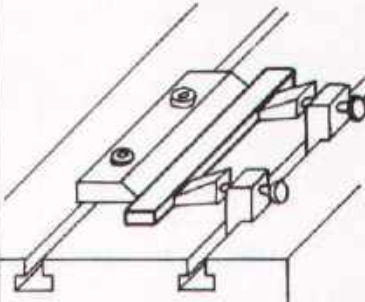
TURNER



6 ^{H7}	+ 0.012 0
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NOTE: Radii and holes to be done by Fitter during assembly.

SEQUENCE OF OPERATIONS

No.	Symbol	Tool	Description
1		HOLD-DOWN FIXTURES STRAIGHT LEFT-HAND CUTTING TOOL DEPTH GAUGE	IN CASE THE LENGTH OF THE VICE JAWS DO NOT ALLOW PROPER CLAMPING, FIX THE WORKPIECE DIRECTLY ON THE TABLE BY MEANS OF HOLD-DOWN FIXTURES SHAPING OF THE LEVER TO THE REQUIRED SIZE 20 x 8

SCALE 1:1

MAT: MILD STEEL

LEVER

(For Lever press)

No. 3.1.2/3

SHAPING III



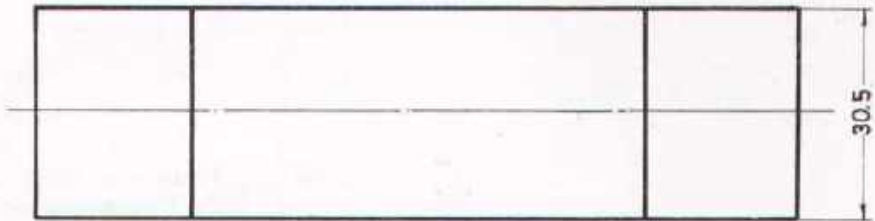
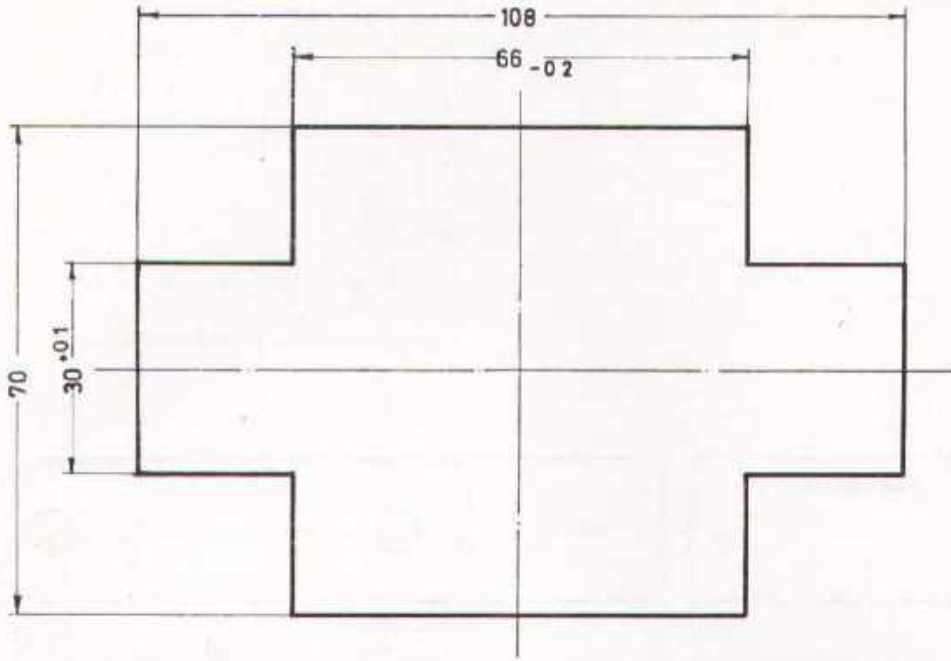
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER



Tolerance ± 0.1
unless otherwise stated



SCALE 1:1

MOVEABLE NUT

No. 3.1.2 / 4

MAT. CAST IRON

SHAPING III



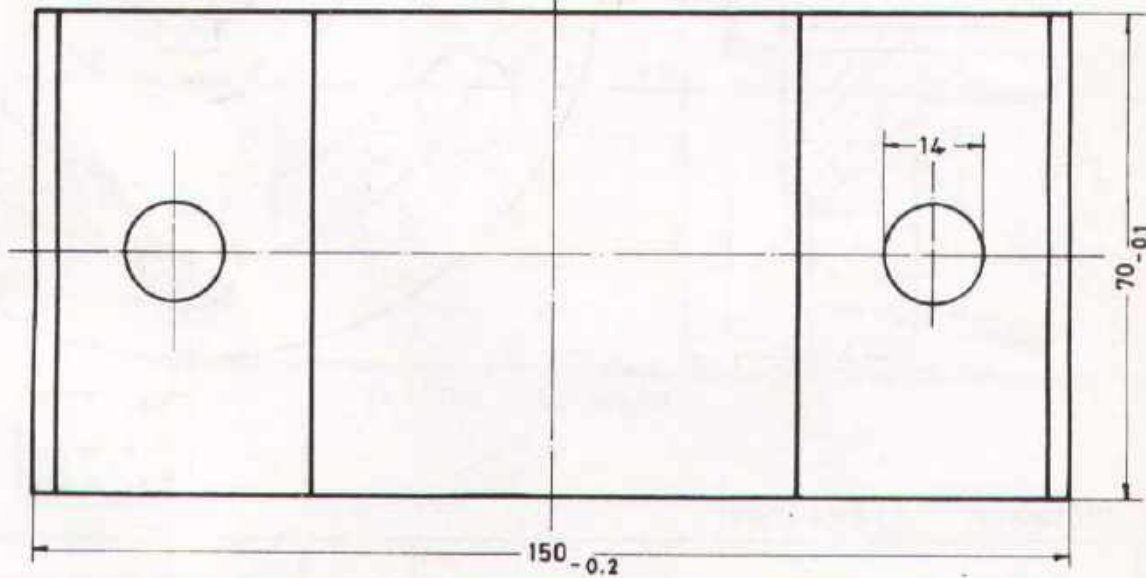
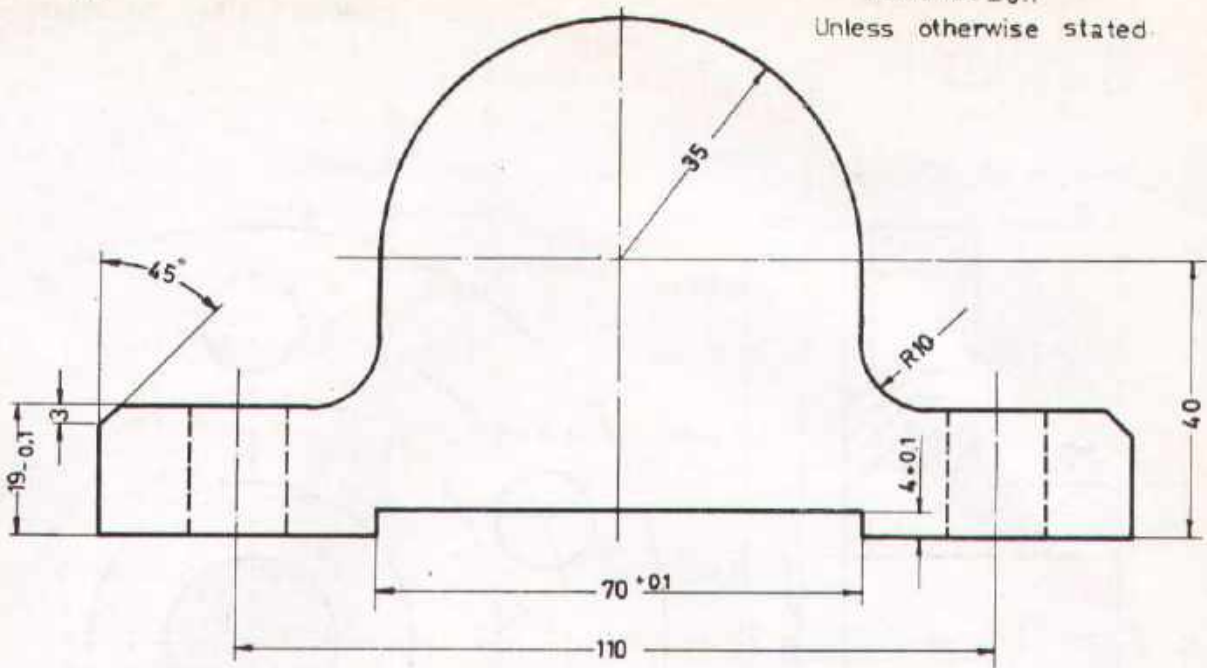
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER



Tolerance ± 0.1
Unless otherwise stated.



No.	Symbol	Description
1		SHAPE THE BASE SURFACE AND RECESS 70 x 4 MM. USE THIS FACE AS A REFERENCE TO SHAPE THE WIDTH 70 MM. SHAPE TO THE LENGTH. CLAMP AS SHOWN IN THE SKETCH AND SHAPE THE RADII AND THICKNESS 19 MM AS WELL AS CHAMFER 3 x 45.

SCALE 1:1

MAT. CAST-IRON

BRACKET

No. 3.1.2 / 5

SHAPING III



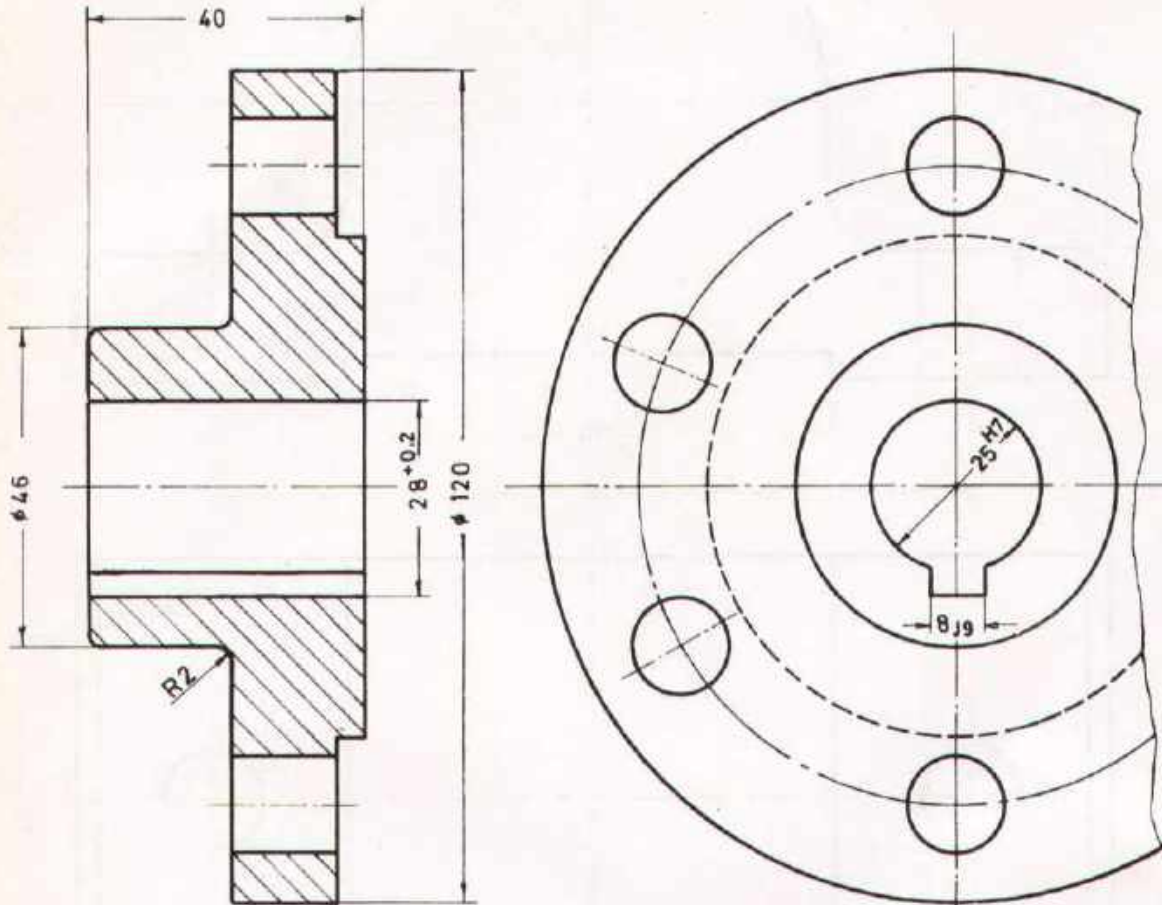
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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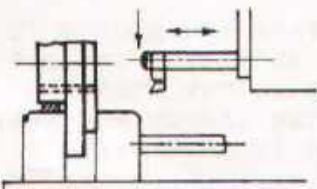
TURNER



Tolerance ± 0.1
unless otherwise stated.



SEQUENCE OF OPERATIONS

No	Symbol	Tools	Description
1		KEYWAY TOOL-HOLDER PARALLEL BAR GAUGE BLOCKS	MARK OUT THE KEYWAY CLAMP THE FLANGE AS SHOWN IN THE SKETCH CUT THE KEYWAY

SCALE 1:1

MAT: MILD STEEL

FLANGE

From Turner / Turning III

No. 3.1.2/6

SHAPING III



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

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TURNER

