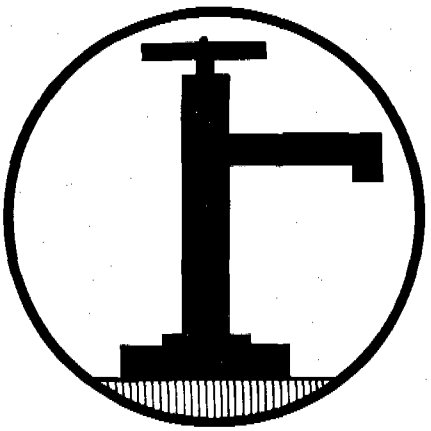
THE TARA HANDPUMP

PRODUCTION MANUAL AND DRAWINGS

INTERNATIONAL VERSION



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RURAL WATER SUPPLY & SANITATION PROGRAMME

DHAKA-BANGLADESH

THE TARA HANDPUMP

PRODUCTION MANUAL AND DRAWINGS

DHAKA-BANGLADESH

INTERNATIONAL VERSION

THE TARA HANDPUMP

The TARA handpump is a low-lift direct action handpump suitable for pumping heads up to 15 metres. It is manufactured from plastics and mild steel and can easily be produced in most developing countries. The pump has been extensively field tested and is now being installed on a regular basis under the Government of Bangladesh Rural Water Supply and Sanitation Programme assisted by UNICEF, with funds from DANIDA, S D C and UNCDF. In the period July 1986-June 1987, some 1,750 TARAs were installed, bringing the total number of TARAs in operation in Bangladesh to 3,000.

The TARA handpump has been developed by staff of the Mirpur Agricultural Workshop Training School, Dhaka (MAWTS), the World Bank/UNDP Handpump Testing Project INT/81/026 and UNICEF Dhaka. Staff of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) have also been involved in the field testing of the pump.

Note :

This production manual was originally produced specifically for the procurement by UNICEF, Dhaka of large numbers of TARA handpumps for the Government of Bangladesh. One essential purpose of the original manual was to encourage and help interested manufacturers to undertake production of the pump in Bangladesh. This "international" version of the manual is being made available to enable governments, development organizations and manufacturers in other developing countries either to set up production of the TARA, or to develop their own version of the pump suitable for local needs.

CHECKLIST OF PAGES

This checklist is valid to include Amendment No. 01

CONTENTS

INTRODUCTION

INTRODUCTION

1 PURPOSE OF MANUAL

THE information contained in this Manual will assist manufacturers of TARA handpumps (or TARA components) to achieve the high quality required by the Purchasing Agency and to minimise chances of rejection of finished products by the inspector.

This manual

1.1 contains specifications for the TARA handpump which will be referred to in invitations to bid, purchase orders and other procurement documents ;

1.2 contains production drawings, which must take precedence over all other information. Similarly, the most detailed part drawing will have precedence over assembly drawings ;

1.3 specifies quality assurance which will be carried out by the Purchasing Agency-appointed inspectors who will inspect during production and will conduct final quality inspection of completed product ;

1.4 serves as an aid for manufacturers to take necessary care and adopt appropriate measures to ensure quality mass production required for reliable performance and interchangeability of parts.

2 LAYOUT OF MANUAL

2.1 A checklist of the pages in this Manual is provided in the beginning for reference.

2.2 The Manual is arranged in two Sections. Section A contains background information consisting of : system drawings of the handpump ; list of assemblies, sub-assemblies and parts ; some selected common processes; materials and their testing methods ; and the inspection and testing methods to be used by the quality assurance Inspector.

2.3 Section B consists of : the production drawings and information on each part indicating the process recommended ; major production machine tools/equipment and major production aids ; critical aspects of production and inspection that will be the focus of inspection and indication of approximate production time for assembly or sub-assembly.

INTRODUCTION

SYSTEM DRAWINGS AND GENERAL PROCESS INFORMATION

3.1 SYSTEM DRAWINGS

These drawings present an overview of the handpump system.

3.2 LIST OF ASSEMBLIES, SUB-ASSEMBLIES AND PARTS

The list shows name of assemblies, sub-assemblies and parts along with respective part numbers.

3.3 SELECTED COMMON PROCESSES

Some common processes have been selected, for ready reference, on the basis of their frequent applications and others because of their special significance in the manufacture of TARA handpumpsThe Standards mentioned against these processes should be followed to maintain high level of quality in the manufacture of the parts of the handpump. The numbers of those parts affected by these processes are also indicated. A list of major production tools/equipment and major production aids (as indicated in the production informaton sheets) has been provided.

3.4 MATERIALS AND THEIR TESTING METHODS

1. Materials should conform to the brands listed. Manufacturers wishing to use other brands must seek ***Prior*** approval of the Purchasing Agency.

2. The Purchasing Agency may require to see the manufacturer's Test Certificate of raw materials.

3.5 STANDARDS

British Standards (BS), as available at the time of preparation of this Manual, have been given preference. When a particular BS is not available other Standards such as ASTM, ISI, ISO etc, as available, have been indicated. Manufacturers may use other equivalent Standards with the ***Prior*** approval of the Purchasing Agency.

INTRODUCTION

3.6 MARKINGS

1. Markings of Parts and Assemblies

Where specified, the parts and assemblies should have clear permanent markings identifying the manufacturer's name, production batch number and the year.

2. Marking of Packages

The packages shall be marked with the name of the manufacturer, number of parts in the package, trade mark if any, and the month and year of the manufacture.
Detailed marking instructions will be specified in the bid documents and purchase orders.

3.7 PACKAGING

Detailed packaging insturctions will be specified in the bid documents and purchase orders.

3.8 MANUFACTURER'S IN-HOUSE INSPECTION AND TESTING

The manufacturers should assign their own inspectors for the selection and testing of materials and for in-process quality control of parts and asembles in order to minimise chances of rejection by the Purchasing Agency appointed quality assurance Inspector.
Names of persons responsible for in-house quality control should be submitted to the Purchasing Agency on request.

3.9 QUALITY ASSURANCE

For the purpose of quality assurance the Purchasing Agency will appoint an independent inspection agency who will inspect and test materials, Jigs, fixtures and gauges, work in process, finished parts, sub-assemblies and assemblies and conduct such other tests as may be prescribed by the Purchasing Agency for the manufacturers. The independent inspectors will conduct tests from samples to be provided by the manufacturers and the tests should be done in accordance with the Standards prescribed.

INTRODUCTION

4 PRODUCTION INFORMATION AND DRAWINGS

4.1 PRODUCTION INFORMATION

1. Production process sequence, production machine tools/equipment, and production aids described in the 2nd, 3rd and 4th columns of the production information sheets are guidelines only and are not mandatory.

2. Critical aspects of production and inspection described in the 5th column of the production information sheets must be strictly followed by the manufacturers.

3 Production Aids

The manufacturers of parts and assemblies should be equipped with all necessary production aids. Jigs and gauges should be so made that these shall be of ten (10) times the accuracy of the product. Jigs and fixtures should be calibrated periodically and gauges in regular use checked periodically against their master gauges. Jigs, fixtures and gauges are subject to inspection by an independent inspector appointed by the Purchasing Agency.

4. Production Time

In the production information sheets "Approx production time.... minutes" is supplied as guideline only. This time includes manufacturing time of all the relevant parts of a sub-assembly or an assembly and their assembling time.

INTRODUCTION

4.2 DRAWINGS

1 · The TARA handpump consists of over fifty parts. Several parts make a sub-assembly. There are thirteen sub-assemblies and eight assemblies.

2 Each assembly, sub-assembly and part has a part number ; the part number is the same as the drawing number. The first digit of a part number corresponds to an assembly. The first digit after the decimal corresponds to a sub-assembly. The second digit after the decimal corresponds to the number of the individual part. Thus, the assemblies (and drawings) in the TARA handpump are identified as 1.00, 2.00... 8.00; sub-assemblies (and drawings) are identified by numbers such as 1.10, 1.20,.... 4.10,4.20 etc ; and parts (and drawings) are identified by numbers such as 1.11.1.12....1.14, or 2.11,2.12 etc. .

3 Tolerances shown in the drawings are in millimetres unless otherwise specified.

4 Precedence of drawings : the most detailed drawing is to be followed and drawings take precedence over other information.

5 Parts shall be manufactured of specified materials and to dimensions, tolerances and surface finish as specified in the drawings and production information

6 Finished sub-assemblies and assemblies should be exclusively as per the drawings and production information. Dimensions, tolerances, classes of fit, alignments, concentricity and the quality of finish should be as specified.

7 In the event of a revision of a drawing, the manufacturers should adhere to relevant changes that might occur in material, standards, dimensions, tolerances, classes of fit, alignments, concentricity, quality of finish and other specification.

5 AMENDMENTS

The Manual allows Provision for incorporating future amendments, for which amendment record sheets are provided. (see end of Manual)

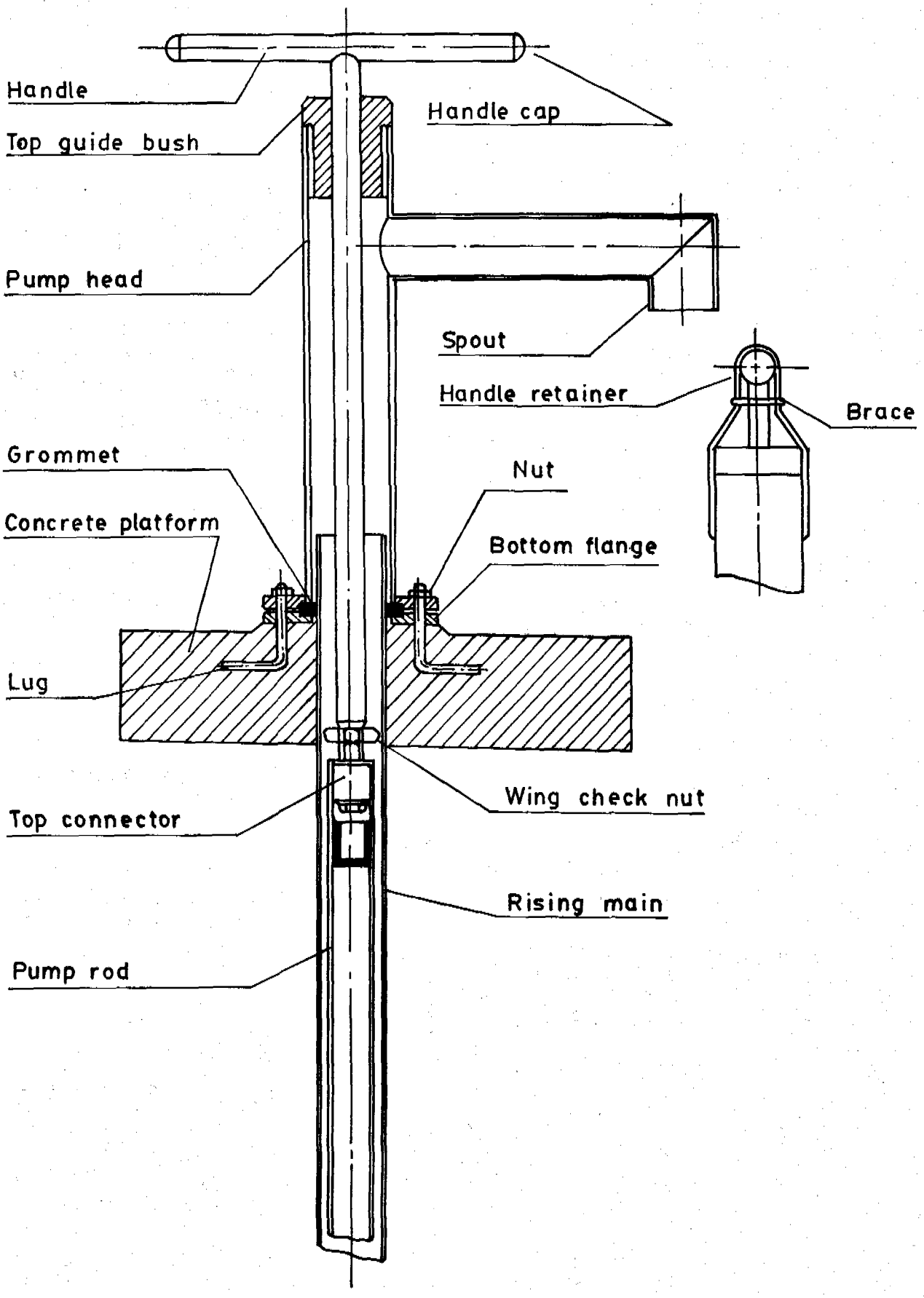
SECTION A

SYSTEM DRAWINGS
AND GENERAL PROCESS INFORMATION

SYSTEM DRAWINGS

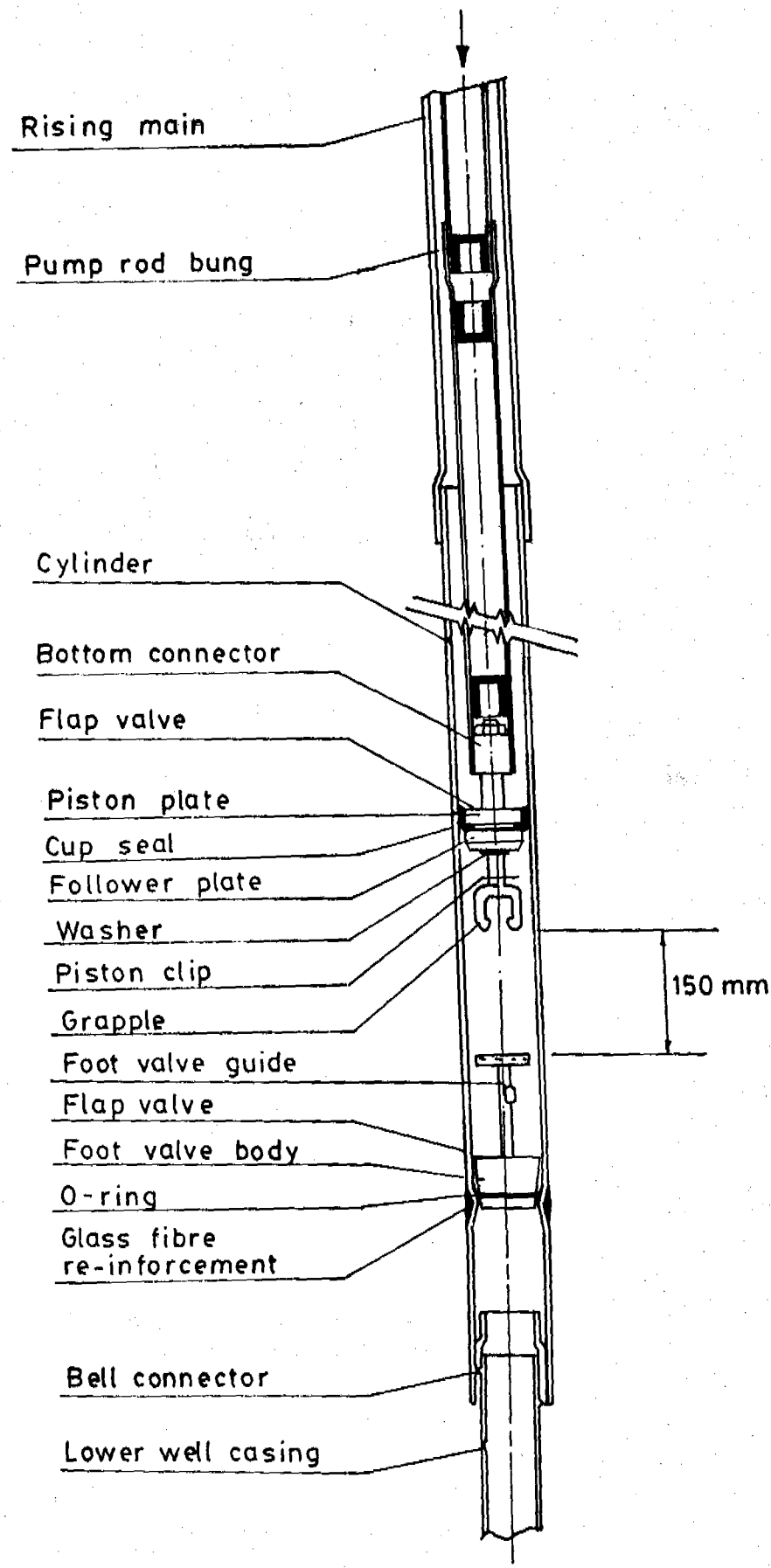
TARA PUMP SYSTEM DRAWING

(Standard Model)



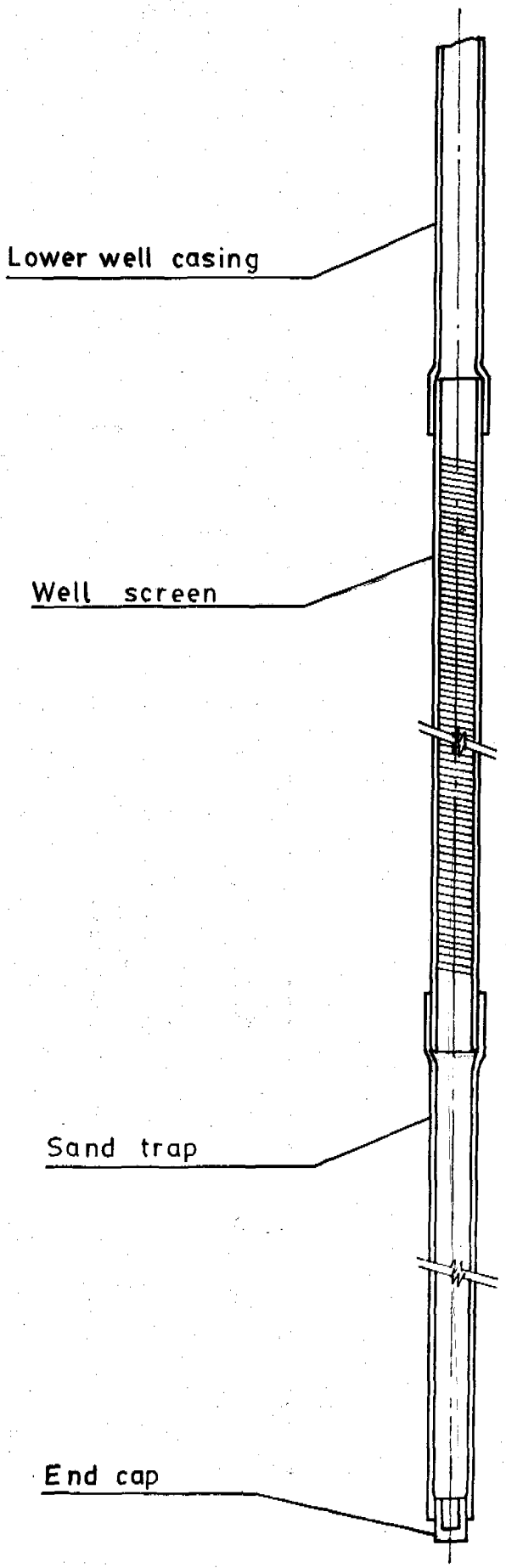
TARA PUMP SYSTEM DRAWING

(Standard Model)

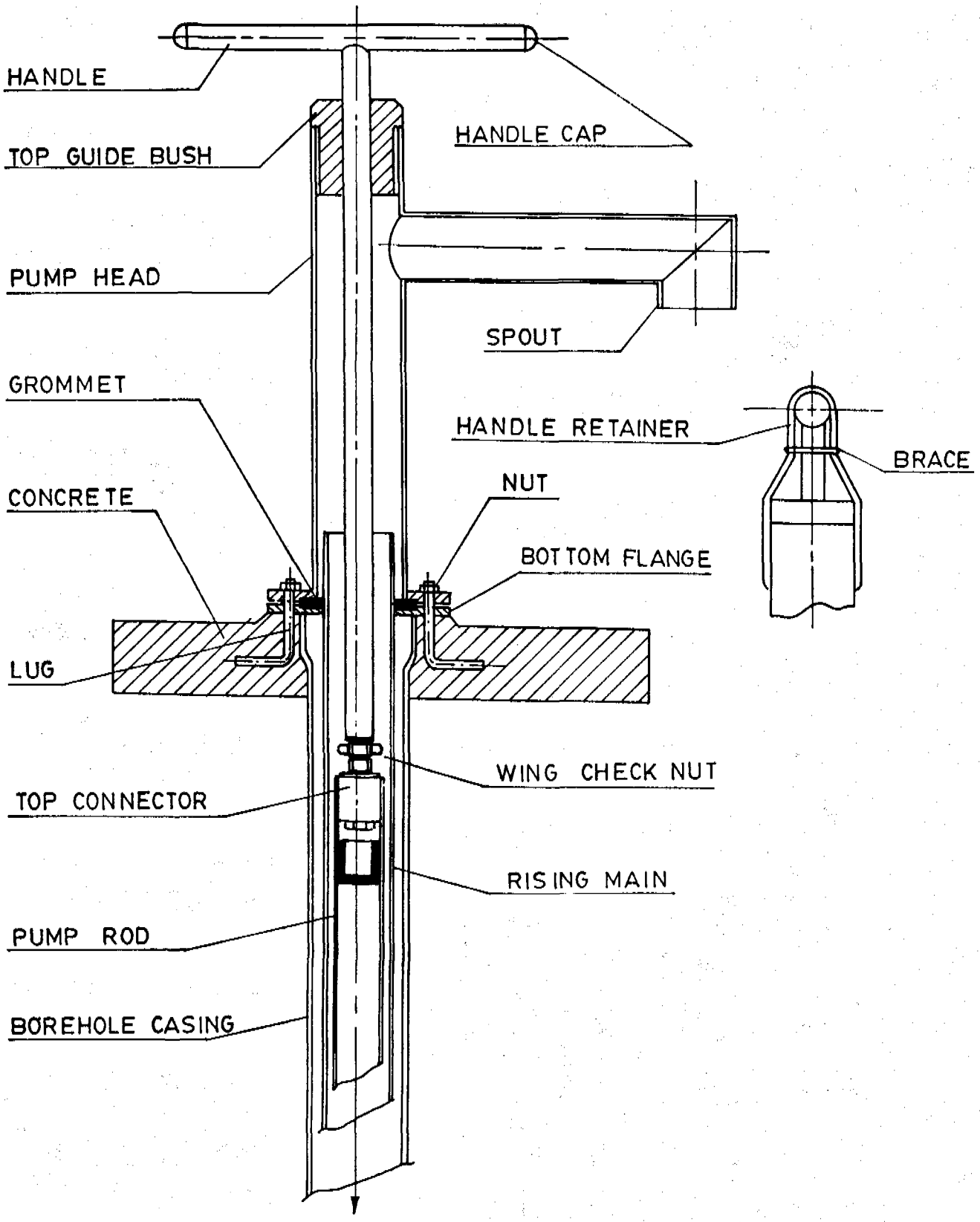


TARA PUMP SYSTEM DRAWING

(Standard Model)

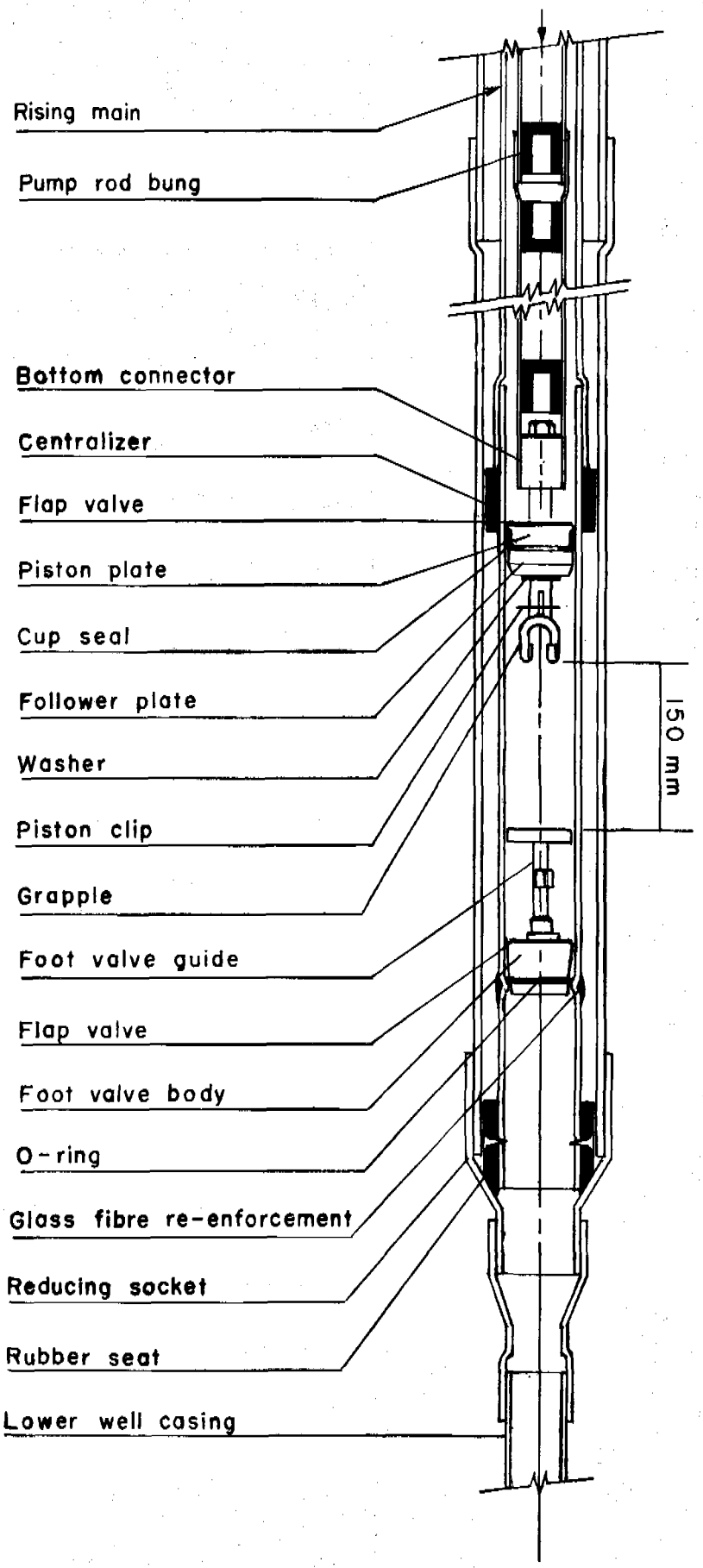


TARA PUMP SYSTEM DRAWING
(EXTRACTABLE MODE)

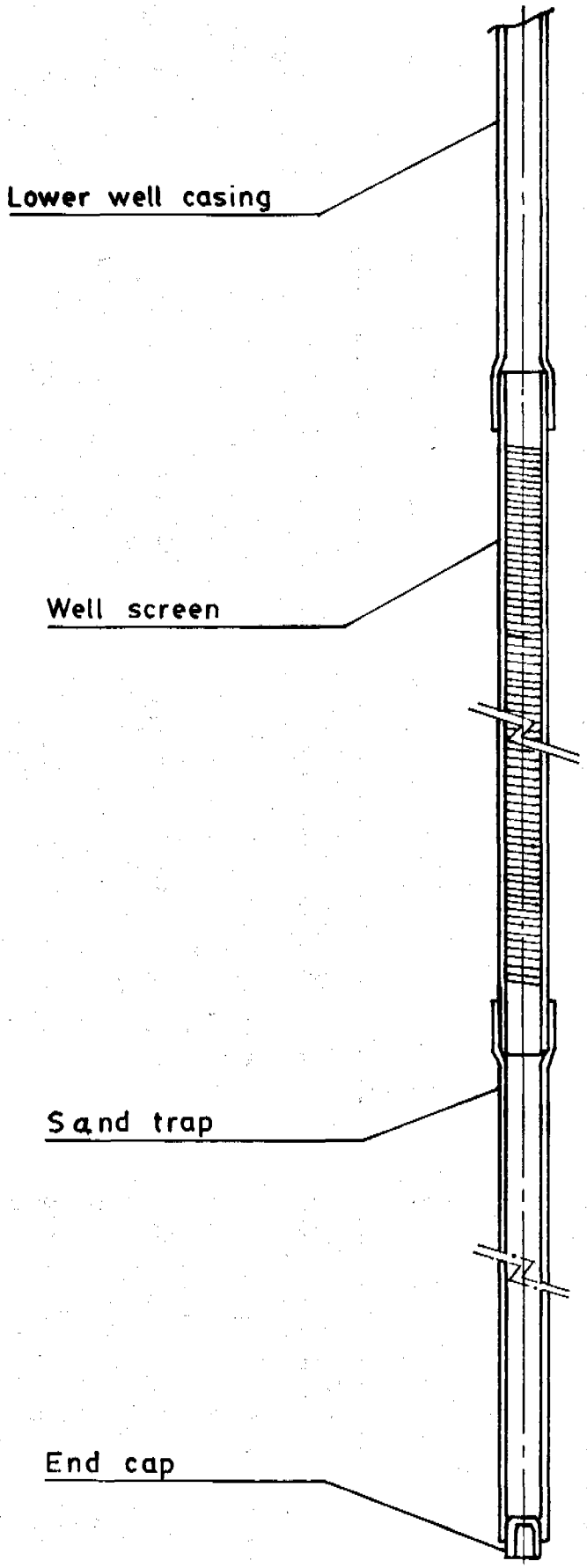


TARA PUMP SYSTEM DRAWING

(Extractable Mode)



TARA PUMP SYSTEM DRAWING
(Extractable Model)



LIST OF ASSEMBLIES,
SUB-ASSEMBLIES
AND PARTS

PART NUMBER

NAME

LIST OF ASSEMBLIES. SUB-ASSEMBLIES AND PARTS

ASSEMBLY		SUB-ASSEMBLY		PART	
PART NO	NAME	PART NO	NAME	PART NO	NAME
1.00 / 1	Pump Head Assembly	1.10 / 1	Pump Head Sub-Assembly	1.11 / 1	Body
				1.12 / 1	Spout
				1.13 / 1	Top Flange
				1.14 / 1	Grommet
		1.20	Bottom Flange Sub-Assembly	1.21	Bottom Flange
				1.22	Stud
				1.23	Lug
				1.24 (ND)	Nut
		1.30 / 1	Top Guide Bush Sub-Assembly	1.31	Top Guide Bush
				1.32	Sleeve
		1.40 / 1	Handle Retainer Sub-Assembly	1.41 / 1	Handle Retainer
				1.42	Brace

(ND) No drawing provided

LIST OF ASSEMBLIES. SUB-ASSEMBLIES AND PARTS

ASSEMBLY		SUB-ASSEMBLY		PART	
PART NO	NAME	PART NO	NAME	PART NO	NAME
7.00 (ND)	Tubewell Assembly	7.10	Upper Tubewell Sub-Assembly	7.11 (ND)	2" Rising Main
				7.12(ND)	3" Upper Well Casing*
				7.13 / 1	Rising Main Centralizer*
					(7.14 Deleted)
				7.15 / 1	Reducing Socket*
		7.20	Lower Tubewell Sub-Assembly	7.21(ND)	1.5" Lower Well Casing
				7.22	Well Screen
				7.23 (ND)	Sand Trap
				7.24	End Cap
8.00	Retrieving Rod Assembly			8.11(ND)	Rod
				8.12(ND)	Nut
	ND= NO drawing provided				*For extractable mode only

LIST OF ASSEMBLIES. SUB-ASSEMBLIES AND PARTS

ASSEMBLY		SUB-ASSEMBLY		PART	
PART NO	NAME	PART NO	NAME	PART NO	NAME
2.00 / 1	Handle Assembly			2.11 / 1	Rod
				2.12 / 1	Handle
				2.13	Handle Nut
				2.14	Handle Cap
3.00 / 1	Pump Rod Assembly with Top Connector	3.10 / 1	Top Connector Sub-Assembly	3.11	Top Connector Bush
				3.12 / 1	Bolt
				3.13	Washer
					(3.14 Deleted)
				3.15	Nut
					(3.16 Deleted)
				3.17	Wing Check Nut
		3.20 (ND)	Pump Rod Sub-Assembly	3.21 (ND)	Pump Rod
				3.22 / 1	Pump Rod Bung
					(3.23 Deleted)
	ND=No drawing provided				

LIST OF ASSEMBLIES. SUB-ASSEMBLIES AND PARTS

ASSEMBLY		SUB-ASSEMBLY		PART	
PART NO	NAME	PART NO	NAME	PART NO	NAME
4.00 / 1	Piston Assembly with Bottom Connector	4.10	Bottom Connector Sub-Assembly	4.11 / 1	Bottom Connector Bush
				4.12	Connector Rod
				4.13	Nut
				4.14 (ND)	Washer (same as 3.13)
		4.20/1	Piston Sub-Assembly	4.21	Flap Valve (Piston)
				4.22	Piston Plate
				4.23	Follower Plate
				4.24	Washer
					(4.25 Deleted)
				4.26 / 1	Cup Seal Leather
		4.30	Grapple Sub-Assembly	4.31	Grapple Bush
				4.32	Hook
				4.33 / 1	Piston Clip
	ND=No drawing Provided				

LIST OF ASSEMBLIES. SUB-ASSEMBLIES AND PARTS

ASSEMBLY		SUB-ASSEMBLY		PART	
PART NO	NAME	PART NO	NAME	PART NO	NAME
5.00	Food valve Assembly	5.10 (ND)	Foot Valve Body Sub-Assembly	5.11	Foot Valve Body
				5.12	Bolt
				5.13	Flap Valve (Foot Valve)
				5.14 / 1	O Ring
		5.20	Foot Valve Guide Sub-Assembly	5.21	Guide Rod
				5.22	Rod
				5.23	Guide
				5.24	Foot Valve Guide Bush
6.00 / 1	Cylinder Assembly			6.11	Cylinder Pipe
				6.12	Bell Connector
				6.13	Rubber Seat*
	ND=NO drawing Provided				* For Extractable mode only.

SELECTED

COMMON PROCESSES

STANDARDS

GENERAL REMARKS

SELECTED COMMON PROCESSES — LIST OF MAJOR PRODUCTION TOOLS / EQUIPMENT AND AIDS

Major production Tools / Equipment

1 Electric arc welder (minimum 180A)
2 Hand grinder machine
3 Hot dip galvanizing bath
4 Reciprocating Saw
5 Band Saw
6 Circular Saw machine
7 Lathe machine
8 Radial Drill machine
9 Milling machine
10 Oxy acetylene gas cutting equipment
11 Drilling machine
12 Mixing roller
13 Press machine
14 Die mould
15 Reversible tapping chuck
16 Press machine (bench type)
17 Wood turning lathe
18 Shearing machine
19 Bending roller machine
20 Oxy acetylene gas welding equipment
21 Shearing press or iron worker
22 Heat treatment oven
23 Bench grinding machine
24 Punching press (bench type)
25 Zinc electroplating equipment
26 Combination die
27 Forming die
28 Injection moulding machine
29 Punching press
30 Metal cutting machine
31 Pedestal grinder
32 Ball press
33 Bending die
34 Hack saw
35 Heating equipment
36 Crimping die
37 Flaring die
38 PVC extrusion plant
39 Bell socket forming die
40 Slitting saw attachment
41 Hand injection moulding machine

Major Production Aids

1 Drill jig
2 Welding jig
3 Non-slip assembly welding jig
4 Sawing jig
5 Plug gauge
6 Milling fixtures
7 Circular guide for gas cutting
8 Go, not go snap gauge
9 Ring gauge for threaded external diameter
10 Bending jig
11 Cylindrical mandrel
12 Go,not go thread plug gauge
13 Ring gauge
14 Snap gauge
15 Go, not go plug gauge
16 Dial gauge indicator
17 Thread gauge
18 Form pipe (mandrel)
19 Non-slip welding jig
20 Thread plug gauge
21 Feeler gauge

NB. Items have been listed above in the order in which they appear in the production information sheets.

SELECTED COMMON PROCESSES

Process	Standard (if applicable)	General Remarks
Electric Arc Welding PART NO. (amendment suffix not shown) 1.10 1.20 2.00 4.30 5.20 8.00	Specification & Testing Method BS 499-Part 1 1983	1 Prepare surface to be joined by removing all mill scales, rust, oxides and other impurities 2 Clean thoroughly welded joints to remove slag deposits 3 Inspect welded joints thoroughly for blow holes and cracks and repair as specified in Standard
Hot Dip Galvanizing PART NO. (amendment suffix not shown) 1.10 1.20 1.32 1.40 2.00 5.20	Specification & Testing Method BS 729-1971 or ASTM A386-1971	1 Surface must be free from contamination e.g. paint, oil, grease, welding etc which are not removable by pickling 2 Where permanent identification marks are specified, they must be punched or embossed before galvanizing 3 Care should be taken when dipping that identification marks are not obscured

SELECTED COMMON PROCESSES

Process	Standard (if applicable)	General Remarks
Zinc Electroplating PART NO. (amendment suffix not shown) 1.22 1.24 3.12 3.13 3.15 3.17 4.12 4.13 4.24 4.30 5.12	Specification and Testing Method BS 1706-1960 or ISO-2081-1973(E)	Over the area of significant surface to be electroplated, the plated article shall be free from visible plating defects such as blisters, pits or unplated areas and shall not be stained or discoloured. The article shall be clear and free from damage. Permanent identification marks should be made before coating. Consideration of service condition and base metal is very important in galvanizing
Heat Treatment PART NO. (amendment suffix not shown) 1.41	Testing Hardness (Brinell) BS 240-1962 Hardness (Rockwell) BS 891	

SELECTED COMMON PROCESSES

Process	Standard (if applicable)	General Remarks
Unplasticized Polyvinylchloride uPVC extrusion PART NO. (amendment suffix not shown) 3.11 3.21 4.11 6.11 7.11 7.12 7.15 7.21 7.22 7.23	Extrusion process must be suitable for production of uPVC Pipe to BS 3505-1968 as confirmed September 1982	PVC extrusion method is applied for continuous production of pipes, bars etc
Injection Moulding of Plastics PART NO. (amendment suffix not shown) 2.14 4.22 4.23 5.11 7.24		1 Design of die mould should take care of shrinkage allowances for the plastics to avoid dimensional variations. In case of designing die for Nylon, special care should be taken for water absorption factor 2 Mould cooling should not result in distortion and poor surface finish

SELECTED COMMON PROCESSES

Process	Standard (if applicable)	General Remarks
Leather Cup Seal Forming PART NO. (amendment suffix not shown) 4.26	Specification for Vegetable Tanned Hydraulic Leather BS 2780-1983 or IS : 581-1976 Method of Chemical Testing of Leather BS 1309-1974 or IS : 582-1970 Physical Testing BS 3144-1968	Leather should be fully vegetable tanned. Origin of leather should be from butt or shoulder portion of hides of healthy buffalo
Vulcanizing Acrylonitrile Butadiene Rubber PART NO. (amendment suffix not shown) 1.14 3.22 5.14 6.13 7.13		Careful compounding should be done to achieve specified shore hardness. Carbon black is preferred as filler material for compounding

MATERIALS AND THEIR TESTING METHODS

RECOMMENDED BRAND
STANDARD
GENERAL REMARKS

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
Mild Steel Bar Plates and Sheets PART NO. (amendment suffix not shown) 1.13 3.12 4.32 1.21 3.13 5.21 1.22 4.12 5.22 1.23 4.14 5.23 1.32 4.24 5.24 2.13 4.31 8.11 8.12	Locally available and imported	1 Specification and testing method for steel plates and sheets : BS 1449 Part 1A - 1967 BS 1449 Part 1B - 1962 2 Specification and testing method for bars : BS 970 Part 1 - 1972	Finished surfaces of bars, plates and sheets should be free of mill scales, pits, oxide corrosion and other impurities
Mild Steel Tubes (Electric Resistance Welded) PART NO. (amendment suffix not shown) 1.11 1.12 2.11 2.12	Locally available	Specification and testing method : BS 1387 - 1967	Tubes should be smoothly finished free from harmful defects and reasonably free from scales

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
Hard Drawn Spring Steel Wire PART NO. (amendment suffix not shown) 1.41 1.42	Imported and locally available	1 Specification : ASTM A227-68 2 Testing Method : ASTM A370-68 3 Tensile Testing : ASTM A318-70	Hard drawn spring steel should be hardened, quenched and tempered as specified in drawings
Rubber Inner Tube PART NO. (amendment suffix not shown) 4.21 5.13	Locally available		Select flat portion of inner tube of uniform thickness, free of cracks, defects and weathering damage

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
Acrylonitrile Butadiene Rubber (ABR) PART NO. (amendment suffix not shown) 1.14 3.22 5.14 6.13	Bayer Perbunan N 3307 NS or Similar subject to prior approval by UNICEF	Testing Method : BS 6064 - 1981	Selection and proportion of raw materials in compounding should be done to achieve desired rubber hardness after curing. Carbon black is preferred as filler material for compounding
Vulcanized ABR PART NO. (amendment suffix not shown) 1.14 3.22 5.14 6.13 7.13		Testing Method of vulcanized rubber; determination of hardness : BS 903 Part A26 - 1969 Use and calibration of rubber hardness meter (pocket type) : BS 2719 - 1975	
Rubber 'O' Ring PART NO. (amendment suffix not shown) 5.14		Testing Method : ASTM D144 - 68	

MATERIALS AND THEIR TESTING METHODS

Material	Rocommended Brand	Standard (if applicable)	General Remarks
Plastics		Testing Method : BS 2782 Part 1, 2, 3, 4, 6, 8, 9	Synthetic plastic resins should be carefully combined, compounded, or chemically added with plastisizers, stabilizers, fillers, colourants and reinforcing agents before processing
High Density Polyethlene (HDPE) PART NO. (amendment suffix not shown) 5.11	Lupolen 5261z (BASF) Lupolen 6031M (BASF) Vestolene (Bayer) Hostallen Gur 412 (Hoechst) Alkathane (ICI) or similar subject to prior approval by UNICEF		(a) HDPE is easily mouldable thermoplastic synthetic resin. Refer to manufacturers' specification
Polyamide (Nylon) PART NO. (amendment suffix not shown) 4.22 4.23	Durathan BKV-35H (Bayer) Durathan 840SK (Bayer) Vestamid (Bayer) Zytel (Dupont) Maranyl (ICI) or similar subject to prior approval by UNICEF		(b) Polyamides are easily mouldable thermoplastic synthetic resin. Nylon, most widely used of polyamides, is tough, strong, light, abrasion resistant, good chemical and electrical resistant. It is highly water absorbent. Refer to manufacturers' specifications
uPVC Compound PART NO. (amendment suffix not shown) 7.24	imported or locally available	Specification and Testing Method : BS 2571 - 1963	(c) uPVC compound must be available for water grade pipe manutacture

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
u PVC Pipe and bar stock PART NO. (amendment suffix not shown) 3.11 7.11 3.21 7.12 4.11 7.21 6.11 7.22 6.12	Locally available	Specification and Testing Method: For u PVC Pipes BS 3505 - 1968 (1982)	1 Check all dimensions to conform to specified tolerances 2 Internal surface for smooth finish critical for cylinder pipe 3 Check for ovality 4 Check bell socket dimensions and alignment with pipe 5 Pipes and bar stocks should be of water grade. Check pipe straightness after extrusion 6 To avoid inducing bends in pipes during stacking, transportation and storing, make tight small bundles of pipes with 50% of bells pointing on both sides 7 Pipes should have markings identifying the manufacturer and Standard at regular intervals, as specified in purchase order 8 The above remarks also apply to manufacturers of pipes with internal reinforcing ribs 9 Bar stock to be free from blow holes

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
PVC Solvent Cement	S - Lon or similar subject to prior approval by UNICEF		Use quick drying solvent cement and apply as per the instruction of the manufacturer
Leather Vegetable Tanned Leather PART NO. (amendment suffix not shown) 4.26	Locally available	Specification : BS 2780 - 1983 or IS : 581 - 1976 Testing - Physical : BS 3144 - 1968 Testing - Chemical : BS 1309 - 1974 or IS : 582 - 1970	Use only butt and shoulder portion of hides of healthy buffalo. Hides should be tanned with natural vegetable tanning materials or their extracts or either of these in combination with syntans. The hides should be suitably dressed with oils and fats to make them suitable for moulding
Leather Cup Seal made from vegetable tanned leather PART NO. (amendment suffix not shown) 4.26		Specification for Leather pump buckets (cup seals) made from vegetable tanned leather : IS : 1015 - 1956	Cup seals should be manufactured by moulding having the grains surface inside. The seals should be uniform in substance, free from grit, hard pits and other visible defects

MATERIALS AND THEIR TESTING METHODS

Material	Recommended Brand	Standard (if applicable)	General Remarks
Hardwood PART NO. (amendment suffix not shown) 1.31	Teak (Tectona grandis) or Shal (Shorea Robusta) or Shilkoroi (Albizia Lebbec)		Hardwood should be seasoned, finished surfaces to be free of cracks and knots
Hexagon Head Bolts and Nuts PART NO. (amendment suffix not shown) 1.24 4.13 3.15 5.12 3.17	Locally available and imported	BS 3692 - 1967 or ISO 4016 (1979) for bolts and ISO 4034 (1979) for nuts	Steel property class 4.6
Stainless Steel PART NO. (amendment suffix not shown) 4.33	Locally available or imported	BS 2056 : 1983	

INSPECTION AND TESTING

MATERIAL
PRODUCTION PROCESS
ASSEMBLIES, SUB-ASSEMBLIES AND PARTS

INSPECTION AND TESTING

1 MATERIAL

INSPECTION

External inspectors may check raw materials and standard products used in the manufacture of the Tara pump against their specification and testing methods in accordance with the Standards mentioned in the third column of the sub-section "Materials and Their Testing Methods" and the relevant drawings. UNICEF may ask to see manufacturers' test certificates on raw materials and standard products.

INSPECTION AND TESTING

2 PRODUCTION PROCESS

2.1 IN-HOUSE INSPECTION

1 Producers should have well-trained and adequate number of quality control personnel for in-house routine inspection : each manufacturer should ensure that there is at least one person in charge of quality control for each shift, reporting directly to one person at management level specifically responsible for quality.

2 Inspection requirements have been identified in the "critical aspects" column of the production information sheets.

3 In-house inspectors should conduct periodic calibration of jigs/fixtures, gauges and measuring devices.

2.2 EXTERNAL INSPECTION

1 External inspectors may check the calibration of Jigs/fixtures, gauges and devices.

2 External inspectors may check production processes during manufacture.

INSPECTION AND TESTING

3.1 IN-HOUSE INSPECTION

1 Examine assemblies, sub-assemblies and parts visually for defects and finish.

2 Examine galvanized surface finish and painted surface finish for continuity, smoothness and adhesion. The surface should be free of blemishes. Some samples may be tested for thickness of coating.

3 Inspect welded joints for blow holes, cracks and slag deposits.

4 Check alignment, concentricity and surface finish of assemblies and sub-assemblies.

5 Check critical dimensions as mentioned in the last column "critical aspects" of the production information sheets in this manual.

6 Check parts made of hard drawn steel wire for spring elasticity.

7 Check thread formation and fits of relevant parts.

3.2 EXTERNAL INSPECTION

1 Sampling should be done to conform to standards BS 6001-72 and BS 6002-79.

2 Assemblies, sub-assemblies and parts should be properly inspected with regard to "critical aspects" and Standards.

3 Inspection should result in interchangeability of parts.

SECTION B

PRODUCTION INFORMATION AND DRAWINGS

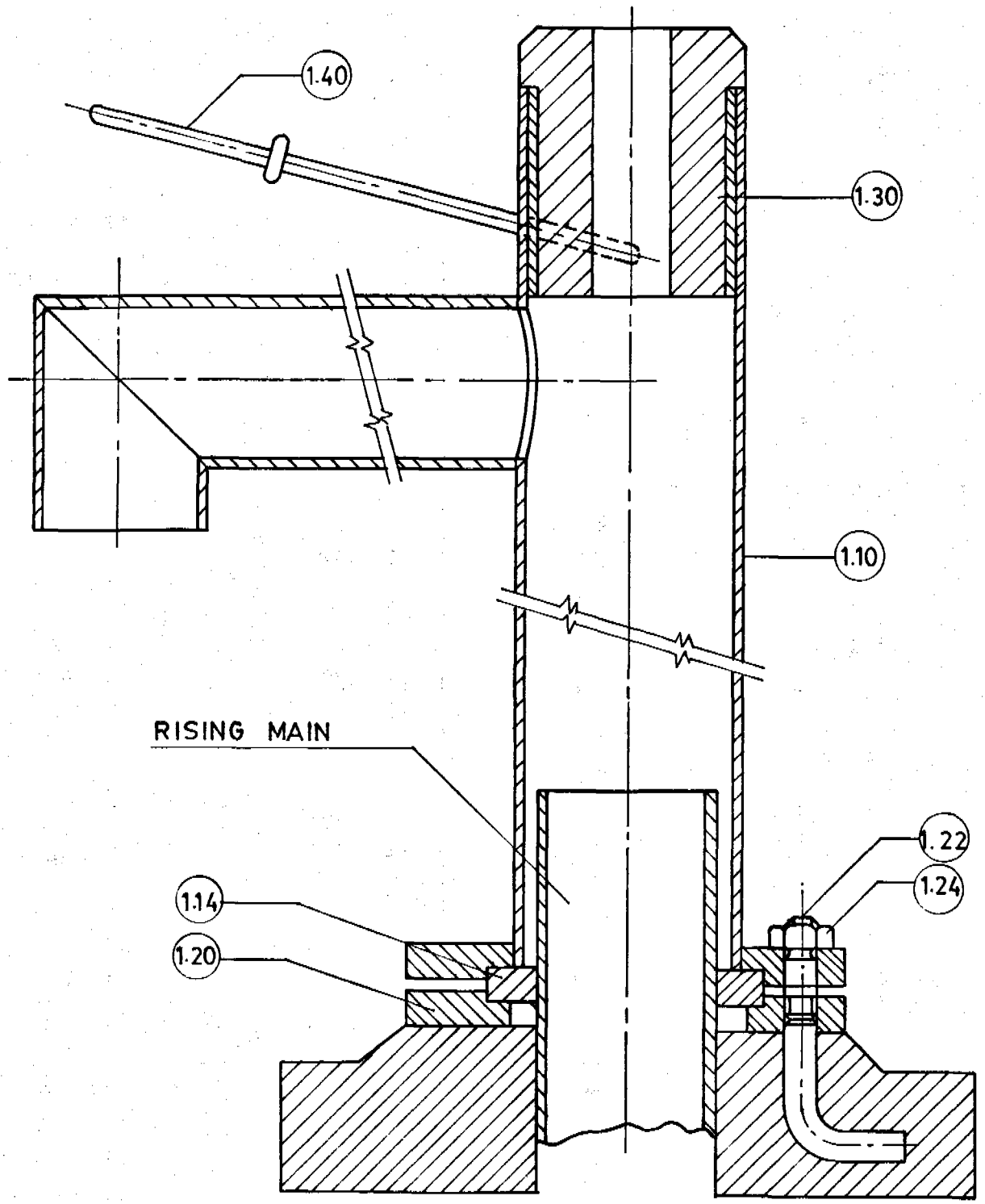
PUMPHEAD ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

PUMPHEAD ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.00 Pump Head Assembly	1 Fit guide bush assembly in pump head body 2 Drill 2 holes of dia 7mm on pump head body as per Drawing Nos 1.11 and 1.30 3 Assemble handle retainer with pump head body 4 Screw 3 studs of full 12mm thread side with bottom flange 5 Place grommet in between top and bottom flange in assembly 6 Tighten nut dia 0.5" BSW on each stud to secure the pump head assembly with bottom flange 7 Mark 8 Inspect (Approx production time 210 minutes)		Drill jig	Check 1 Alignment of holes in guide bush and pump body for both possible positions of guide bush and interchangeability between different pump bodies 2 Surface finish 3 Correctness of marking and packaging



TARA HANDPUMP

DPHE

unicef

1		
QUANTITY	MATERIAL	CUT OFF SIZE
SCALE 1 : 2	TOLERANCE U.O.S ± 0.5	DATE 21.1.87
NAME : PUMPHEAD ASSEMBLY		PART NO. 1.00/1

PUMP HEAD ASSEMBLY

PUMP HEAD SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.10 Pump Head Sub-Assembly	1 Fix inner pipe and end pipe in Sub-assembly jig and weld (to make spout) 2 Weld flange top with body 3 Fix spout and flanged body in assembly jig and tack weld 4 Final weld 5 Grind 6 File 7 Hot dip galvanize 8 Inspect (Approx production time 70 minutes)	1 Electric arc welder (minimum 180A) 2 Hand grinder Machine 3 Hot dip galvanizing bath	1 Welding jig for spout 2 Non-slip assembly welding jig for complete pump head assembly	Check 1 Spout alignment so that inner pipe and end pipe are at 90^0 2 Alignment of top flange and spout with body so that after welding flange and spout are at 90^0 with body and spout end pipe is in line with body 3 Flange hole locations to conform to drawing 4 Surface finish

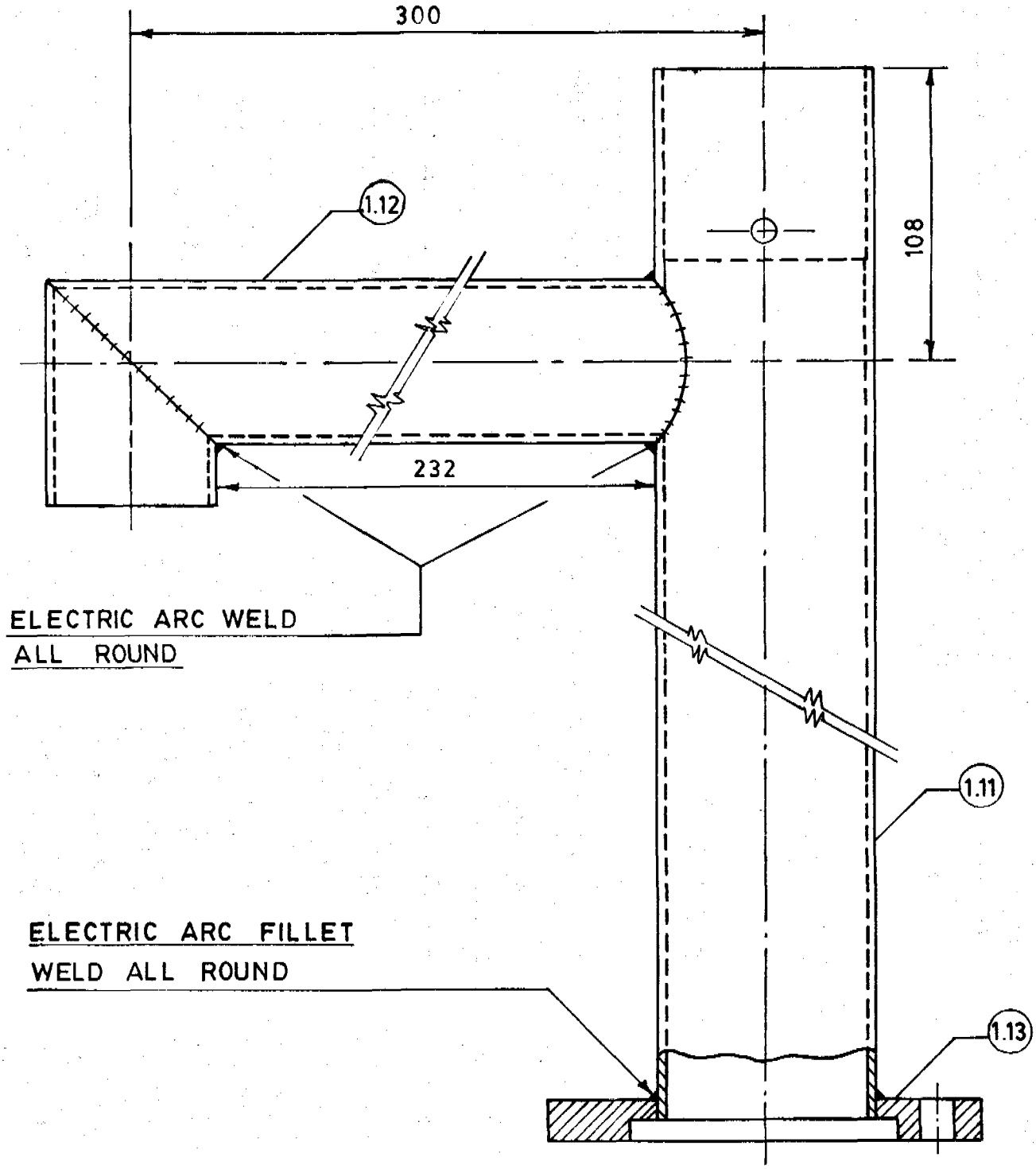
PUMP HEAD ASSEMBLY

PUMP HEAD SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.11 Body	1 Saw 2 Turn internal diameter to dia 70mm 3 Drill dia 50mm hole 4 File 5 Inspect	1 Reciprocating/ Band or Circular Saw machine 2 Lathe machine 3 Radial drill machine	1 Sawing jig 2 Plug gauge 3 Drill jig	Check Concentricity of 70 mm internal diameter with body
1.12 Spout	1 Saw pipe for inner pipe and end pipe 2 Mill end pipe for end profiling 3 File all ends 4 Inspect	1 Reciprocating/ Band or Circular Saw machine 2 Milling machine	1 Sawing jig 2 Milling fixture	

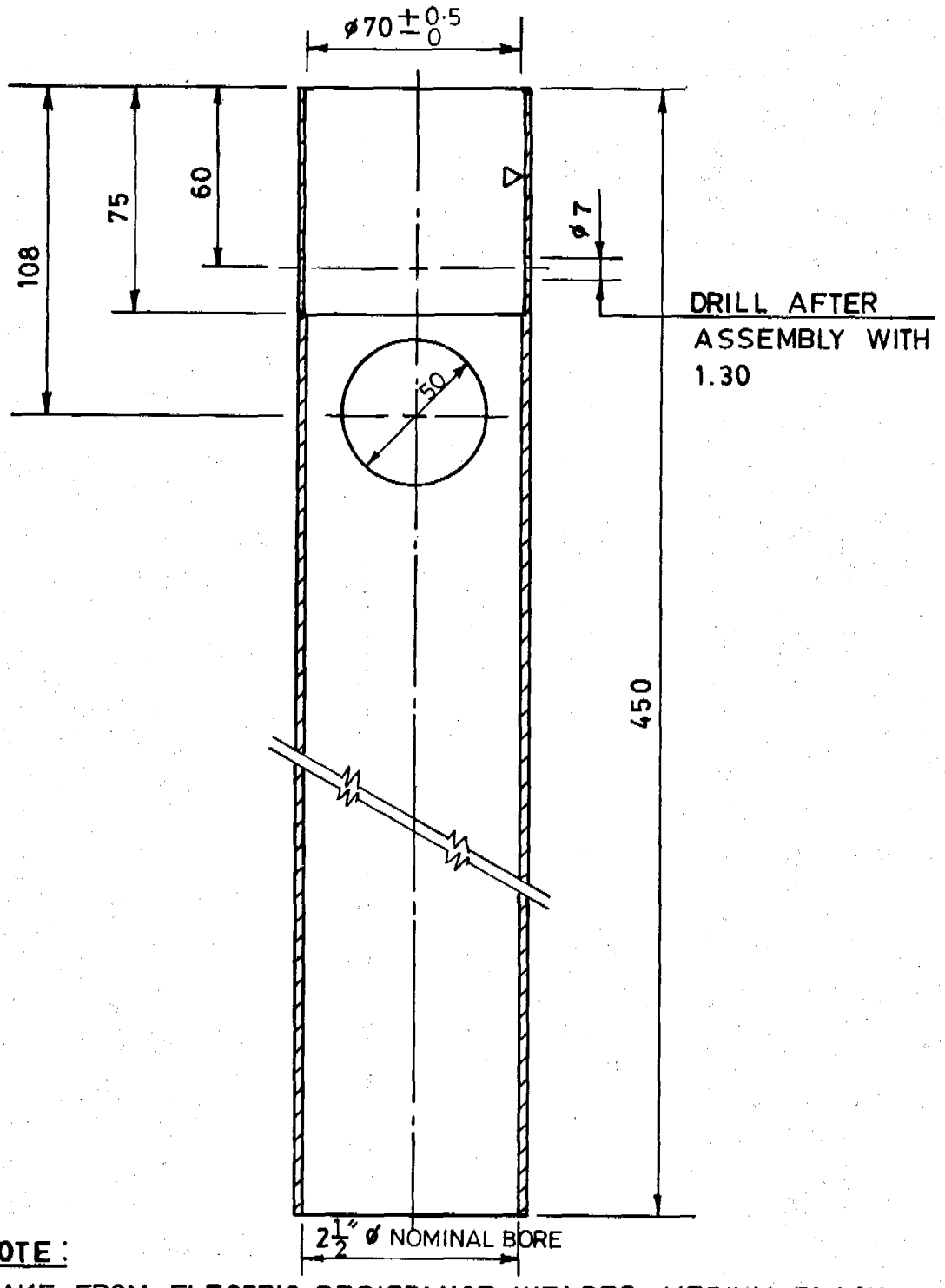
PUMP HEAD ASSEMBLY **PUMP HEAD SUB-ASSEMBLY**

Part No (without amendment) and Name	Production Process sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection.
1.13 Top Flange	1 Cut blanks from MS plates by Oxy acetylene gas 2 Turn 3 Bore 4 Drill holes 5 Inspect	1 Oxy acetylene gas cutting equipment 2 Lathe machine 3 Drilling machine	1 Circular guide for gas cutting 2 Drill jig	Check 1 Drilling of 3x14mm holes equispaced on PCD 120mm 2 Location of 3 holes in relation to the body and direction of spout 3 Surface finish smooth
1.14 Grommet	1 Compound and roll rubber dough into sheets 2 Mould and vulcanize 3 Inspect	1 Mixing roller 2 Press machine 3 Die mould		Check 1 Hardness 55-70 Shore "A" 2 Moulded dimensions



HOT DIP GALVANISE TO BS. 729 : 1971

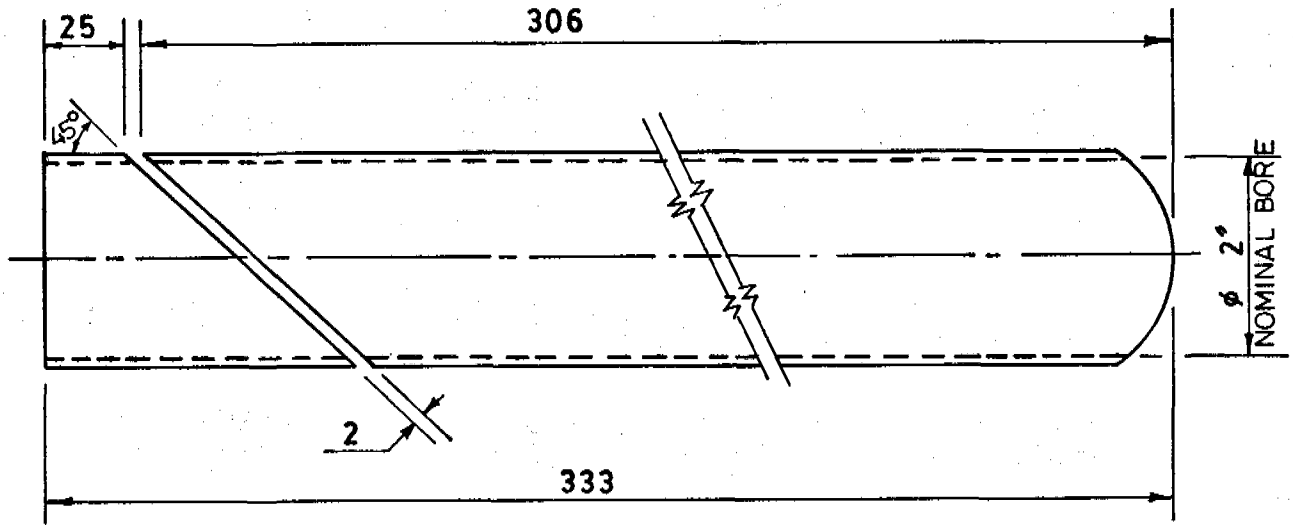
TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 2	TOLERANCE U. O. S ± 0.5	DATE 21. 1. 87
DPHE unicef	NAME : PUMP HEAD SUB ASSEMBLY		PART NO. 1.10/1



NOTE :

MAKE FROM ELECTRIC RESISTANCE WELDED MEDIUM BLACK M. S. PIPE TO BS 1387 : 1967

TARA HANDPUMP	1	SEE NOTE	ø 2½" x 450
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 2	TOLERANCE U.O.S. ± 0·5	DATE 22 . 1 . 87
DPHE unicef	NAME : BODY		PART NO. 1.11/1



NOTE: MAKE FROM ELECTRIC RESISTANCE WELDED MEDIUM BLACK M.S. PIPE TO BS 1387 : 1967

TARA HANDPUMP	1	SEE NOTE	ø 2" x 333
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 2	TOLERANCE U.O.S. ± 0.5	DATE 22.1.87
	NAME : SPOUT		PART NO. 1.12/1

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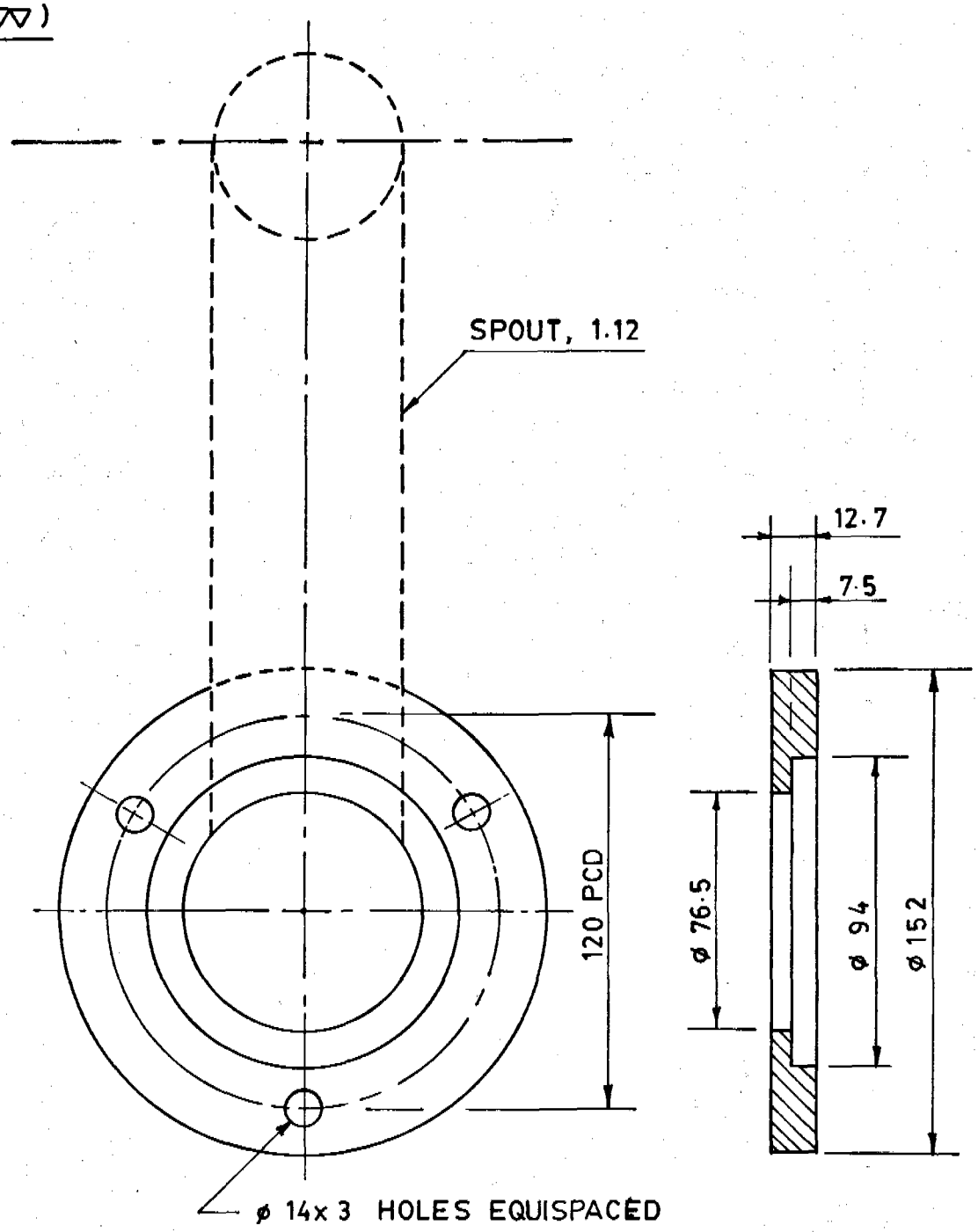
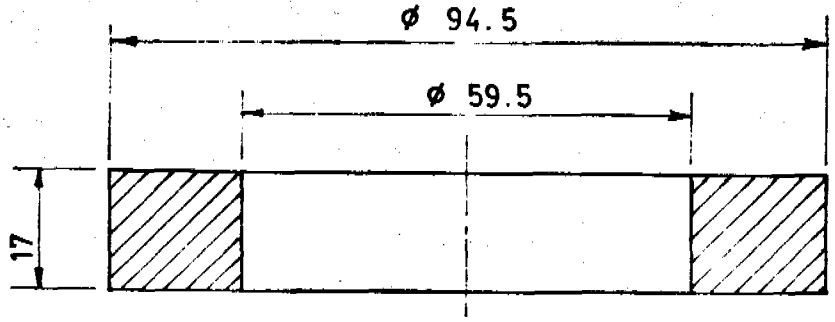


TARA HANDPUMP	1	M.S. PLATE	ø 160 x 1/2"
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 2	TOLERANCE U.O.S. ± 0.3	DATE 22.1.87
DPHE unicef	NAME: TOP FLANGE ALSO SHOWING LOCATION OF HOLES RELATIVE TO SPOUT.		PART NO. 1.13/1



NOTE: MAKE FROM ACRYLONITRILE BUTADIENE RUBBER BAYER PERBUNAN N3307 NS OR EQUIVALENT HARDNESS 55-70 SHORE 'A'

TARA HANDPUMP	1	SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1:1	TOLERANCE U.O.S ± 0·5	DATE 22.1.87
	NAME : GROMMET		PART NO. 1.14/1

PUMP HEAD ASSEMBLY — BOTTOM FLANGE SUB ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.20 Bottom Flange Sub-Assembly	1 Fix Flange and Lugs in assembly jig 2 Electric arc weld 3 Inspect 4 Hot dip galvanize 5 Inspect (Approx production time 70 minutes)	1 Electric arc welder (minimum 180A) 2 Hot dip galvanizing bath	Non-slip assembly welding jig	Check 1 That lugs are welded to flange at 90^{0} and end of lugs should not interfere with internal thread 2 Protect threads from galvanizing or after galvanizing run tapping die 3 Surface finish smooth

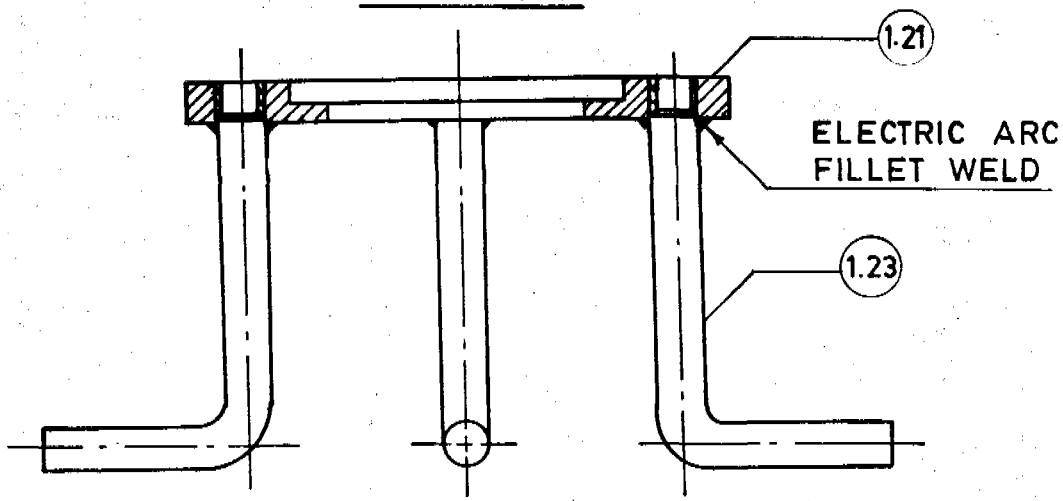
PUMPHEAD ASSEMBLY **BOTTOM FLANGE SUB ASSEMBLY**

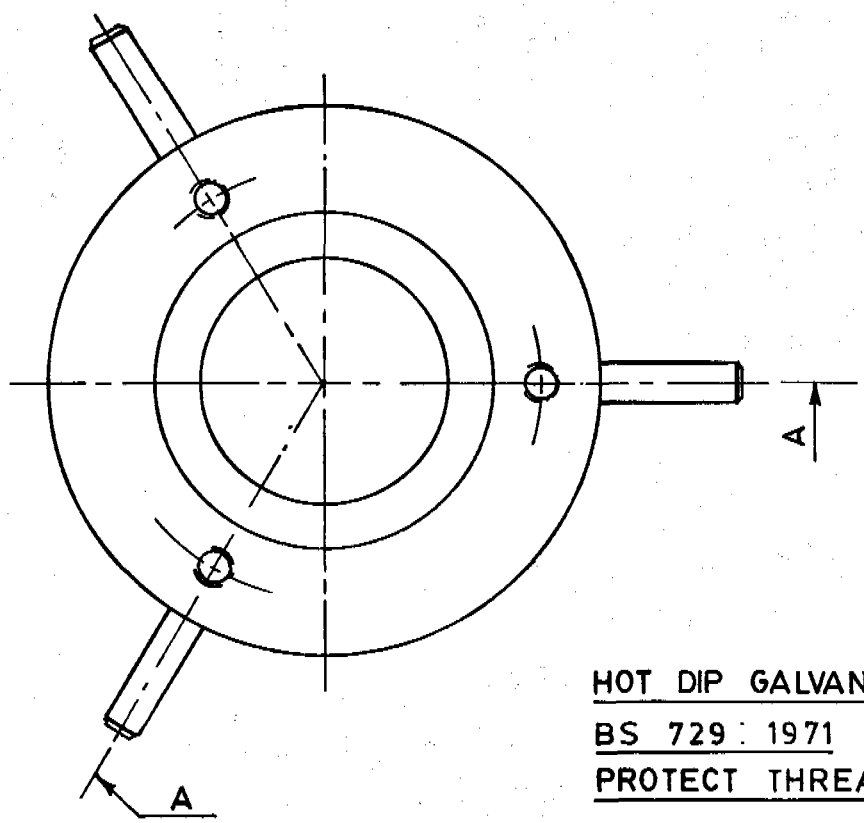
Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.21 Bottom Flange	1 Cut blanks from MS plates by oxy acetylene gas 2 Turn 3 Bore 4 Drill holes 5 Tap thread 6 Inspect	1 Oxy acetylene gas cutting equipment 2 Lathe machine 3 Drilling machine with reversible tapping chuck	1 Circular guide for gas cutting 2 Drill jig	Check Location of 3x0.5" BSW holes equispaced on PCD 120mm
1.22 Stud	1 Turn 2 Form thread 3 Cut off 4 Zinc electroplate 5 Inspect	Lathe machine	Go not go snap gauge or Ring gauge for threaded external diameter	Quality of threads

PUMP HEAD ASSEMBLY **BOTTOM FLANGE SUB ASSEMBLY**

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.23 Lug	1 Straighten 0.5" rod stock 2 Chamfer 3 Cut off to size 4 Bend in press 5 Inspect	1 Lathe machine 2 Bench press	Bending jig	
1.24 (ND) Nut	1 Procure general purpose steel HEX nut 2 Inspect 3 Zinc electroplate 4 Inspect			

SECTION A-A





HOT DIP GALVANISE TO
BS 729 : 1971
PROTECT THREADS

TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 2	TOLERANCE	DATE 22.1.87
DPHE unicef	NAME : BOTTOM FLANGE SUB ASSEMBLY		PART NO. 1·20

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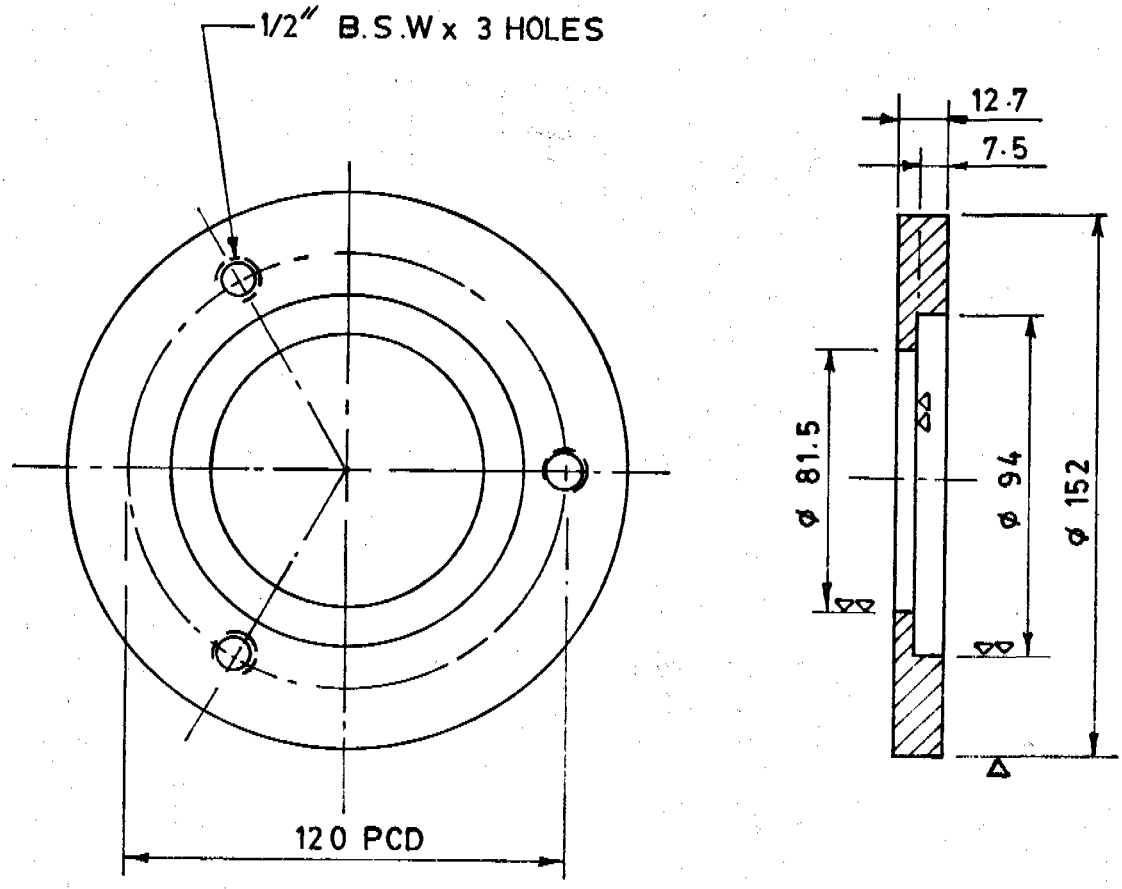
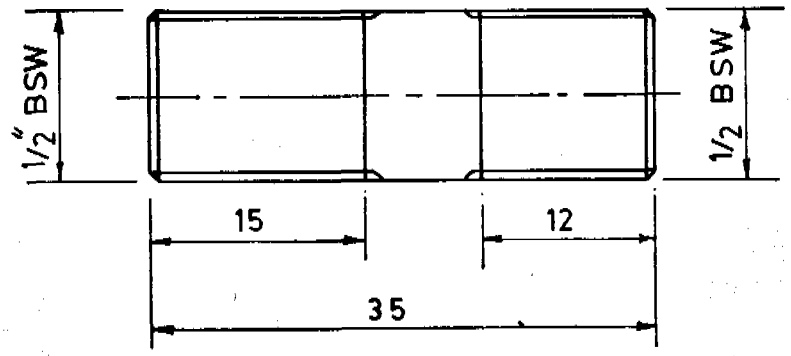


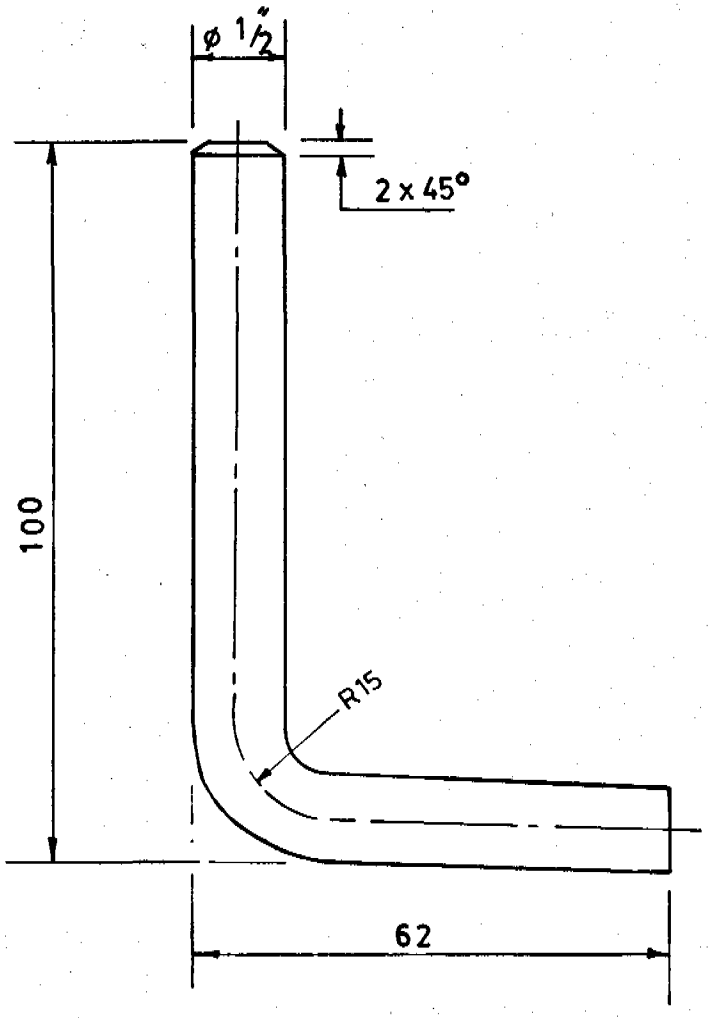
TARA HANDPUMP	1	M.S. PLATE	ø 160 x 1/2"
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1: 2	TOLERANCE U. O. S ± 0.3	DATE 22.1.87
	NAME : BOTTOM FLANGE		PART NO. 1.21



NOTE : MAY BE MADE FROM STANDARD BOLT 1/2" B.S.W. $1\frac{1}{2}$"
ELECTRO GALVANISE

TARA HANDPUMP	3	M.S	
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 2 : 1	TOLERANCE U.O.S ± 0·3	DATE 22.1.87
	NAME : STUD		PART NO. 1·22

DPHE unicef



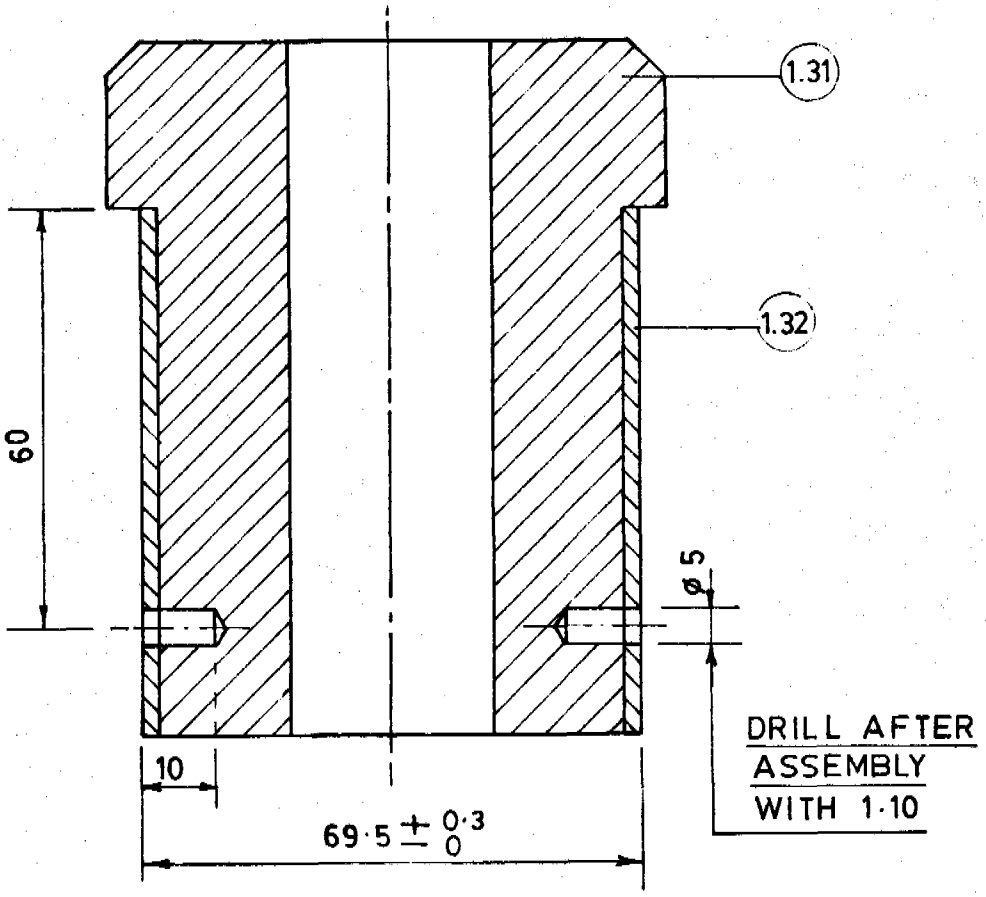
TARA HANDPUMP	3	M. S	ø 1/2" x 160
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1:1	TOLERANCE U.O.S. ± 0.3	DATE 31. 1. 87
DPHE unicef	NAME : LUG		PART NO. 1.23

PUMPHEAD ASSEMBLY **TOP GUIDE BUSH SUB-ASSEMBLY**

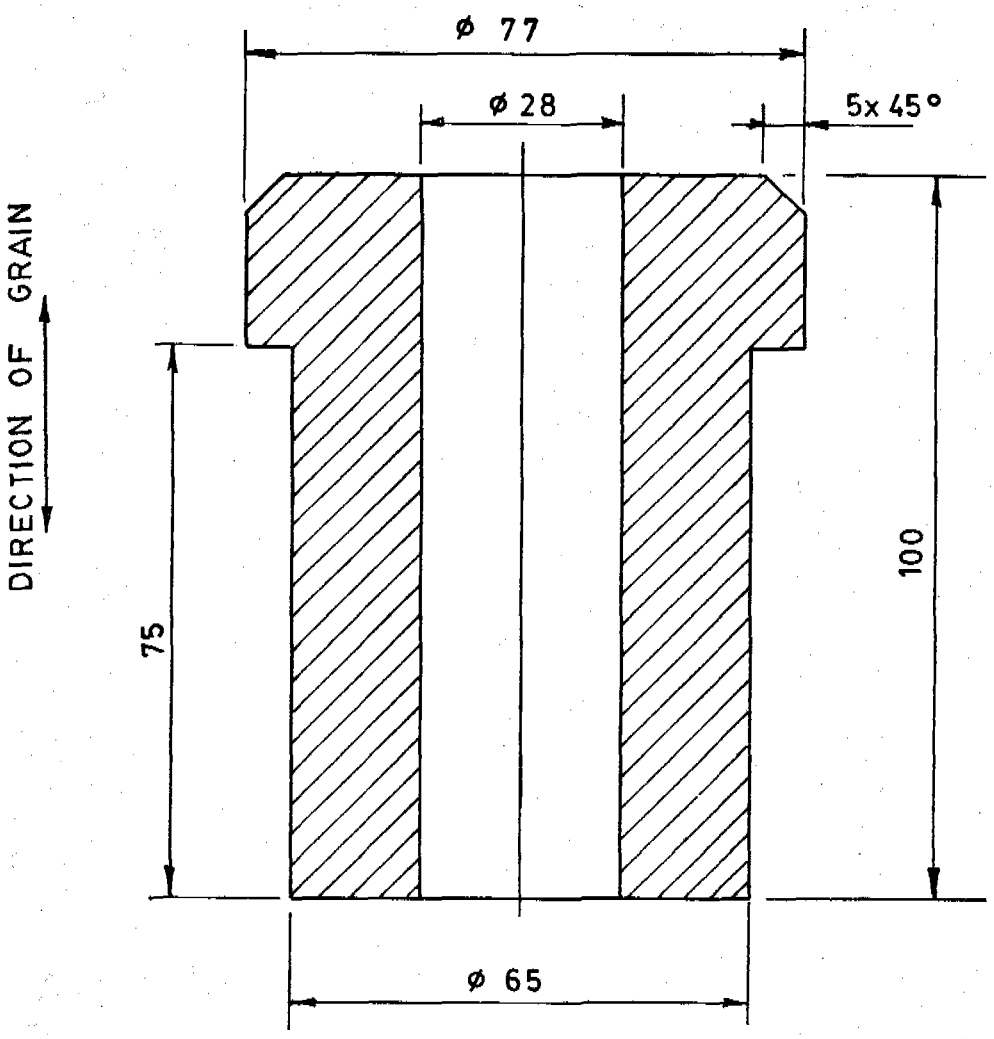
Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.30 Top Guide Bush Sub-Assembly	1 Smooth guide bush surface by emery paper and press fit sleeve 2 Inspect (Approx production time 25 minutes)			Check 1 OD of guide bush sub-assembly 2 Alignment of drill holes in guide bush for interchangeability with different pump bodies in both possible positions (drilling to be done at time of pump head assembly (1.00)

PUMPHEAD ASSEMBLY **TOP GUIDE BUSH SUB-ASSEMBLY**

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids.	CRITICAL ASPECTS of Production and Inspection
1.31 Top Guide Bush	1 Prepare stock dia 80x105mm from seasoned wood 2 Turn 3 Bore 4 Face 5 Chamfer 6 Cut off to finish size 7 Inspect	Wood turning lathe		**Check** 1 For direction of wood grain along the direction of hole 2 Quality of wood
1.32 Sleeve	1 Shear into strip of MS sheet 210 mm x 75 mm x 14 SWG 2 Roll into circular tube 3 Seam weld by Oxy acetylene gas 4 Hammer welded joint 5 Reroll 6 Hot dip galvanize 7 Inspect	1 Manual or power shearing machine 2 Bending roller machine 3 Oxy acetylene gas welding equipment	Cylindrical mandrel of dia 65.5 mm $\pm$ 0.5 (hardened & tempered)	**Check** 1 Outside diameter 2 Quality of pipe seam 3 Surface finish



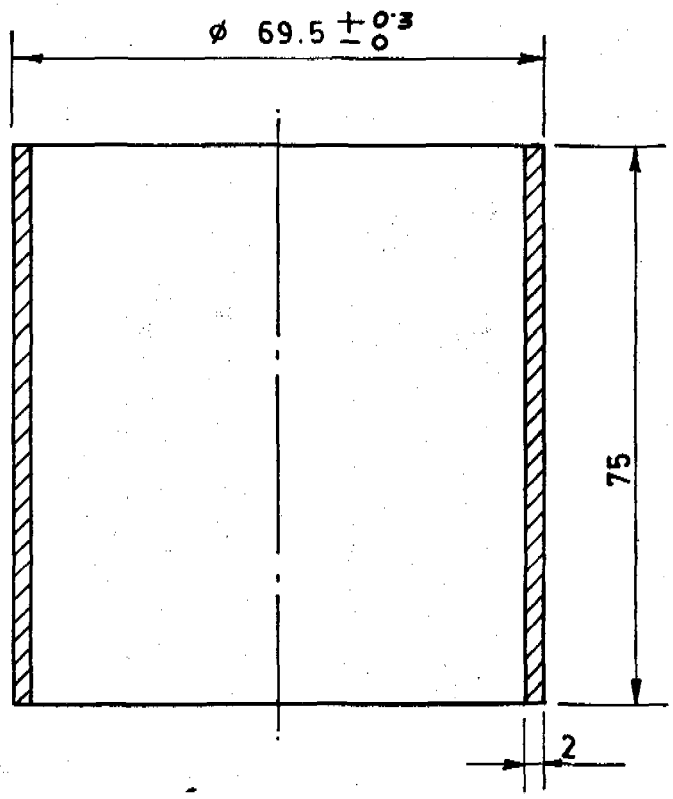
TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U. O. S ± 0·3	DATE 22. 1. 87
	NAME : TOP GUIDE BUSH SUB ASSEMBLY		PART NO. 1.30/1



MAKE FROM SEASONED HARD WOOD - SHAL WOOD OR EQUIVALENT.

NOTE: DIRECTION OF GRAIN FOR MACHINING

TARA HANDPUMP	1	SEE NOTE	ø 80 x 105
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S. ±0.3	DATE 22 . 1 . 87
	NAME : TOP GUIDE BUSH		PART NO. 1-31



HOT DIP GALVANISE TO BS 729 : 1971

TARA HANDPUMP	1	M. S. SHEET	210x75x14 S.W.G.
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1:1	TOLERANCE U.O.S ± 0.3	DATE 22 . 1 . 87
	NAME : SLEEVE		PART NO. 1·32

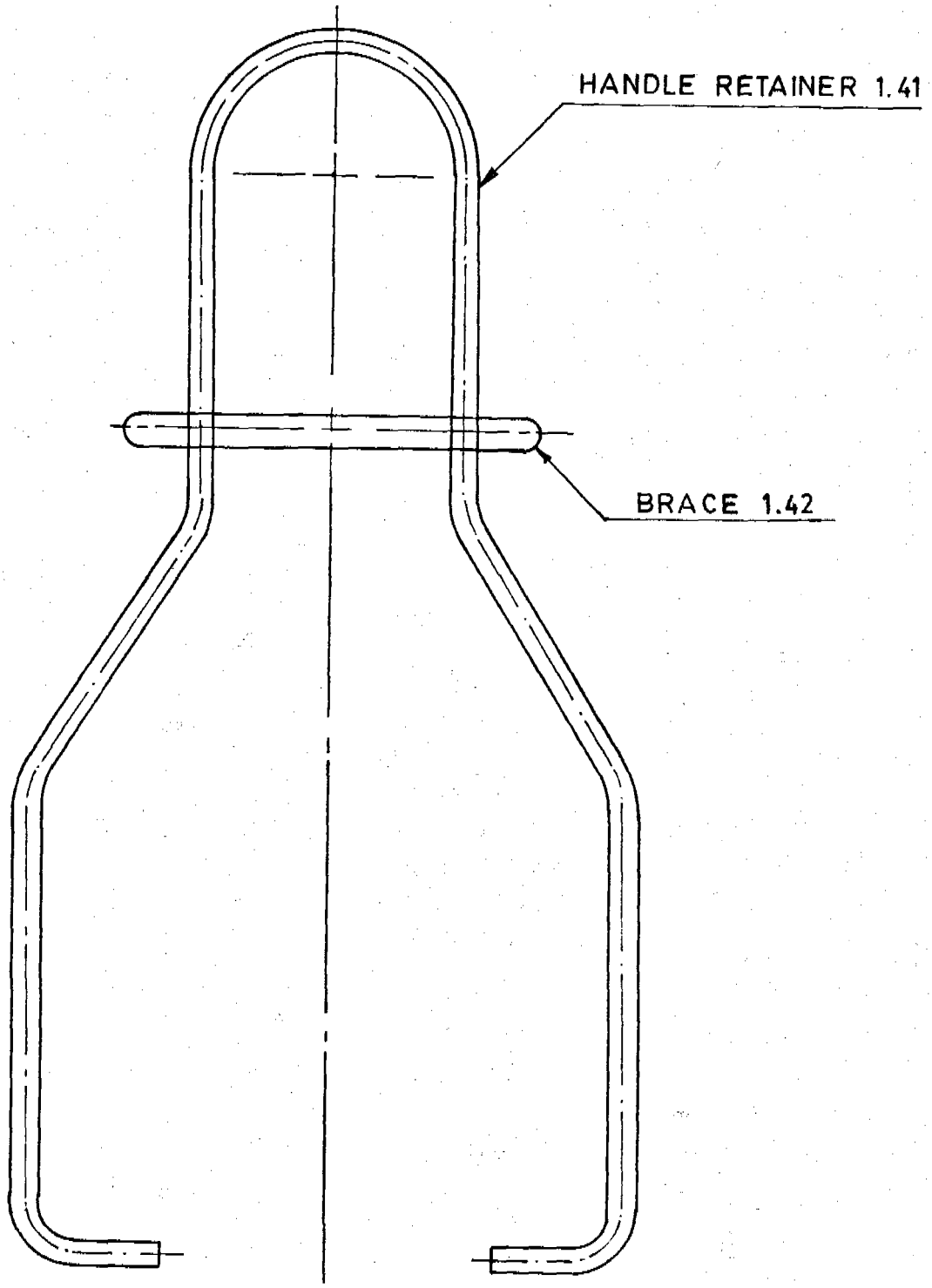
PUMPHEAD ASSEMBLY

HANDLE RETAINER SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.40 Handle Retainer Sub-Assembly	Assemble brace and handle retainer by closing open end of brace (Approx production time 15 minutes)			Check Shape and dimensions as per drawing

PUMPHEAD ASSEMBLY **HANDLE RETAINER SUB-ASSEMBLY**

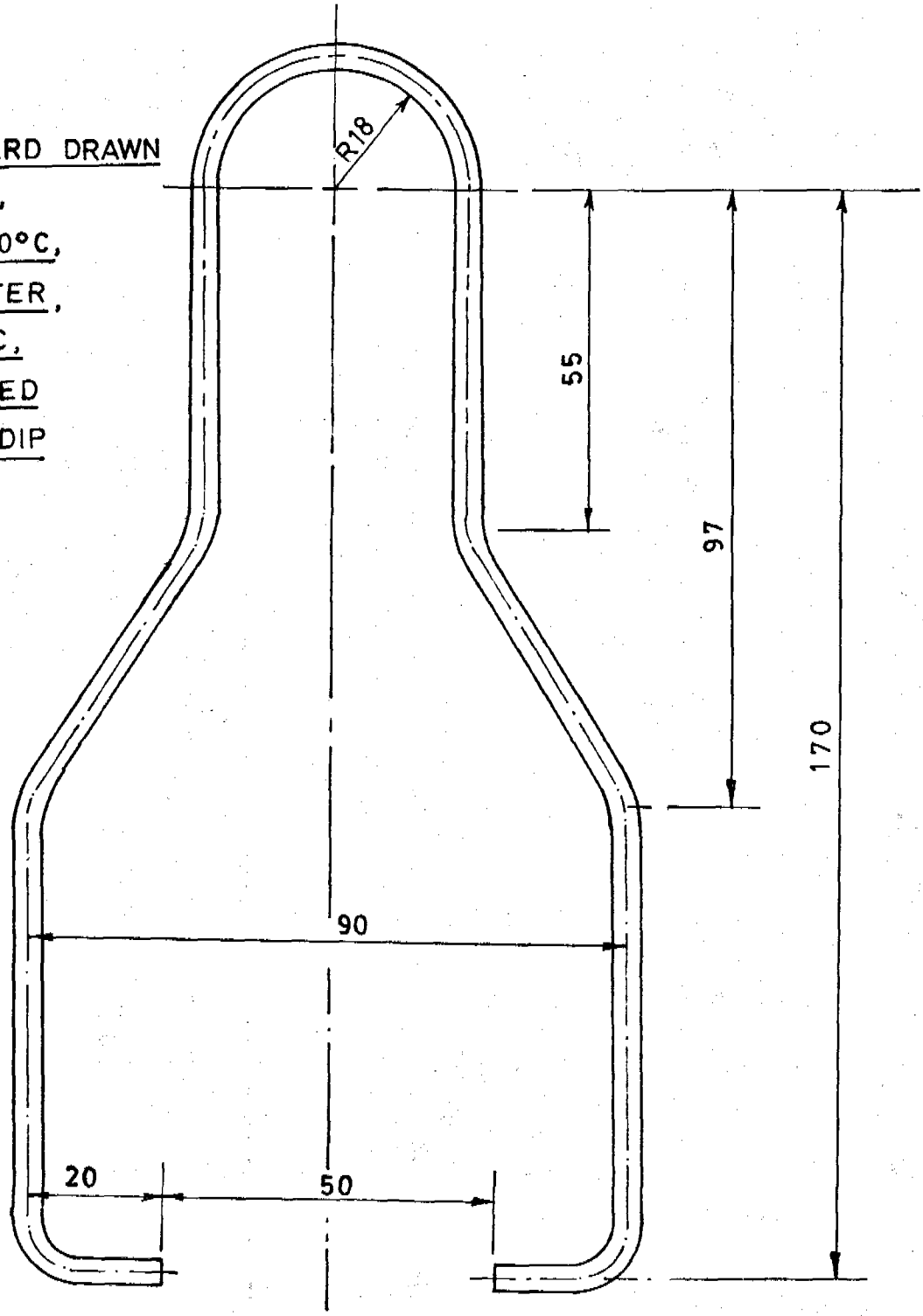
Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
1.41 Handle Retainer	1 Straighten spring steel wire 2 Shear stock 3 Bend 4 Heat treat and temper 5 Inspect 6 Hot dip galvanize 7 Inspect	1 Shearing press or Iron worker 2 Heat treatment oven	Bending jig	Check 1 Springing action of the handle retainer for secured locking 2 Dimensions for proper operation and interchangeability
1.42 Brace	1 Straighten spring steel wire 2 Shear stock 3 Bend 4 Inspect 5 Hot dip galvanize 6 Inspect	Shearing press or Iron worker	Bending jig	



TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 19. 9. 87
	NAME : HANDLE RETAINER SUB - ASSEMBLY		PART NO. 1.40/1

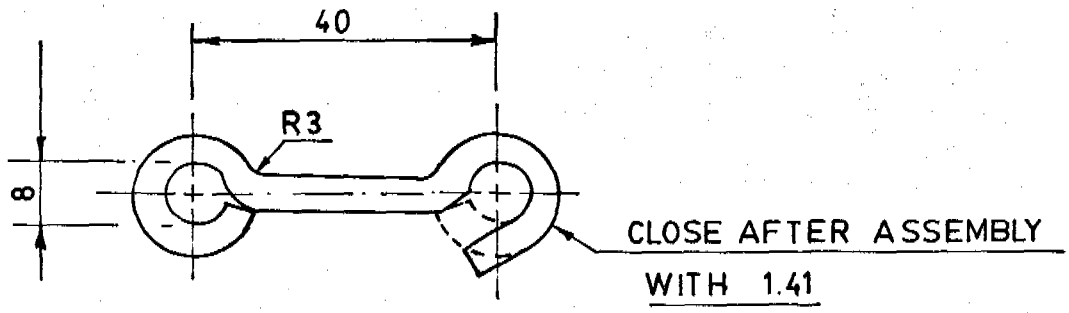
NOTE:

MAKE FROM HARD DRAWN SPRING STEEL, HARDEN AT 840°C, QUENCH IN WATER, TEMPER 400°C, ALL UNSPECIFIED RADII-5, HOT DIP GALVANISE



TARA HANDPUMP	1		ø 3/16"x 500
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE	DATE 19. 9. 87
	NAME : HANDLE RETAINER		PART NO. 1.41/1

DPHE unicef



FINISH HOT DIP GALVANISE
TO BS 729 : 1971

TARA HANDPUMP	1	M.S	ø 3/16"x100
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ± 0·3	DATE 26. 1. 87
	NAME : BRACE		PART NO. 1.42

HANDLE ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

HANDLE ASSEMBLY

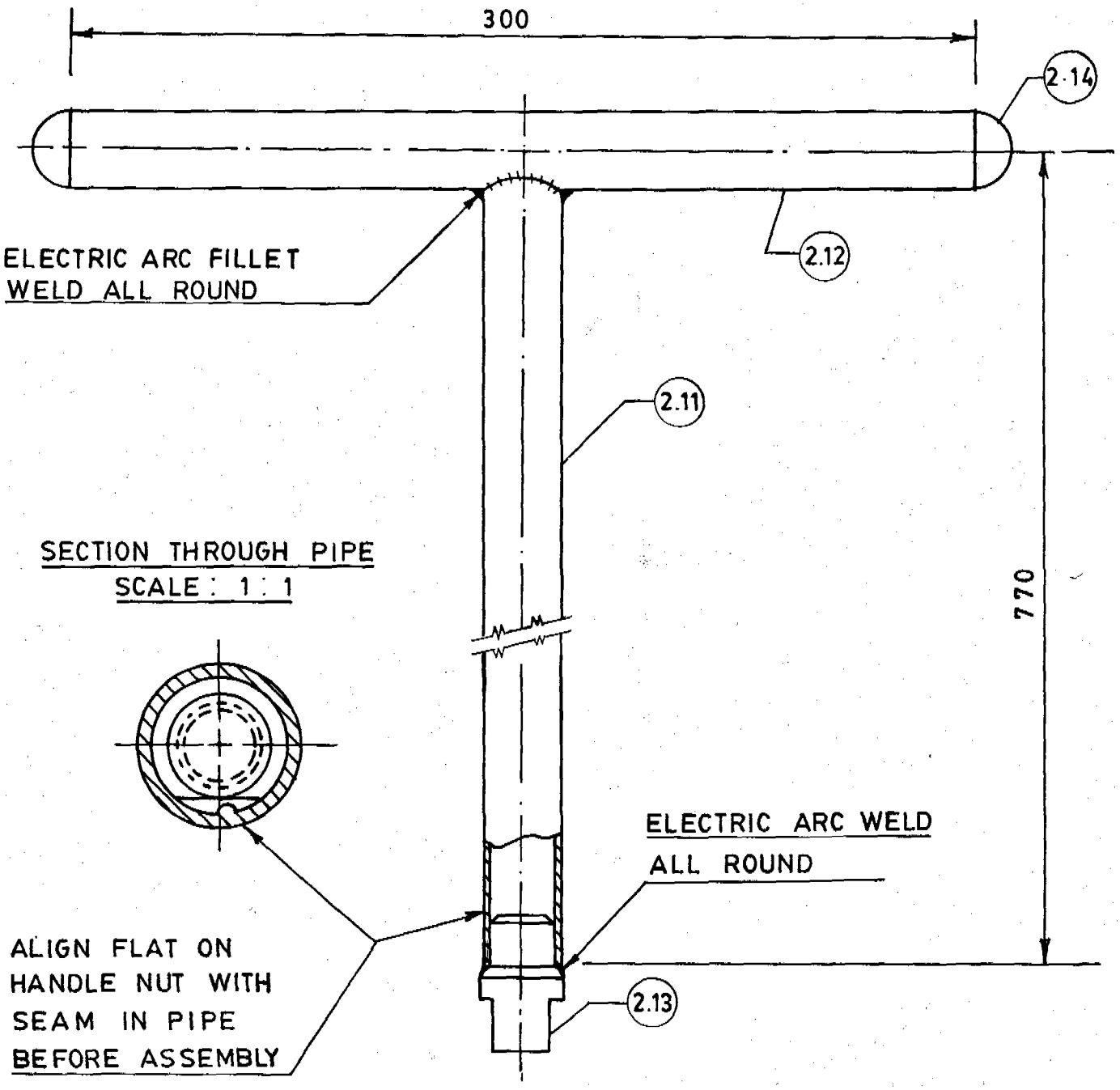
Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
2.00 Handle Assembly	1 Fix components in assembling jig 2 Weld 3 Grind 4 Inspect 5 Hot dip galvanize 6 Clean thread 7 Fix Handle Cap (Part No. 2.14) onto ends of handle T-Bar 8 Inspect (Approx production time 70 minutes)	1 Electric arc welder (minimum 180A) 2 Bench grinding machine 3 Hot dip galvanizing bath	1 Non-slip Assembly welding jig 2 Thread gauge	Check 1 Alignment of handle nut with rod for concentricity 2 Quality of handle nut thread (check with thread gauge) 3 Handle and rod at 90^0 4 Rod surface for smoothness and free of blemishes after galvanizing 5 Surface finish 6 Handle Cap (Part No. 2.14) fixed in position. 7 Correctness of marking and packaging

HANDLE ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
2.11 Rod	1 Saw 2 Mill end profile 3 File 4 Inspect	1 Reciprocating saw machine or Band machine or Circular saw machine 2 milling machine	1 Sawing jig 2 Milling fixture	**Check** 1. Pipe straightness after sawing 2. End profile after milling to conform to drawing for ease of welding
2.12 Handle	1 Saw 2 File 3 Inspect	Reciprocating saw machine or Band saw machine or Circular saw machine	Sawing jig	**Check** Pipe straightness and finishing of ends after sawing.

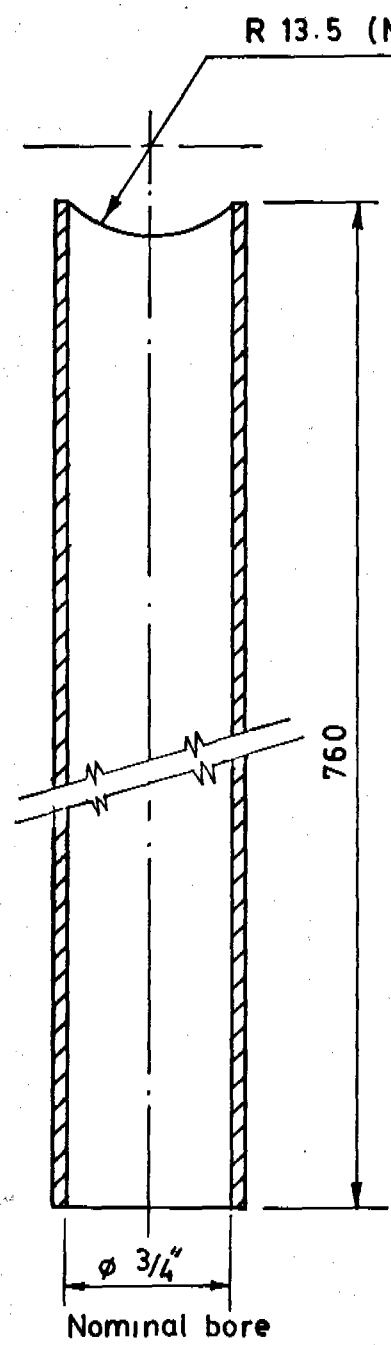
HANDLE ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
2.13 Handle Nut	1 Turn 2 Form groove 3 Face 4 Bore 5 Form thread 6 Chamfer 7 Cut off from stock 8 Inspect 9 Mill or shave flat surface 10 Inspect	1 Lathe machine 2 Milling machine	1 Go, not go thread plug gauge 2 Ring gauge or Snap gauge	Check 1 Dimension 22 mm after milling 2 Length, formation and fit of internal thread to conform to Standard, using a thread gauge
2.14 Handle Cap	1 Injection mould using any common durable plastic resin 2 Inspect	1 Injection moulding machine 2 Die mould		



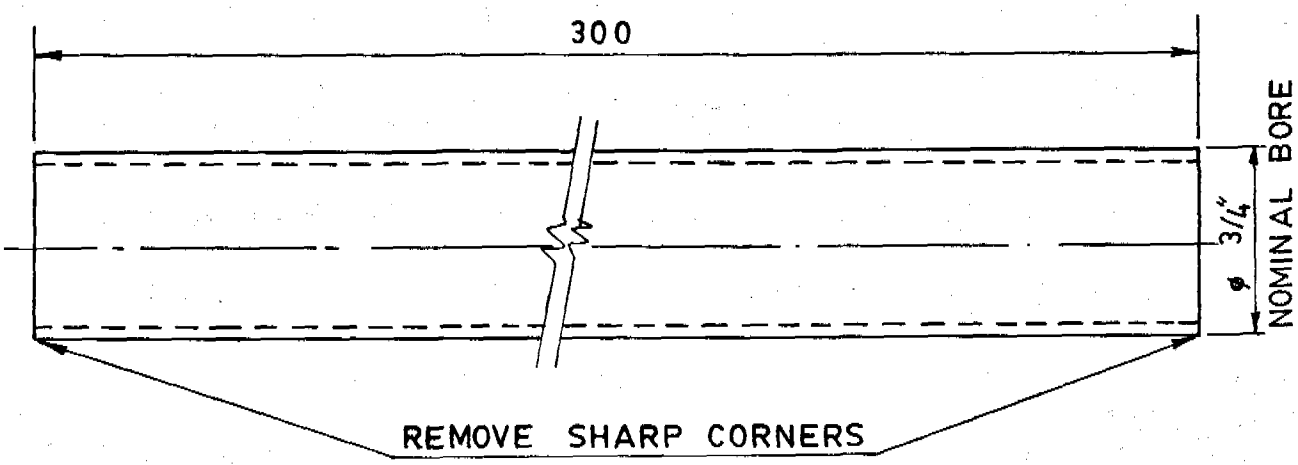
HOT DIP GALVANISE TO BS 729 : 1971 AFTER ASSEMBLY
CLEAN THREADS

TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 2	TOLERANCE U.O.S ±1.0	DATE 31.1.87
	NAME : HANDLE ASSEMBLY		PART NO. 2.00/1



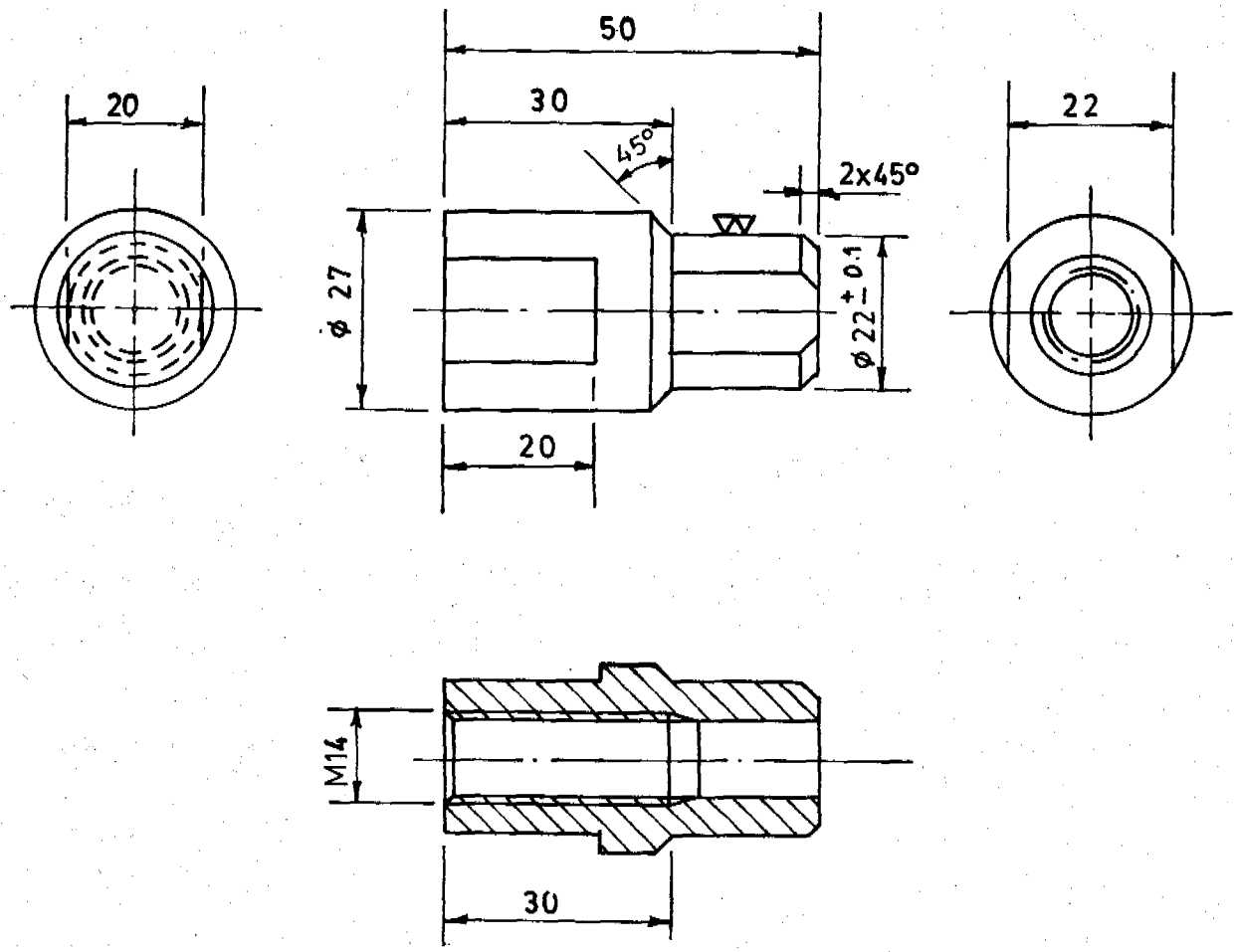
MAKE FROM LIGHT BLACK ELECTRIC RESISTANCE WELDED PIPE TO BS 1387 : 1967

TARA HANDPUMP	1	SEE NOTE	ϕ 3/4"x 760
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ±0.5	DATE 25.1.87
	NAME : ROD		PART NO. 2-11/1

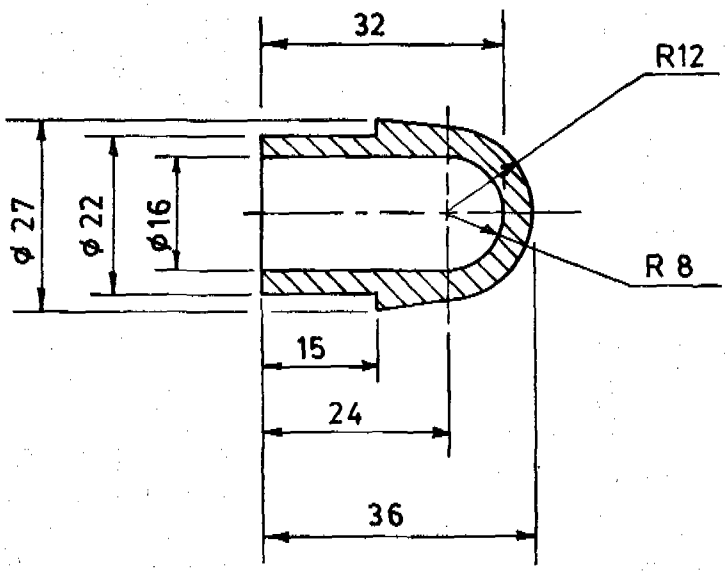


MAKE FROM LIGHT BLACK ELECTRIC RESISTANCE WELDED PIPE TO BS 1387 : 1967

TARA HANDPUMP	1	SEE NOTE	ø 3/4" x 300
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1:1	TOLERANCE U.O.S ± 0.5	DATE 24. 11. 87
	NAME : HANDLE		PART NO. 2·12/1



TARA HANDPUMP	1	M. S.	ϕ 1¼" x 52
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE U.O.S ± 0·2	DATE 31. 1. 87
DPHE unicef	NAME : HANDLE NUT		PART NO. 2·13



TARA HANDPUMP	2	PLASTIC	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1:1	TOLERANCE	DATE 18. 10. 87
DPHE unicef	NAME : HANDLE CAP		PART NO. 2.14

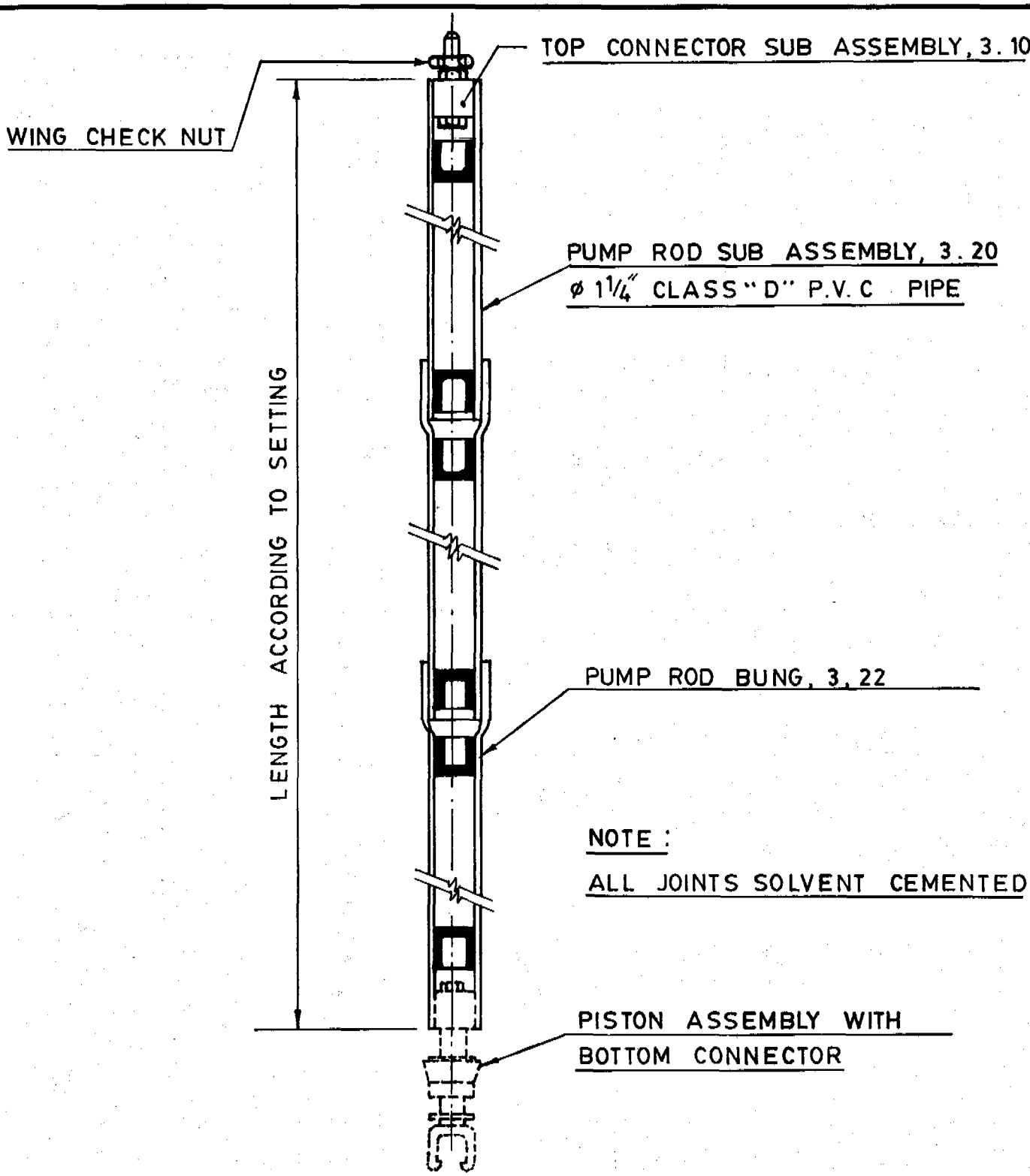
PUMP ROD ASSEMBLY WITH TOP CONNECTOR

PRODUCTION INFORMATION

DRAWINGS

PUMP ROD ASSEMBLY WITH TOP CONNECTOR

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.00 Pump Rod Assembly with Top Connector	1 Fit rubber bung inside pump rod end (using soapy water) 2 Clean thoroughly surface of application preferably by acetone 3 Apply solvent cement on mating surfaces in uniform film thickness 4 Assemble top connector sub-assembly and pump rod 5 Provide specified setting time 6 Wire wing check nut into place 7 Inspect (Approx production time 30 minutes)			Check 1 Tolerances and fits of mating surfaces for correct film thickness of solvent cement 2 For cleanliness of surfaces of application 3 Solvent cement film for continuity and uniformity 4 Setting time 5 That there is no play between mating surfaces to avoid occurrence of fretting 6 One length of pump rod to be solvent cemented to top connector, without socket (length will be specified in purchase order) 7 Wing nut is wired in place



TARA HANDPUMP

DPHE

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QUANTITY	MATERIAL	CUT OFF SIZE
SCALE 1 : 5	TOLERANCE	DATE 2.2.87
NAME : PUMP ROD ASSEMBLY WITH TOP CONNECTOR		PART NO. 3.00/1

PUMP ROD ASSEMBLY WITH TOP CONNECTOR

TOP CONNECTOR SUB-ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.10 Top Connector Sub-Assembly	1 Assemble all the parts i.e. bush, bolt, washers, nut and wing check nut in relative positions 2 Use solvent cement while fitting bolt into uPVC bush as filler 3 Tighten nut and punch to lock the nut with rod 4 Inspect (Approx production time 25 minutes)			**Check** 1 Locking of nut with bolt 2 Whether solvent cement has been used while fitting bolt into bush 3 Surface finish 4 OD of bush to match ID of pump rod

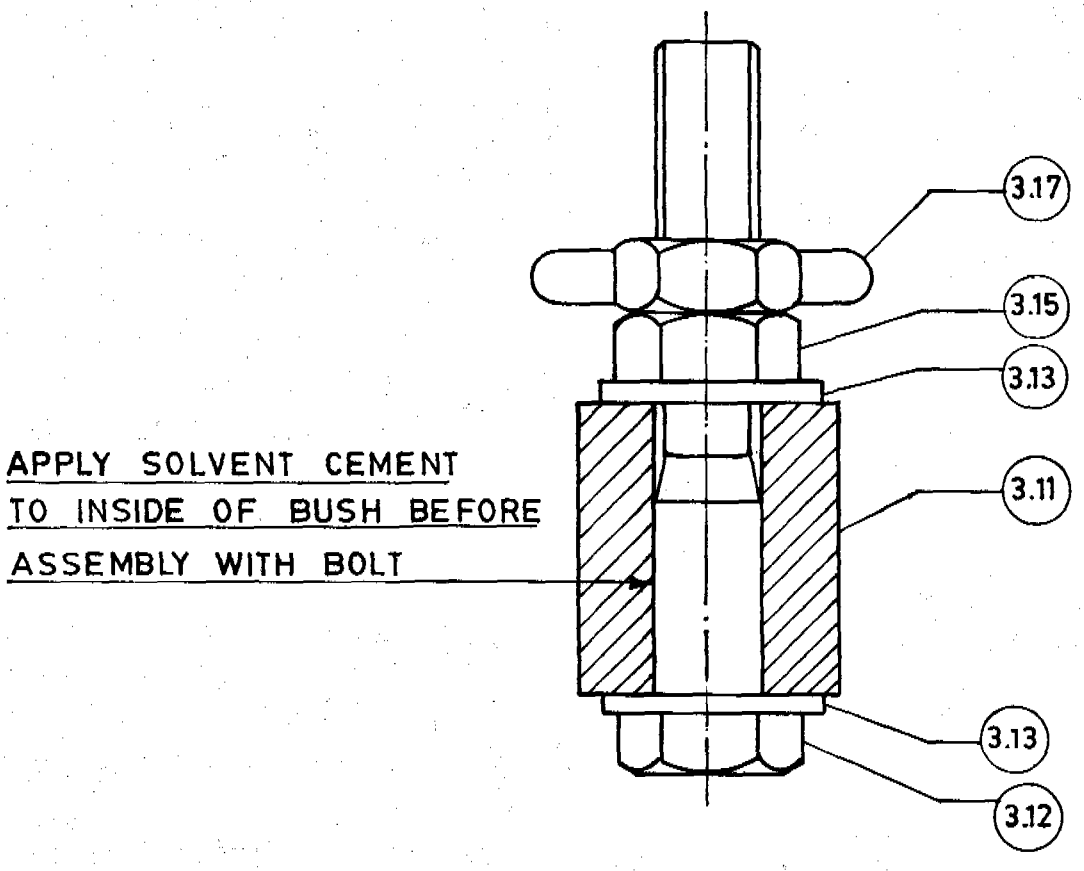
PUMP ROD ASSEMBLY WITH TOP CONNECTOR — **TOP CONNECTOR SUB-ASSEMBLY**

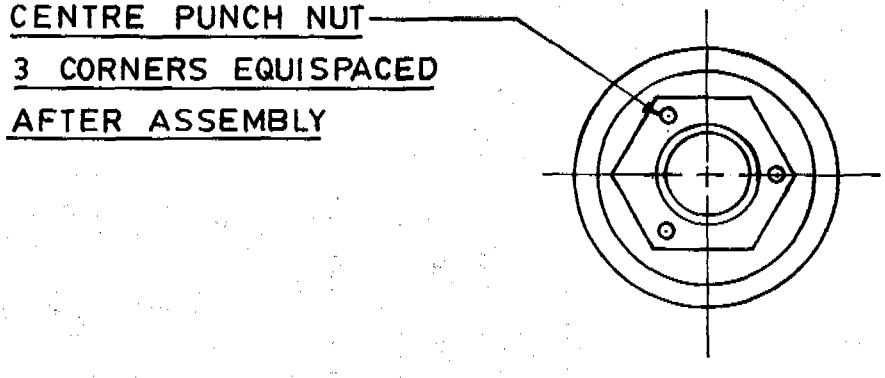
Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.11 Top Connector Bush	1 Procure uPVC bar stock 2 Cut off 3 Turn 4 Bore 5 Cut off 6 Inspect (Note : Take care in selecting cutting speed and feed of tools while working in lathe to achieve desired surface finish)	1 Sawing machine 2 Lathe machine	1 Go, not go plug gauge 2 Snap gauge or Ring gauge	**Check** Diameter 14 mm and outer diameter of bush for specific fit inside the 1.25" uPVC pump rod
3.12 Bolt	1 Make from general purpose Steel HEX bolt to BS 3692-1967 (ISO-4016) or procure 2 Inspect 3 Zinc electroplate 4 Inspect	Lathe machine	1 Thread gauge 2 Snap gauge or Ring gauge	**Check** 1 Dimensions and threads (use thread gauge) 2 Quality of plating

PUMP ROD ASSEMBLY WITH TOP CONNECTOR

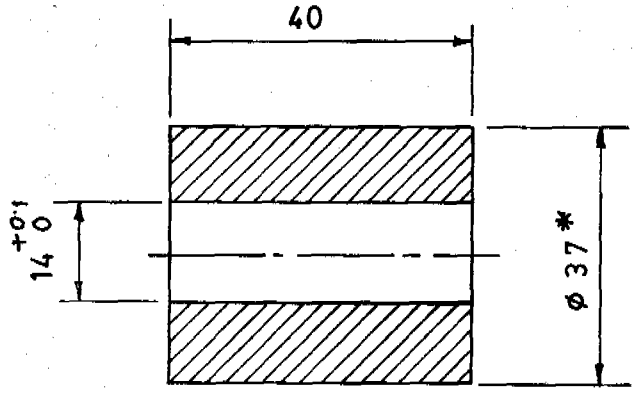
TOP CONNECTOR SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.13 Washer	1 Stamp 2 Zinc electroplate 3 Inspect (or procure locally finished)	1 Punching press (bench type) 2 Combination die for stamping		
3.15 Nut	1 Procure general purpose steel HEX nut 2 Inspect 3 Zinc electroplate 4 Inspect		Thread plug gauge	Check 1 Thread quality 2 Plating quality
3.17 Wing check nut	1 Procure general purpose steel HEX wing nut 2 Inspect 3 Zinc electroplate 4 Inspect		Thread plug gauge	Check I Thread Quality 2 Plating quality



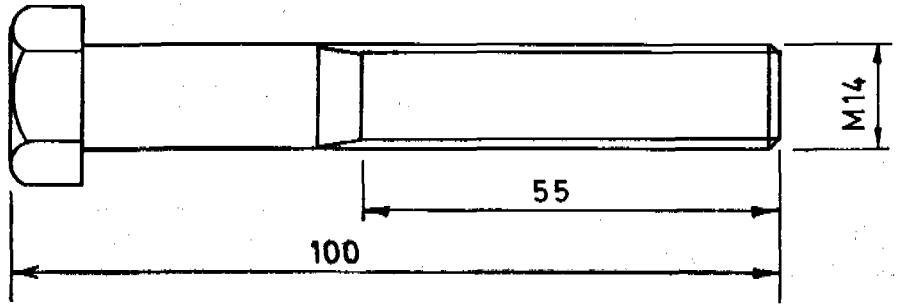


TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1:1	TOLERANCE	DATE 24.11.87
	NAME : TOP CONNECTOR SUB ASSEMBLY		PART NO. 3·10/1



*NOTE : ø 37 TO BE ADJUSTED FOR FIT OF $^{0.3}_{0.1}$ WITH $1\frac{1}{2}$" PVC PIPE

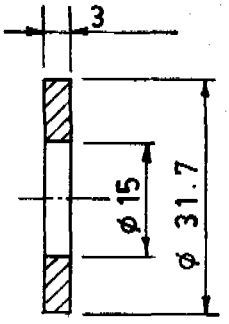
TARA HANDPUMP	1	PVC BAR	ø 42 x 40
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S. ± 0.3	DATE 25. 1. 87
	NAME : TOP CONNECTOR BUSH		PART NO. 3.11



MAKE FROM GENERAL PURPOSE STEEL HEXAGONAL BOLT TO BS - 3692 - 1967 (ISO 4016)

ELECTRO GALVANISE

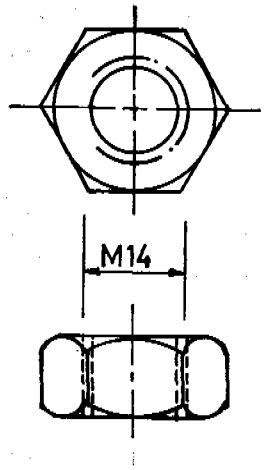
TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 18.9.87
	NAME : HEXAGONAL BOLT		PART NO. 3.12/1



STAMP FROM 1/8" MS SHEET

FINISH ELECTRO GALVANISE

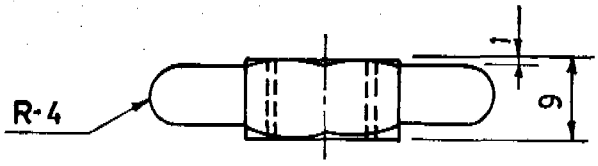
TARA HANDPUMP	4	M.S.	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ± 0·3	DATE 22.1.87
	NAME : WASHER		PART NO. 3·13

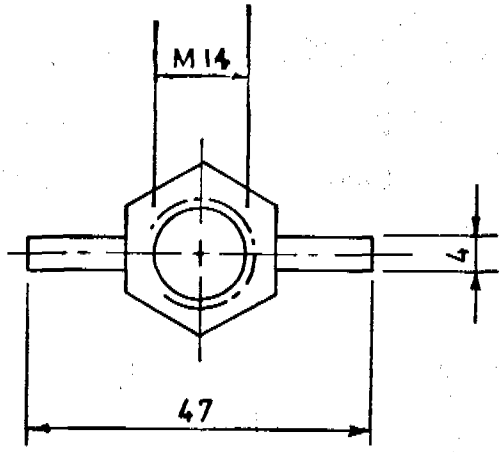


ELECTRO GALVANISE

TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 22.1.87
	NAME : NUT		PART NO. 3·15

▽





ELECTRO - GALVANISE

TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE	DATE 18. 9. 87
DPHE unicef	NAME : WING CHECK NUT		PART NO. 3.17

PUMP ROD ASSEMBLY WITH TOP CONNECTOR

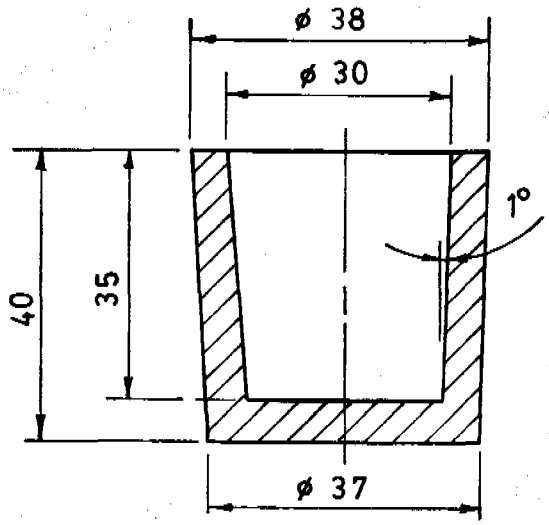
PUMP ROD SUB ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.20 (ND) Pump rod Sub-Assembly				

PUMP ROD ASSEMBLY WITH TOP CONNECTOR

PUMP ROD SUB ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
3.21 (ND) Pump rod	1 Inspect 2 Saw to size 3 Inspect	Sawing machine	Sawing jig	**Check** 1 That only UNICEF quality assured pipes to BS 3505 are used 2 Alignment. concentricity and dimensions of sockets
3.22 Pump rod Bung	1 Compound and roll rubber dough into sheets 2 Mould and vulcanize 3 Inspect	1 Mixing roller 2 Press machine 3 Die mould		**Check** 1 Hardness 50-65 shore "A" 2 Rubber quality (visual check)



HARDNESS 50 - 65 SHORE 'A'

TARA HANDPUMP	10	RUBBER	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S. ± 0.5	DATE 22.1.87
	NAME : PUMP ROD BUNG		PART NO. 3.22/1

PISTON ASSEMBLY

WITH

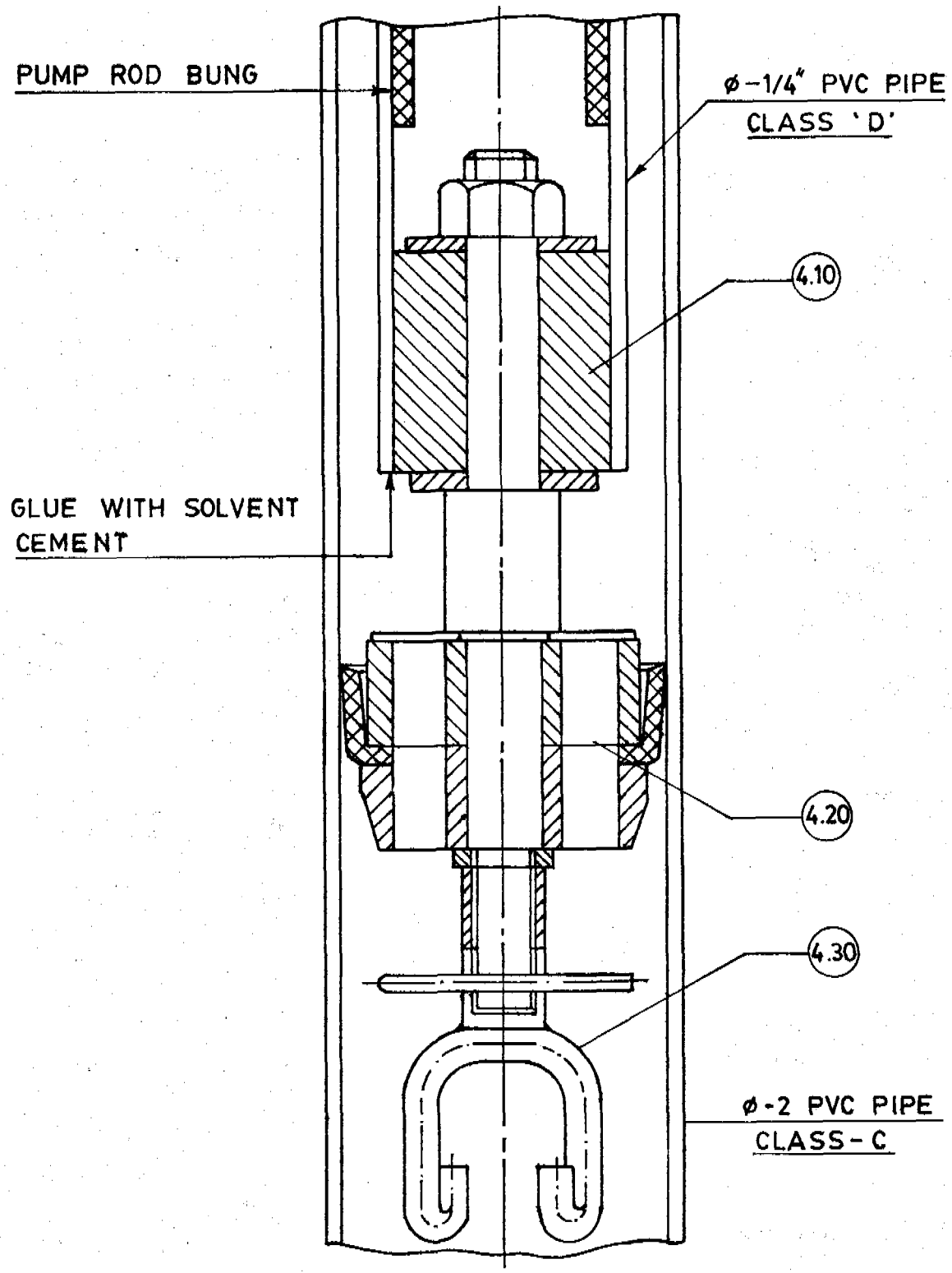
BOTTOM CONNECTOR

PRODUCTION INFORMATION

DRAWINGS

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.00 Piston assembly with Bottom Connector.	1 Push bungs inside pump rod 2 Clean thoroughly surfaces of application preferably by acetone 3 Apply PVC solvent cement on mating surfaces in uniform film thickness 4 Assemble bottom connector sub-assembly and pump rod 5 Provide specified setting time 6 Assemble piston and grapple sub-assemblies onto connector rod and lock with piston clip 7 Inspect (Approx production time 90 minutes)			**Check** 1 Tolerances and fits of mating surfaces for correct film thickness 2 For cleanliness of surface of application 3 Solvent cement film for continuity and uniformity 4 Setting time 5 That there is no play between mating surfaces to avoid occurrence of fretting 6 Surface finish 7 Correctness of marking and packaging 8 One length of pump rod to be solvent cemented to bottom connector, with socket at free end (length will be specified in purchase order)



TARA HANDPUMP

DPHE

unicef

QUANTITY	MATERIAL	CUT OFF SIZE
SCALE 1 : 1	TOLERANCE	DATE 31. 1. 87
NAME : PISTON ASSEMBLY WITH BOTTOM CONNECTOR.		PART NO. 4·00/1

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

BOTTOM CONNECTOR SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspecton
4.10 Bottom Connector Sub-Assembly	1 Assemble all the parts i.e. bush, washers, nut and connector rod in relative positions 2 Use solvent cement while fitting connector rod into uPVC bush as filler 3 Tighten nut and punch to lock the nut with rod 4 Inspect (Approx production time 30 minutes)			**Check** 1 Locking of nut with connector rod 2 Whether solvent cement has been used while fitting connector rod into bush 3 Surface finish

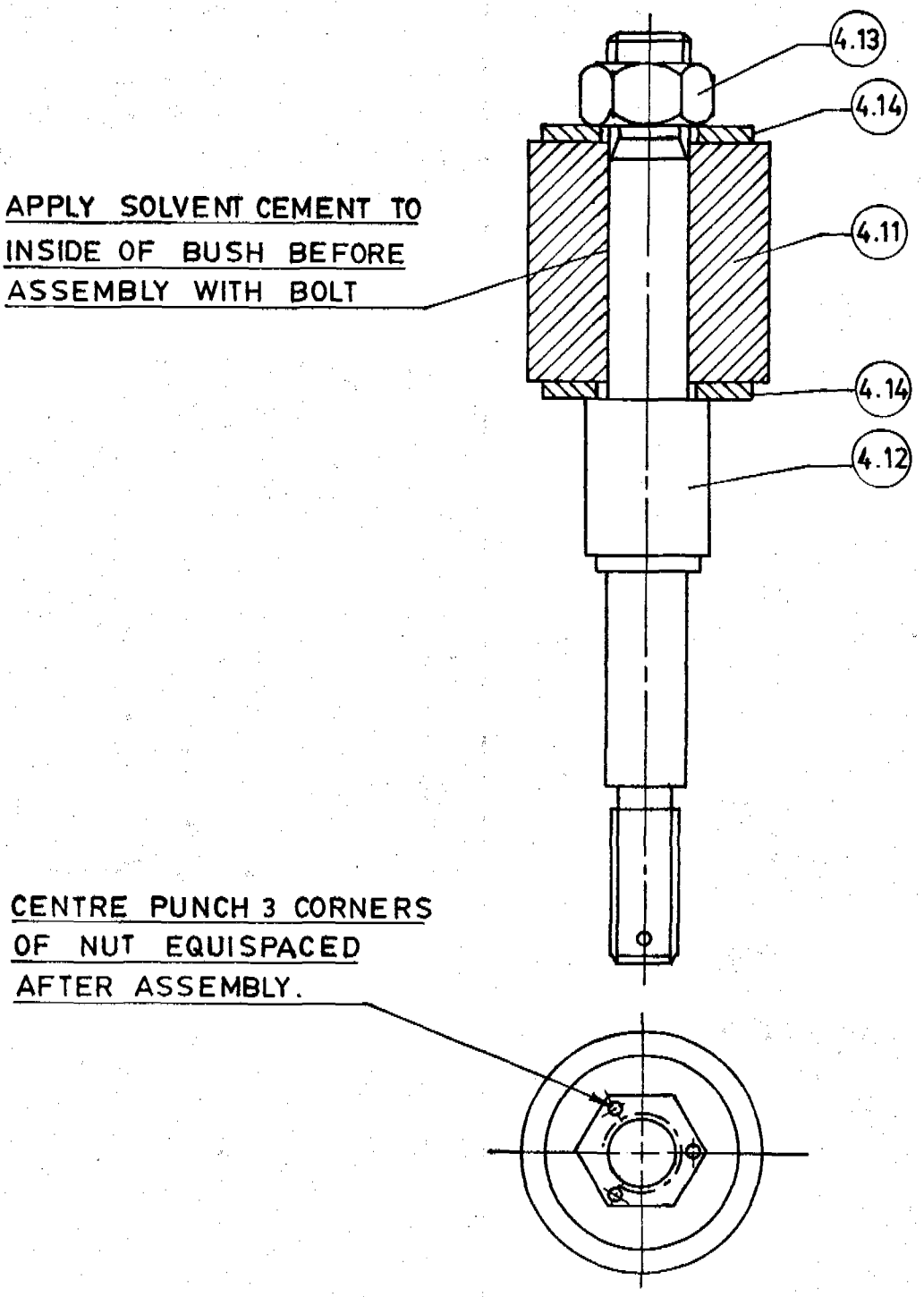
PISTON ASSEMBLY WITH BOTTOM CONNECTOR

BOTTOM CONNECTOR SUB-ASSEMBLY

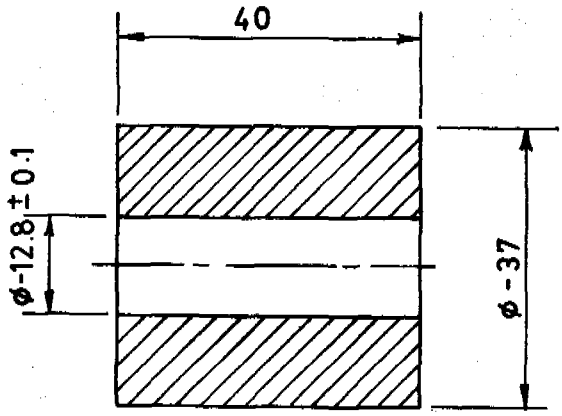
Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.11 Bottom Connector Bush	1 Procure uPVC bar stock 2 Cut off 3 Turn 4 Bore 5 Cut off 6 Inspect (Note : Take care in selecting cutting speed and feed of tools while working in lathe to achieve desired surface finish)	1 Sawing machine 2 lathe machine	1 Go, not go plug gauge 2 Snap gauge or ring gauge	**Check** Diameter 12.7 mm and outer diameter of bush for specific fit inside the 1.25" uPVC pump rod
4.12 Connector Rod	1 Turn different diameters 2 Form groove 3 Form thread 4 Chamfer 5 Cut off 6 Drill 7 Inspect 8 Zinc electroplate 9 Inspect	1 Lathe machine 2 Drilling machine	1 Ring gauge 2 Dial gauge indicator 3 Thread gauge	**Check** 1. Dimension 36 mm for tolerance 2. Concentricity of sections of different diameters. 3. Thread formation and fit 4. Check smooth corner of shoulder adjacent to flap valve as indicated in drawing.

PISTON ASSEMBLY WITH BOTTOM CONNECTOR — **BOTTOM CONNECTOR SUB-ASSEMBLY**

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.13 Nut	1 Procure general purpose HEX nut 2 Inspect 3 Zinc electroplate 4 Inspect			
4.14 Washer	1 Stamp 2 Zinc electroplate 3 Inspect (or procure locally finished)	1 Punching Press (bench type) 2 Combination die for stamping		NB. Same as part number 3.13

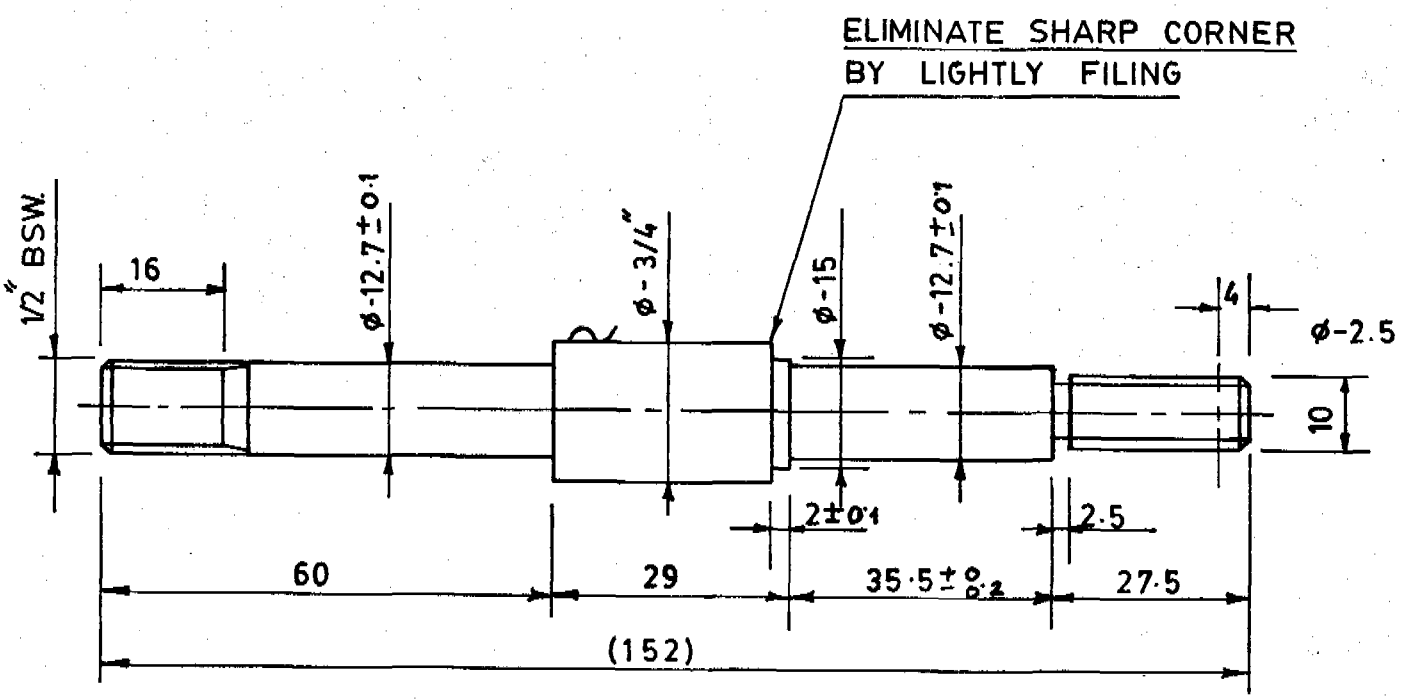


TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE	DATE 31. 1. 87
DPHE unicef	NAME : BOTTOM CONNECTOR SUB ASSEMBLY		PART NO. 4.10



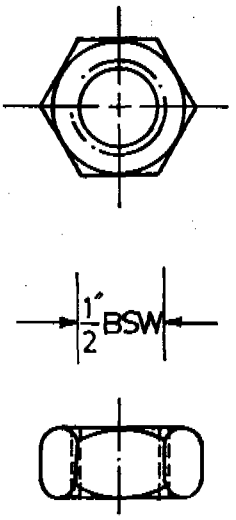
NOTE: ϕ - 37 TO BE ADJUSTED FOR FIT OF $^{0.3}_{0.1}$ WITH 1¼" P.V.C. PIPE

TARA HANDPUMP	1	P.V.C. BAR	ϕ 42 x 40
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE U.O.S ± 0.3	DATE 26. 1. 87
DPHE unicef	NAME : BOTTOM CONNECTOR BUSH.		PART NO. 4.11/1



FINISH ELECTRO GALVANISE

TARA HANDPUMP	1	M.S.	ϕ 3/4"x 155
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ± 0·3	DATE 28.1.87
	NAME : CONNECTOR ROD		PART NO. 4·12



ELECTRO GALVANISE

TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 26 . 1 . 87
	NAME : NUT		PART NO. 4.13

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

PISTON SUB-ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.20 Piston Sub-Assembly	1 Fit piston sub-assembly onto the bottom connector rod and lock with the grapple assembly 2 Inspect (Approx production time 40 minutes)			Check For adequate "squeeze" on cup seal between piston plate and follower plate so that cup seal cannot be rotated by hand NB. This sub-assembly to be delivered attached to bottom connector

PISTION ASSEMBLY WITH BOTTOM CONNECTOR

PISTON SUB-ASSEMBLY

Part No and Name	Production process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.21 Flap Valve (Piston)	1 Blank and pierce 2 Inspect	1 Press machine (bench type) 2 Combination die		**Check** 1 Elasticity-to return to flat position briskly after deflection 2 Surface smoothness on sealing side 3 Thickness* 4 Outside diameter* 5 Inside diameter* *all dimensions critical
4.22 Piston Plate	1 Injection mould using polyamide resin 2 Face and chamfer 3 Inspect	Injection moulding machine		**Check** 1 Outside diameter* 2 Inside diameter* 3 Height* 4 Sealing surface finish *all dimensions critical

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

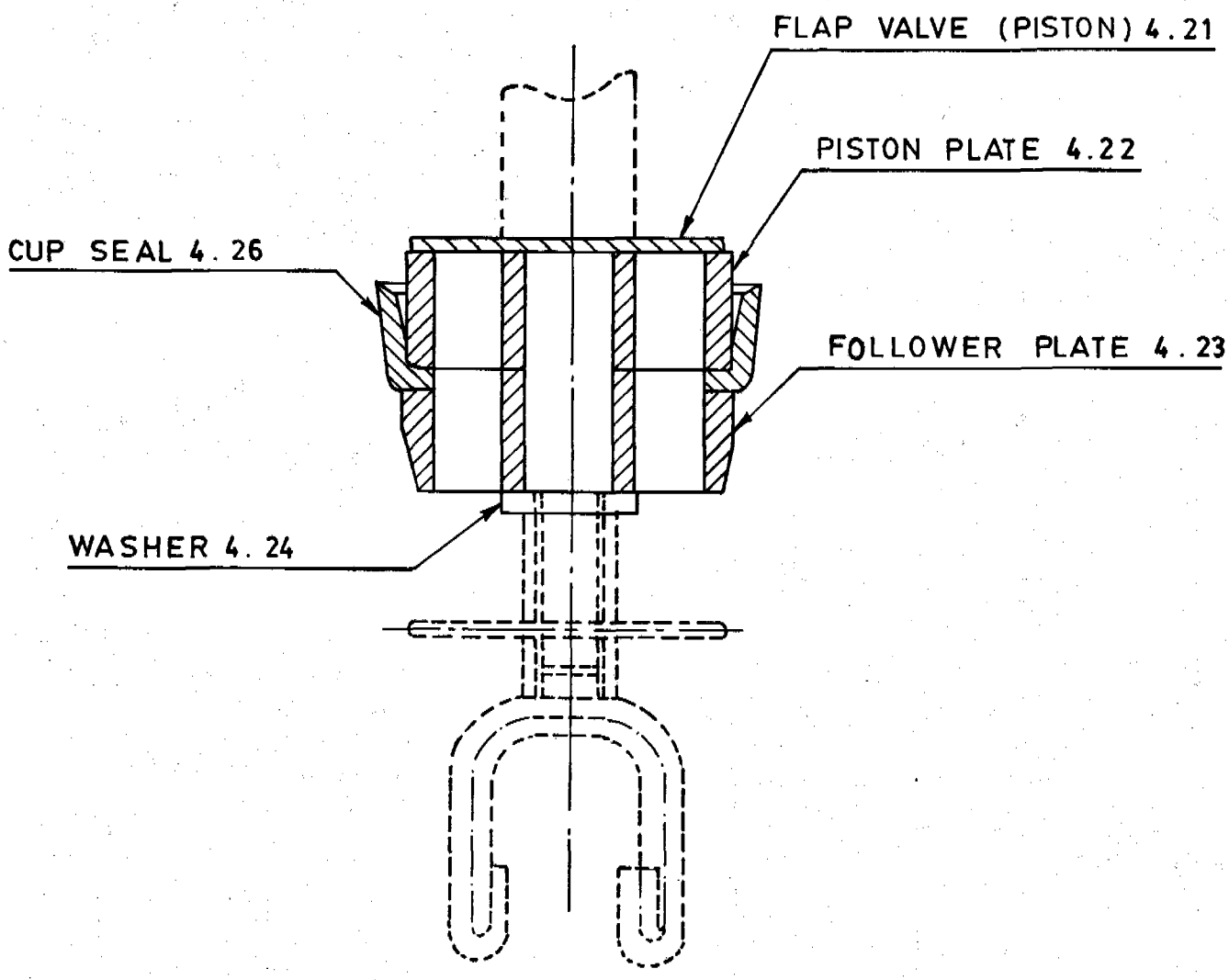
PISTON SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.23 Follower Plate	1 Injection mould using polyamide resin 2 Inspect	1 Injection moulding machine 2 Die mould		**Check** 1 Step dimensions 17.5mm and 2.3mm* 2 Diameter 12.7mm* 3 Diameter 39mm* (cup seal location) 4 Top surface finish * all dimensions critical NB. Locating step dimensions critical to control compression on the cup seal
4.24 Washer	1 Stamp 2 Zinc Electroplate 3 Inspect	Punching press		**Check** Internal diameter

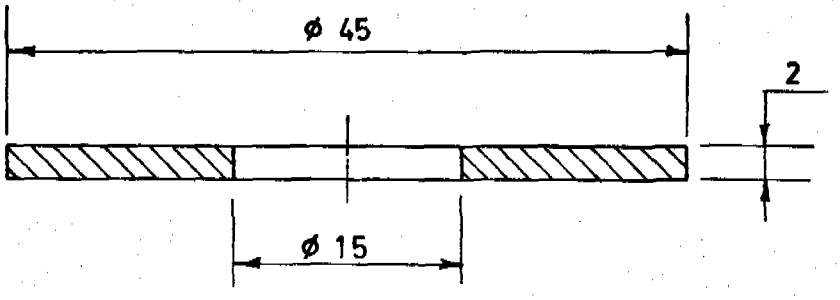
PISTON ASSEMBLY WITH BOTTOM CONNECTOR

PISTON SUB-ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.26 Cup Seal Leather	1 Cut blanks (circular from selected portion of full vegetable tanned leather) 2 Soak blank in water for softening 3 Form cup in die press. Repeated forming may be necessary to obtain specified dimension 4 Dry the formed cup in a form pipe (preferably steel) of correct internal diameter for 72 hours until completely dry 5 Cut center hole and seal lip on lathe 6 Dip in parafin wax solution for 2-5 minutes at 65°c Parafin wax solution can be prepared as follows : 1 Parafin -75 % 2 Carnauba wax- 15 % 3 Linseed oil -10 % 7 Clean excess wax solution with linseed oil 8 Inspect 9 Store in form pipe	1 Press machine 2 Lathe machine	52 mm mandrel (Form pipe)	Check 1 Quality of leather : use only butt and shoulder portion of healthy buffalo 2 Proper impregnation of parafin wax solution 3 Outside diameter and wall thickness all dimensions critical 4 2 % sample to be soaked in water for 24 hours. Wall thickness must not increase by more than 15 % after submersion and shape of cup seal must not be deformed NB Thickness to be checked by placing cut portion of soaked leather between glass plates with 1 kg nominal weight placed on top. Measure space between the plates.



TARA HANDPUMP	1		
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 31. 1. 87
	NAME : PISTON SUB ASSEMBLY		PART NO. 4.20/1



MAKE FROM INNER TUBE

TARA HANDPUMP	1	SEE NOTE	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U.O.S ± 0.1	DATE 26.1.87
	NAME : FLAP VALVE PISTON		PART NO. 4·21

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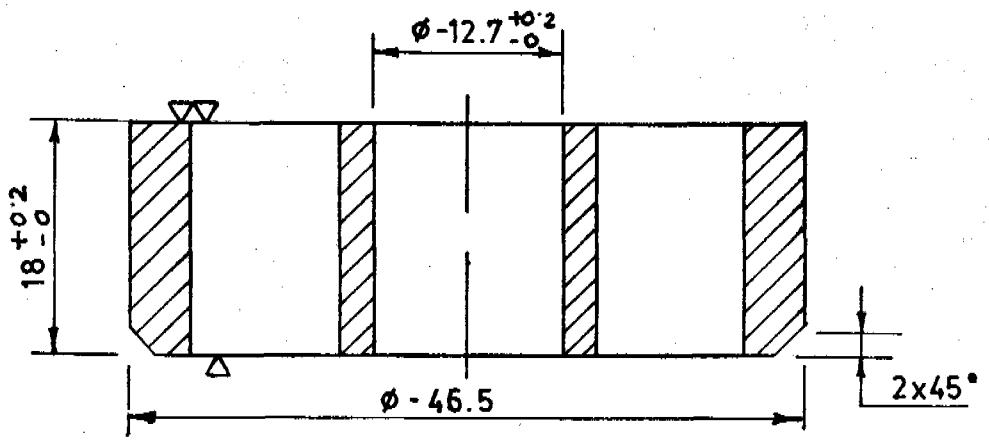
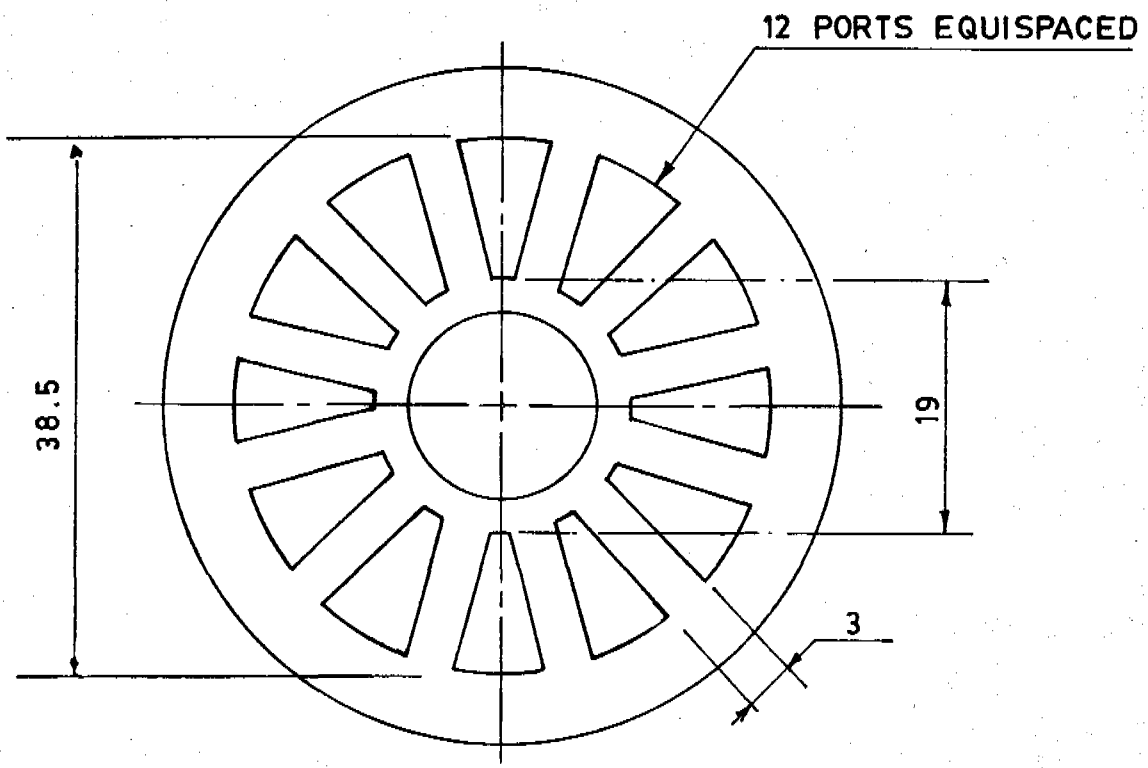
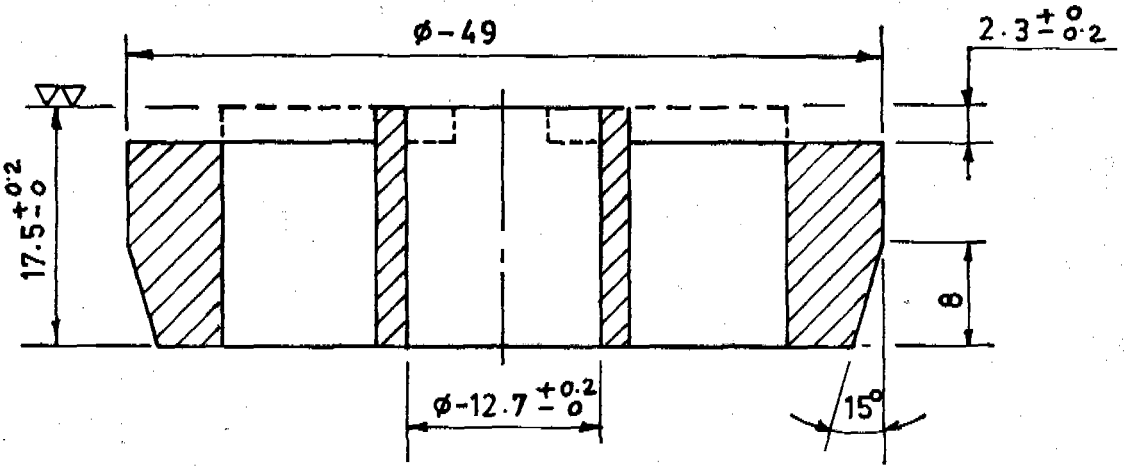
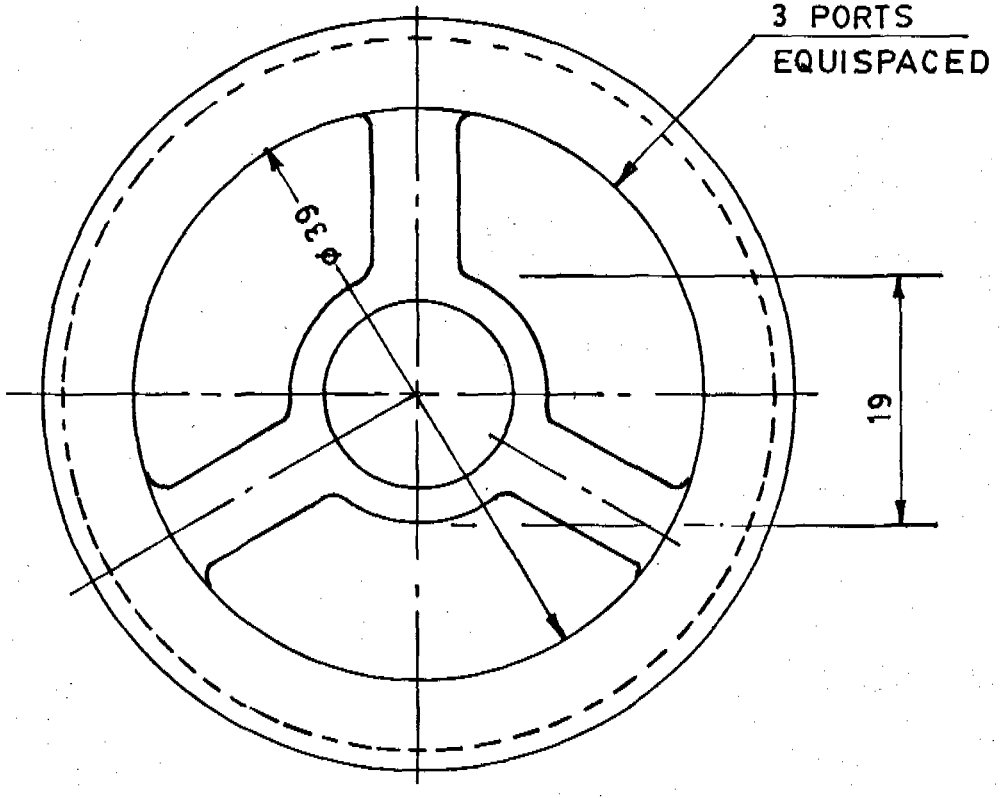




MAKE FROM POLYAMIDE

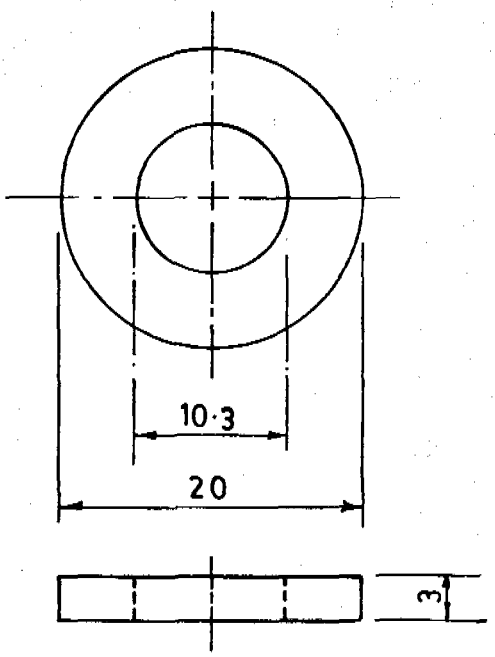
TARA HANDPUMP	1	SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U. O. S ± 0.3	DATE 27. 1. 87
	NAME : PISTON PLATE		PART NO. 4.22





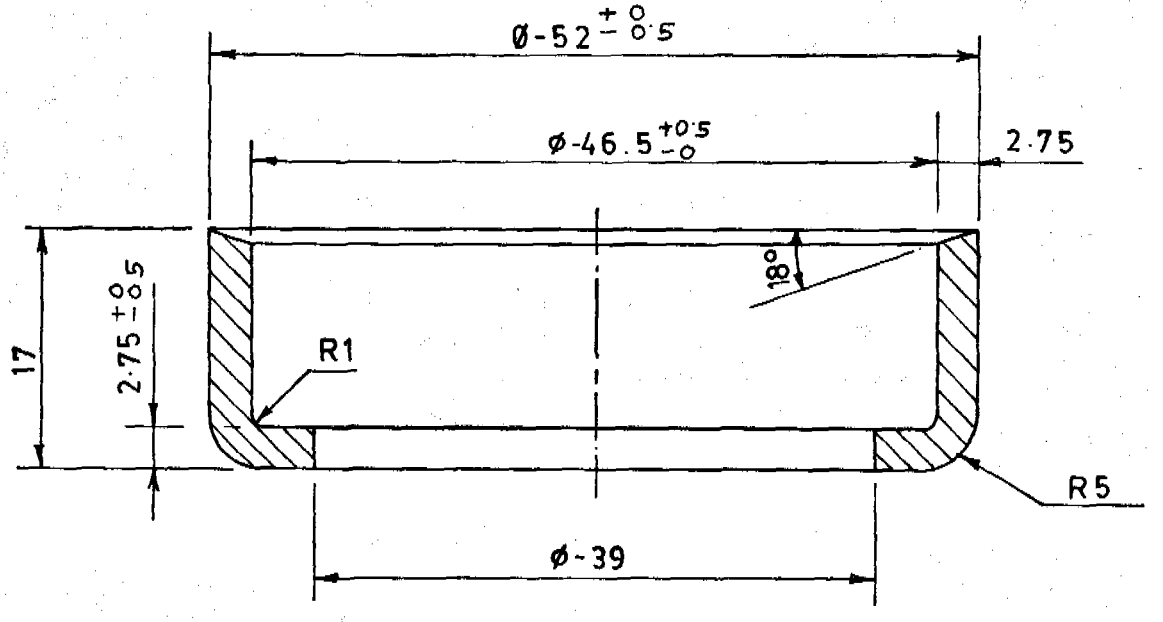
MAKE FROM POLYAMIDE

TARA HANDPUMP	SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U.O.S ± 0.3	DATE 27. 1. 87
	NAME : FOLLOWER PLATE		PART NO. 4.23



STAMP FROM 1/8" M.S. SHEET
ELECTRO GALVANISE

TARA HANDPUMP	1	SEE NOTE	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U.O.S ± 0·3	DATE 26.1.87
	NAME : WASHER		PART NO. 4·24



NOTE: REFER MANUFACTURING SPECIFICATION

TARA HANDPUMP	1	LEATHER	
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 2 : 1	TOLERANCE U.O.S ±0.3	DATE 26.1.8
DPHE unicef	NAME : LEATHER CUP SEAL		PART NO. 4.26/1

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

GRAPPLE SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Porduction Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.30 Grapple Sub-Assembly	1 Fix nut ahd hook in assembling jig 2 Electric arc weld 3 Inspect 4 Zinc electroplate 5 Inspect (Approx production time 20 minutes)	Electric are Welder (minimum 180A)	1 Non-slip assembly welding jig 2 Thread plug gauge	Check 1 Internal thread depth to avoid bottoming off 2 Thread quality

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

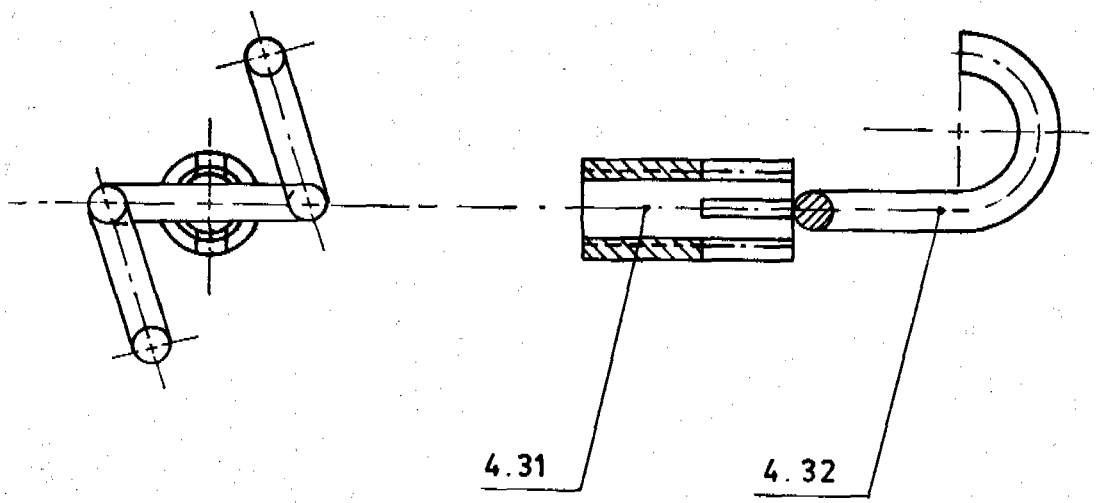
GRAPPLE SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.31 Grapple Bush	1 Turn 2 Bore 3 Counter bore 4 Face 5 Form thread 6 Cut off 7 Slot 3mm 8 Inspect	1 Lathe machine 2 Milling machine	Thread plug gauge	**Check** 1 Slots for alignment 2 Length of bush and internal thread dimensions critical
4.32 Hook	1 Straighten Rod stock 2 Cut to Size 3 Bend 4 Inspect	Metal cutting machine	Bending jig	

PISTON ASSEMBLY WITH BOTTOM CONNECTOR

GRAPPLE SUB-ASSEMBLY

Part No (Without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
4.33 Piston Clip	1 Straighten stainless steel wire 2 Cut to size 3 Bend 4 Inspect		Bending jig	Check 1. Material 2. Returns to shape (spring elasticity)



ELECTRO GALVANISE

TARA HANDPUMP	1	M. S.	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 27. 1. 87
	NAME : GRAPPLE SUB ASSEMBLY		PART NO. 4.30

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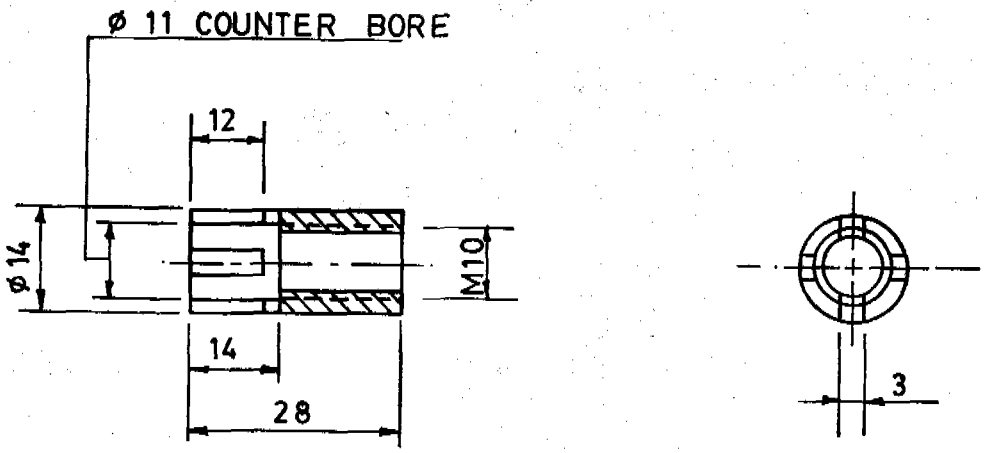
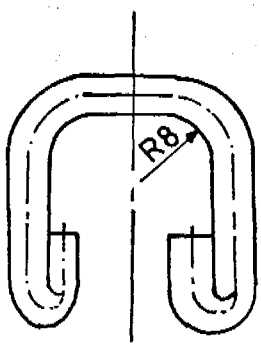
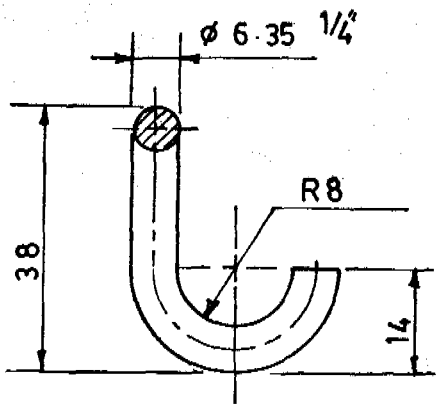
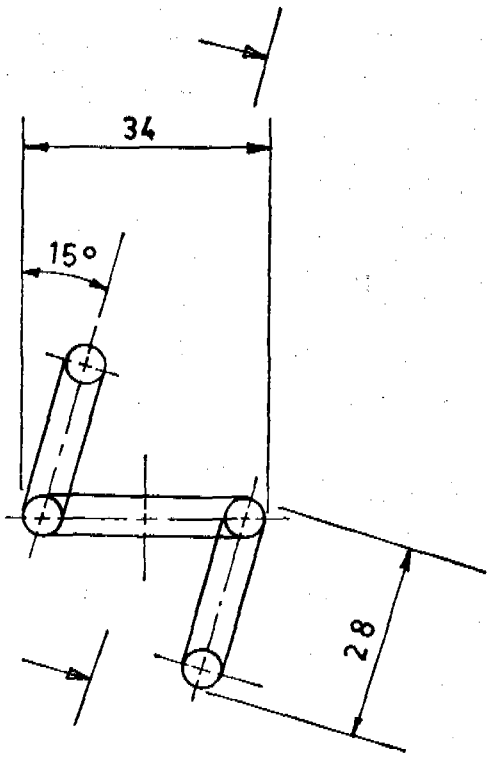


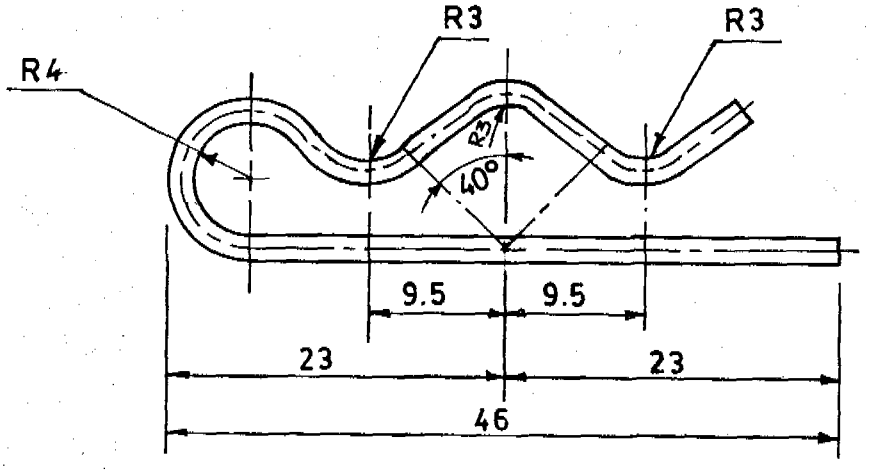
TARA HANDPUMP	1	M. S.	ø 5/8"x 32
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 1	TOLERANCE U.O.S ± 0.3	DATE 26. 1. 87
DPHE unicef	NAME : GRAPPLE BUSH		PART NO. 4.31







TARA HANDPUMP	1	M.S	ø 1/4" x 130
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1:1	TOLERANCE U.O.S ± 0.3	DATE 27.1.87
DPHE unicef	NAME :- HOOK		PART NO. 4.32



TARA HANDPUMP	1	STAINLESS STEEL	16 S.W.G x 100
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U.O.S. ± 0·3	DATE 27. 1. 87
	NAME : PISTON CLIP		PART NO. 4·33/1

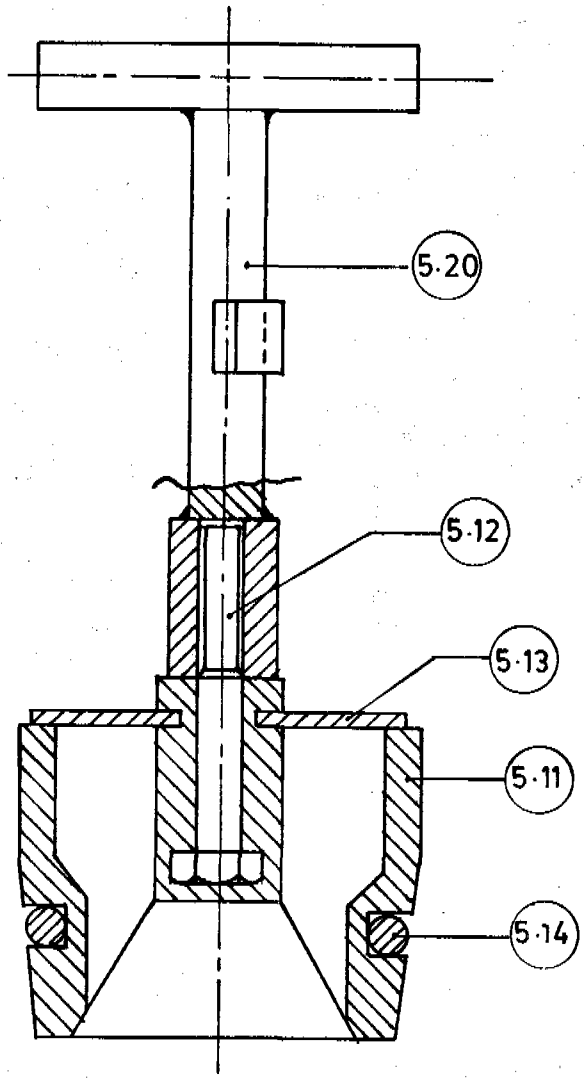
FOOT VALVE ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

FOOT VLAVE ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
5.00 Foot Valve Assembly	1. Assemble foot valve body flap valve, 'O' ring and foot valve quide sub-asembly as per drawing 2 Inspect (Approx production time 60 minutes)			Check 1. Alignment of guide sub-assembly with body sub-assembly 2 While assembling foot valve guide to body ensure foot valve bolt bottoms inside the guide bush before compressing the plastic boss 3. Fit of 'O' ring into groove



TARA HANDPUMP

DPHE

unicef

QUANTITY	MATERIAL	CUT OFF SIZE
SCALE 1 : 1	TOLERANCE	DATE 29. 1. 87
NAME : FOOT VALVE ASSEMBLY		PART NO. 5·00

FOOT VALVE BODY SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of production and Inspection
5.10 (ND) Foot Valve Body Sub-Assembly	1 Assemble flap valve and 'O' ring with body 2 Inspect (Approx production time 15 minutes)			

FOOT VALVE ASSEMBLY

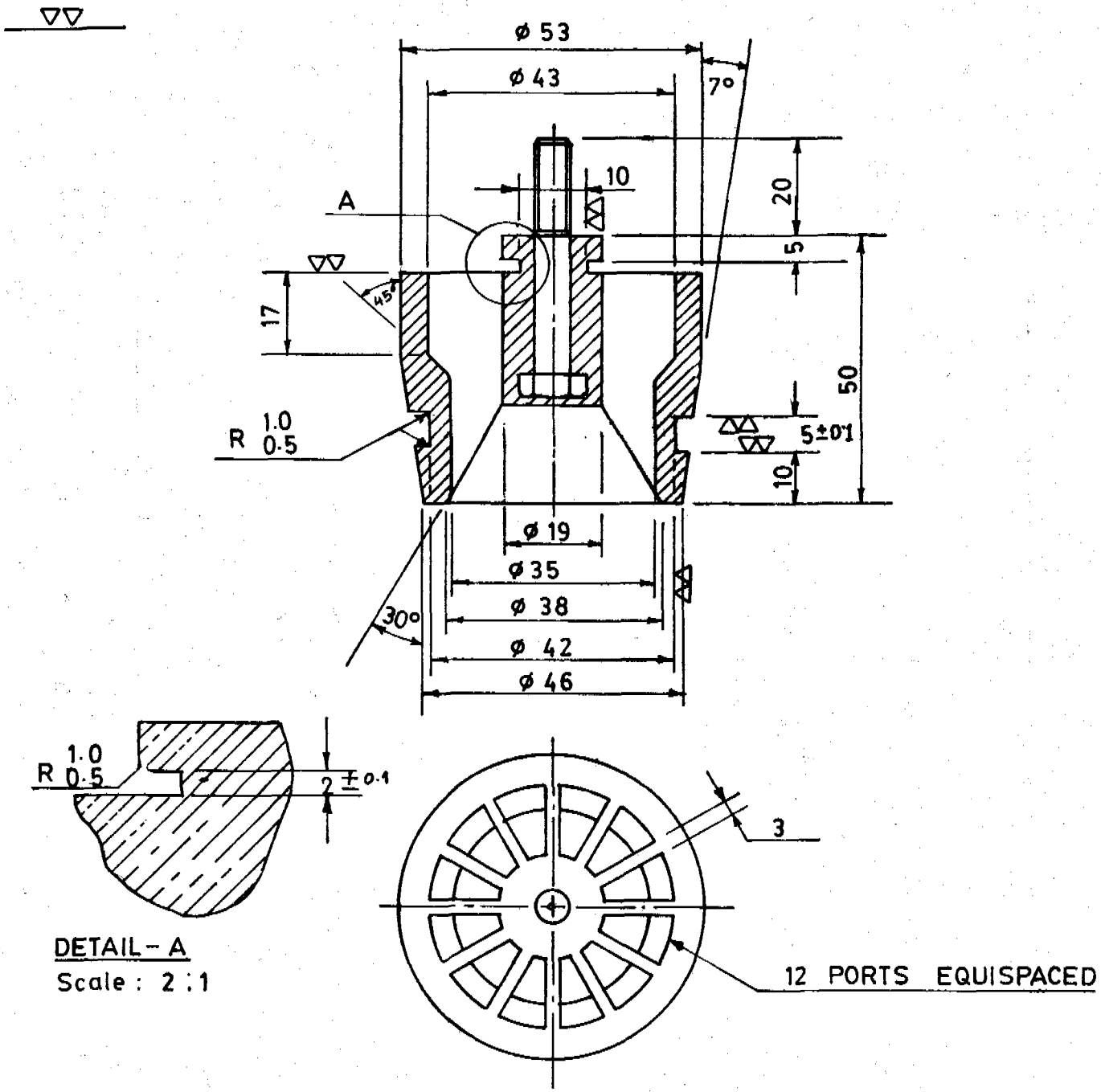
FOOT VALVE BODY SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
5.11 Foot Valve Body	1 Place bolt (5.12) in die 2 Injection mould using HDPE 3 Inspect 4 Face 5 Form groove 6 Inspect	1 Injection moulding machine 2 Die for injection moulding 3 Lathe machine	Feeler gauge	**Check** 1 Groove dimensions 2 Concentricity of bolt 3 Bolt protrusion exactly 20 mm above plastic boss 4 Sealing surface finish of top of valve ports 5 Dimensions of flap valve retainer groove
5.12 Bolt	1 Procure steel HEX bolt 0.25" BSW × 1.75" minimum 20 mm threaded to BS 3692-1967 (ISO-4016) 2 Inspect 3 Zinc electroplate 4 Inspect			

FOOT VLAVE ASSEMBLY

FOOT VALVE BODY SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
5.13 Flap Valve (Foot Valve)	1 Blank and Pierce 2 Inspect	1 Press machine (bench type) 2 Combination die		Check 1 Elasticity-to return to flat position briskly after deflection 2 Surface smoothness on sealing side 3 Thickness* 4 Outside diameter* 5 Inside diameter* * all dimensions critical
5. 14 'O' Ring	1 Compound and roll rubber dough into sheets 2 Mould and vulcanize 3 Inspect			Check 1 Hardness 50-65 Shore "A" 2 All Dimensions critical

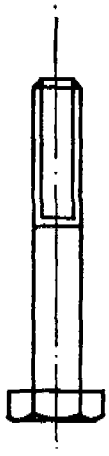


DETAIL – A
Scale : 2 : 1

BODY TO BE MADE FROM HIGH DENSITY POLYETHYLENE

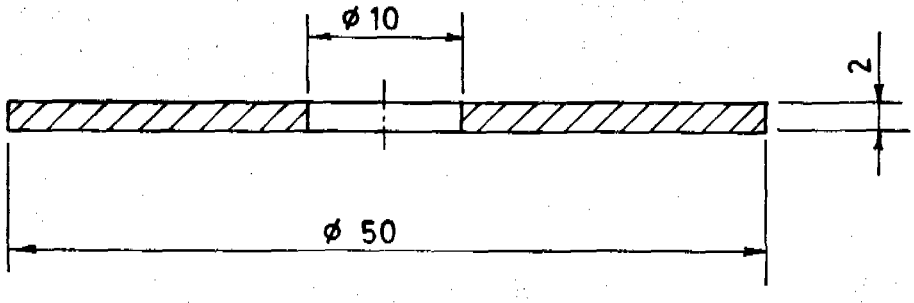
BOLT TO BE POSITIONED INSIDE DIE DURING MOULDING

TARA HANDPUMP			
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U. O. S ± 0·3	DATE 29. 1. 87
	NAME : FOOT VALVE BODY		PART NO. 5·11/1



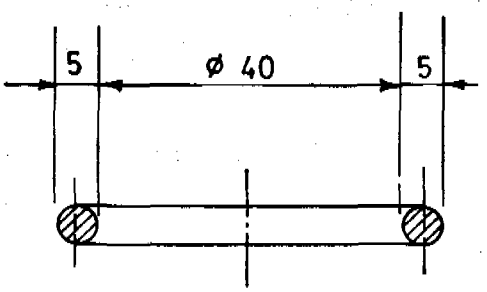
PROCURE GENERAL PURPOSE STEEL HEX-BOLT TO
BS 3692-1967 (ISO 416) ELECTRO GALVANISE

TARA HANDPUMP	1	SEE NOTE	ø 1/4"BSWx1 3/4"
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 26. 1. 87
	NAME : BOLT		PART NO. 5.12



MAKE FROME INNER TUBE

TARA HANDPUMP	1	SEE NOTE	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 2 : 1	TOLERANCE U.O.S ± 0.1	DATE 26. 1. 87
	NAME : FLAP VALVE FOOT VALVE		PART NO. 5·13



NOTE: MAKE FROM ACRYLONITRILE BUTADIENE RUBBER
BAYER PURBUNAN N3307 NS OR EQUIVALENT
HARDNESS 50-65 SHORE 'A'

TARA HANDPUMP	1	SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ± 0·3	DATE 26. 1. 87
	NAME : O - RING		PART NO. 5.14/1

FOOT VLAVE ASSEMBLY

FOOT VALVE BODY SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
5.20 Foot Valve Guide Sub-Assembly	1 Fix guide bush, guide rod, guide and rod in assembly jig and securely tack weld 2 Remove Sub-Assembly from jig and complete arc welding as specified 3 Clean thoroughly 4 Inspect 5 Hot dip galvanize 6 Inspect (Approx Production time 40 minutes)	1 Electric arc welder (minimum 180A) 2 Hot dip galvanizing bath	Non-slip assembly welding jig	**Check** 1 Concentricity of guide bush with guide rod 2 Perpendicularity of rod with guide 3 Central position of rod and gide on guide rod 4 Galvanizing quality (visual check)

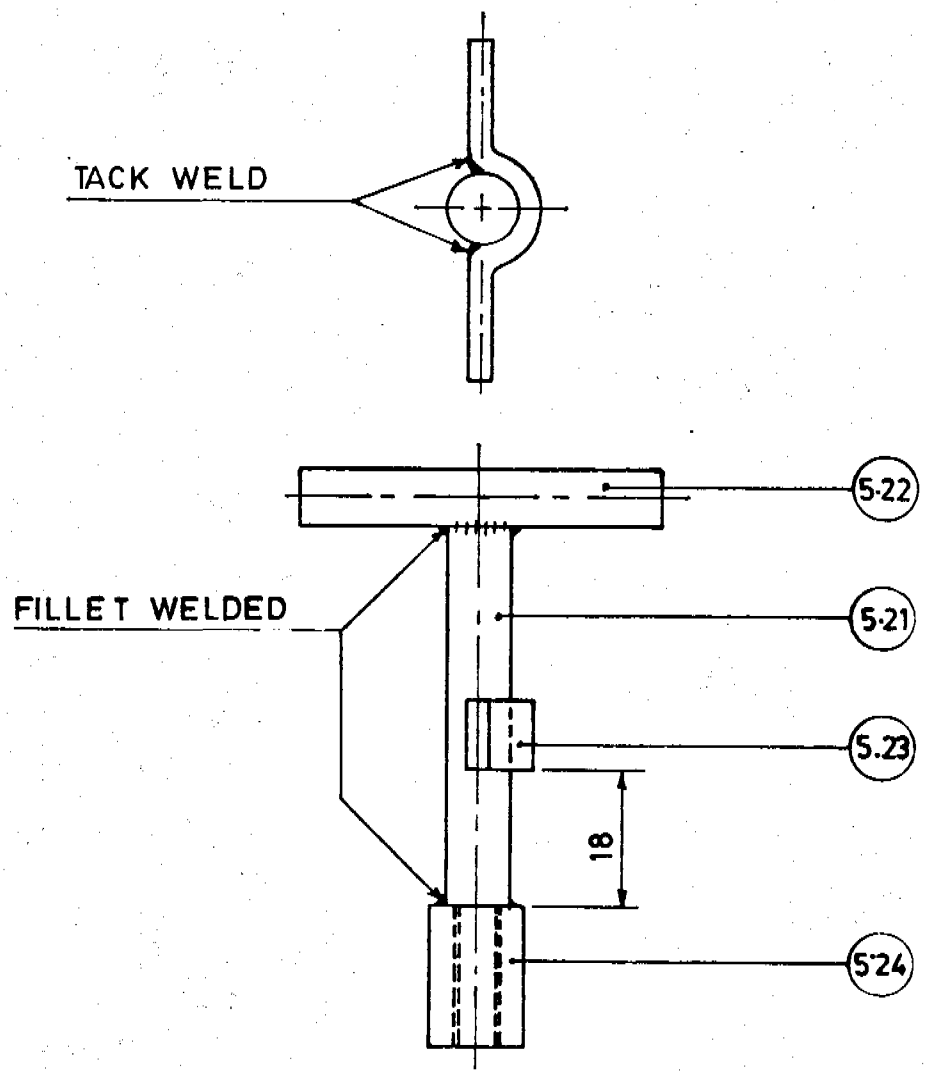
FOOT VLAVE ASSEMBLY

FOOT VALVE GUIDE SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
5.21 Guide Rod	1 Straighten bar stock 2 Chamfer 3 Cut off 4 Inspect	1 Sawing machine 2 Pedestal grinder	Sawing jig	
5.22 Rod	1 Straighten bar stock 2 File sharp corners 3 Cut off 4 Inspect	Sawing machine	Sawing jig	

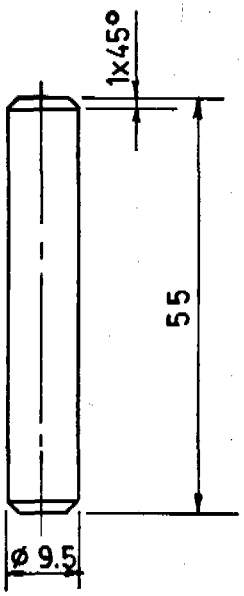
FOOT VALVE GUIDE SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
5.23 Guide	1 Cut Flat Bar 2 Bend in press 3 Grind ends 4 Inspect	1 Iron worker with shearing attachment 2 Ball press 3 Bending die		**Check** 1 Dimension 50 mm after bending and grinding end radius 2 Bend location exactly in centre of flat bar
5.24 Foot Valve Guide Bush	1 Turn 2 Face 3 Bore 4 Form thread 5 Cut off 6 Inspect	Lathe machine	Thread plug gauge	**Check** Dimension 20.5 mm

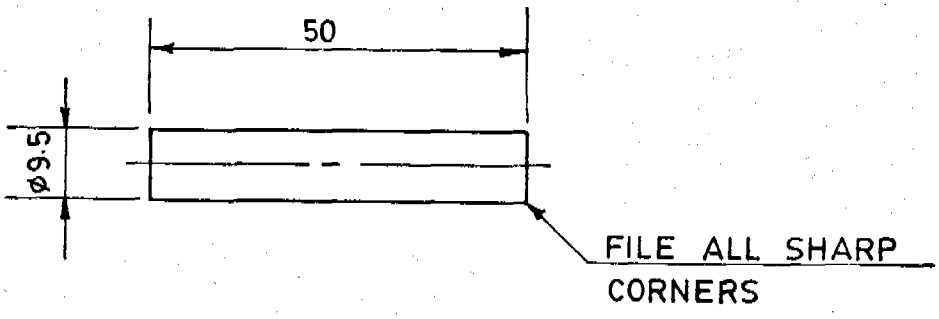


HOT DIP GALVANISE TO BS 729 : 1971 PROTECT THREAD

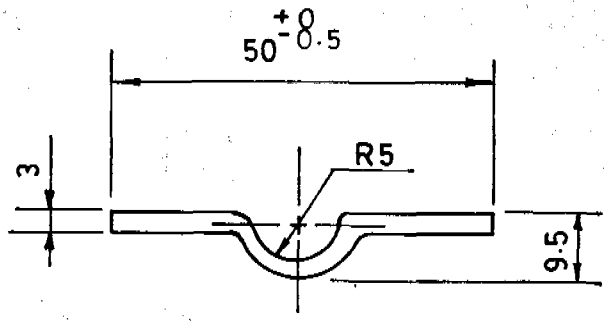
TARA HANDPUMP	1	M. S.	
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE	DATE 29.1.87
	NAME : FOOT VALVE GUIDE SUB - ASSEMBLY		PART NO. 5.20

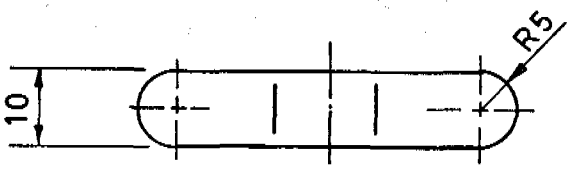


TARA HANDPUMP	1	M.S	ø 3/8"x 55
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ±0.3	DATE 26. 1. 87
	NAME : GUIDE ROD		PART NO. 5.21



TARA HANDPUMP	1	M. S	ø 3/8"x 50
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U. O. S ± 0·3	DATE 26. 1. 87
	NAME : ROD		PART NO. 5.22





TARA HANDPUMP	1	M.S. FLAT BAR	1/8"x 3/8"x 57
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U. O. S ± 0.3	DATE 26. 1. 87
	NAME : GUIDE		PART NO. 5.23

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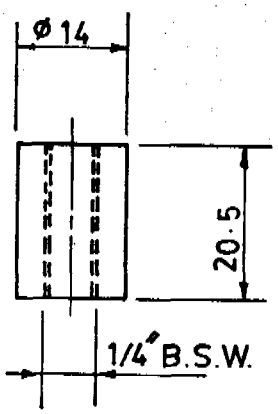


TARA HANDPUMP	1	M.S	ø 5/8"x 30
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1:1	TOLERANCE U.O.S ±0.3	DATE 26. 1. 87
	NAME : FOOT VALVE GUIDE BUSH		PART NO. 5.24

CYLINDER ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

ASSEMBLY CYLINDER

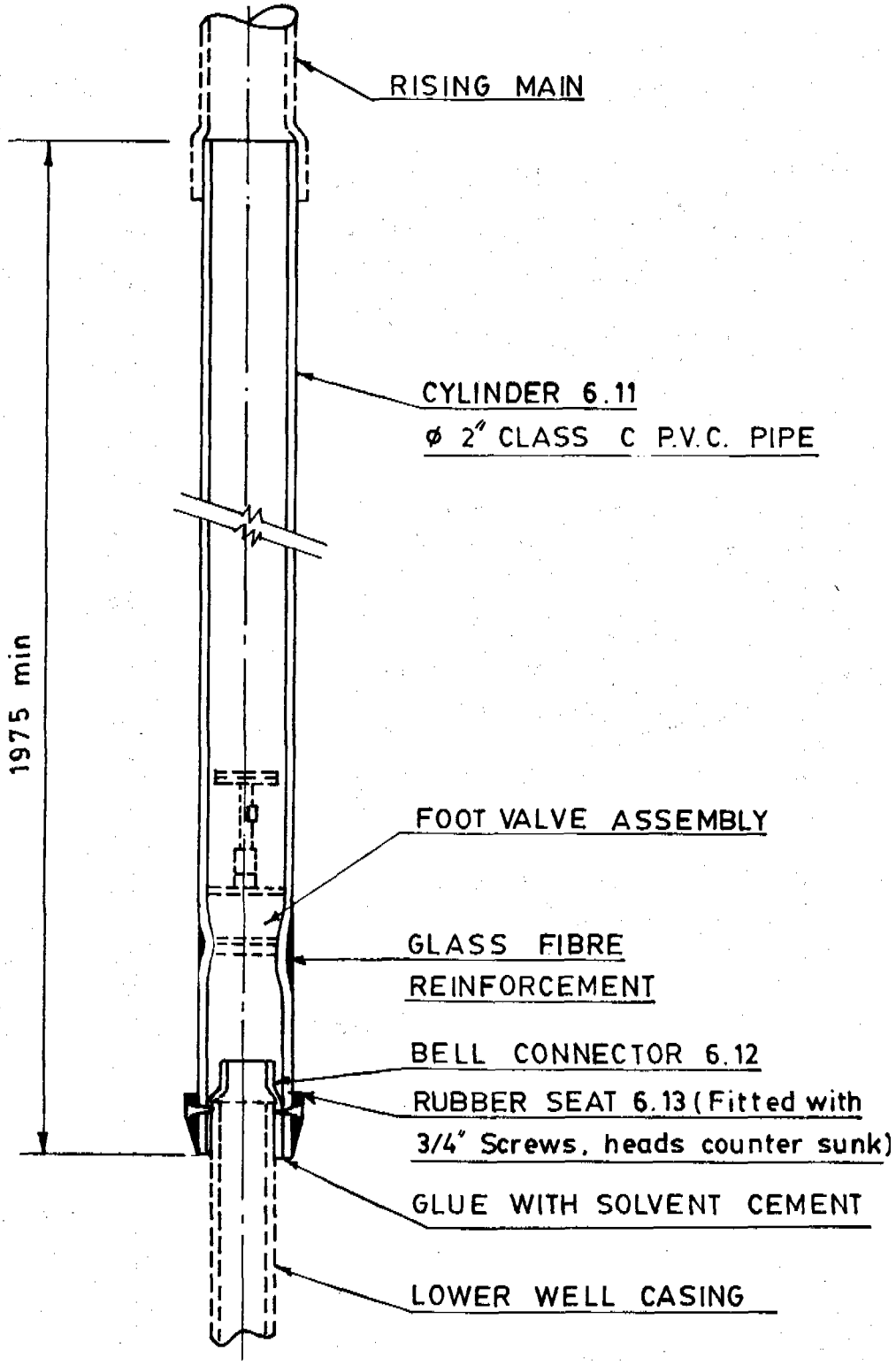
Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
6.00 Cylinder Assembly	1 Clean thoroughly surfaces of application preferably by acetone 2 Apply PVC solvent cement on mating surfaces in uniform thickness 3 Assemble bell connector inside cylinder pipe 4 Provide specified setting time 5 Inspect 6 Fix rubber seat* 7 Inspect (Approx Production time 20 minutes)	* for extractable mode only		1 Tolerances and fits of mating surfaces for correct film thickness 2 For cleanliness of surfaces of application 3 Solvent cement film for continuity and uniformity 4 Surface finish 5 Screw properly countersunk* 6 Screws do not protrude more than on ID of cylinder*

CYLINDER ASSEMBLY

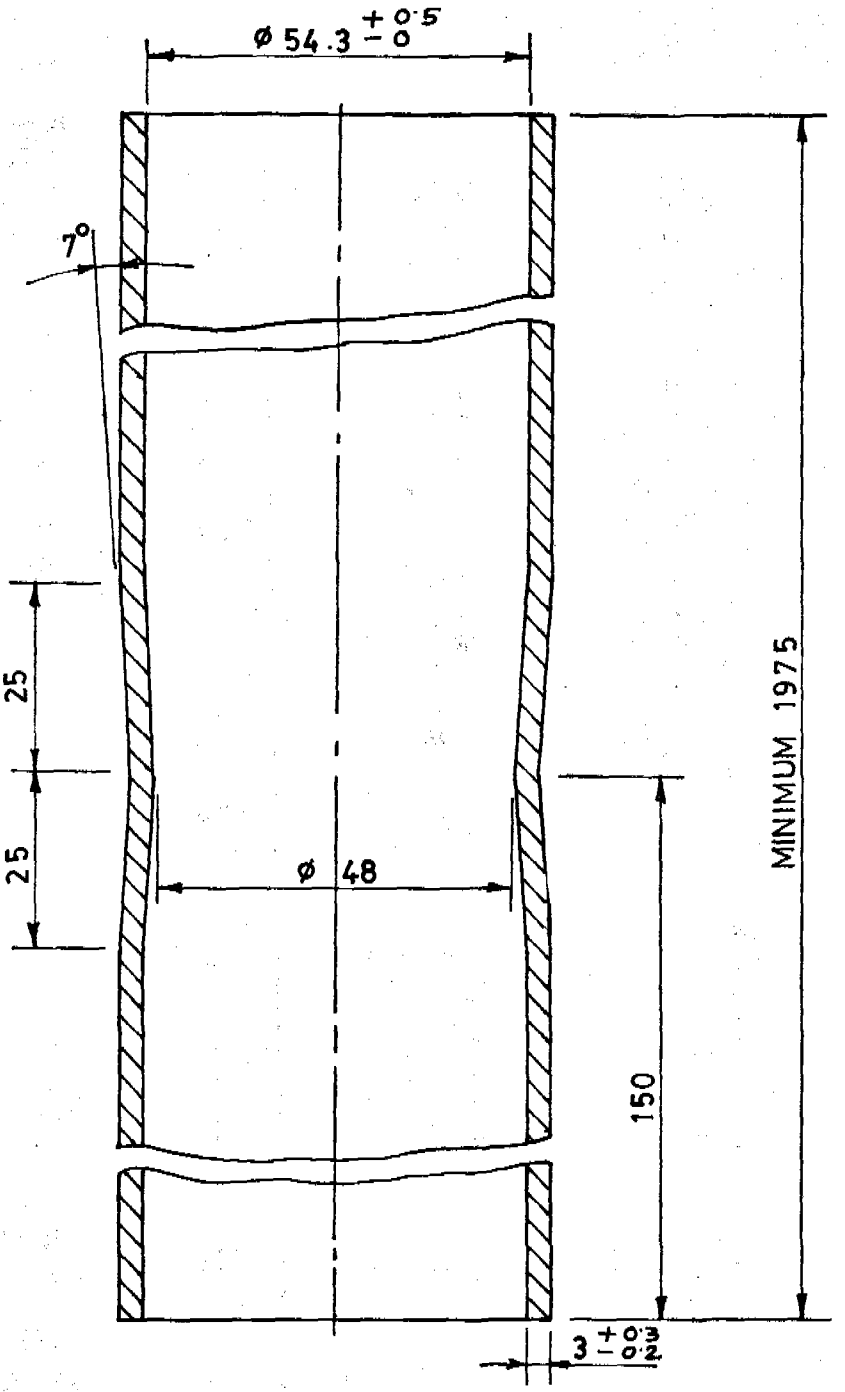
Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major production Aids	CRITICAL ASPECTS of Production and Inspection
6.11 Cylinder pipe	1 Cut to size 2 Heat uniformly the section of pipe to be formed 3 Roll and gradually press the hot section of pipe in forming die for constriction forming 4 Cool 5 Inspect 6 Apply glass fibre reinforced resin band on outside of constricted protion of pipe 7 Provide setting time 8 Inspect	1 Band saw or Circular saw or Hacksaw 2 Heating equipment 3 Crimping die		**Check** 1 Pipe for dimension tolerances specified in drawing and for internal smooth finish 2 Straightness of pipe after forming constriction 3 Dimensions of constriction before applying glass fibre reinforced resin 4 Correct storage after manufacture to avoid induced bending
6.12 Bell Connector	1 Cut to size 2 Heat pipe end in oil 3 Press on flaring die for forming 4 Cool 5 Remove from die 6 Cut to size 7 Inspect	1 Band saw or Circular saw or Hacksaw 2 Heating equipment 3 Flaring die		**Check** Outside and inside diameter of finished flared portion★ ★NB. Dimensions critical

CYLINDER ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
6.13 Rubber Seat	1 Compound and roll rubber dough into sheets 2 Mould and vulcanize 3 Inspect	1 Printing roller 2 Press machine 3 Die mould		Check 1 Hardness 60-75 Shore "A" 2 Internal diameter

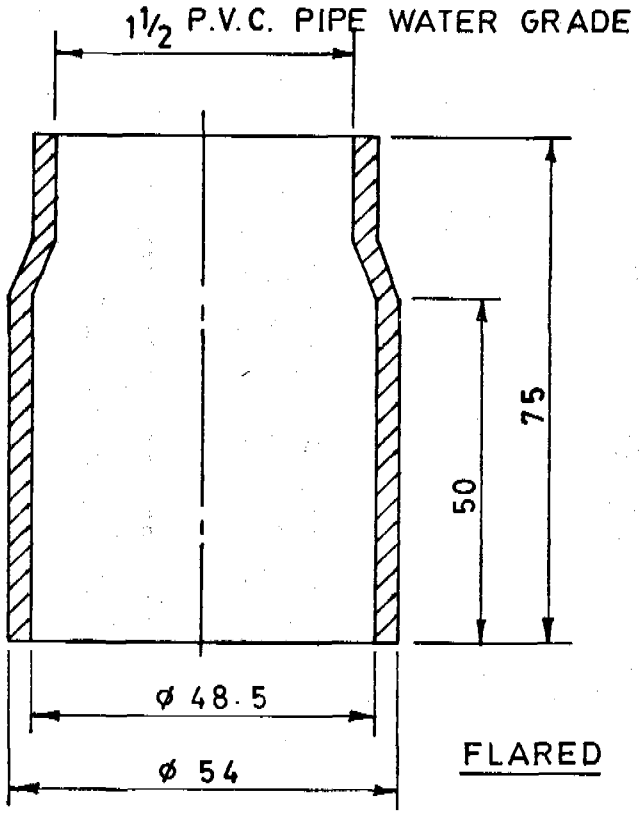


TARA HANDPUMP			
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 5	TOLERANCE	DATE 2. 2. 87
DPHE unicef	NAME : CYLINDER ASSEMBLY		PART NO. 6.00/1



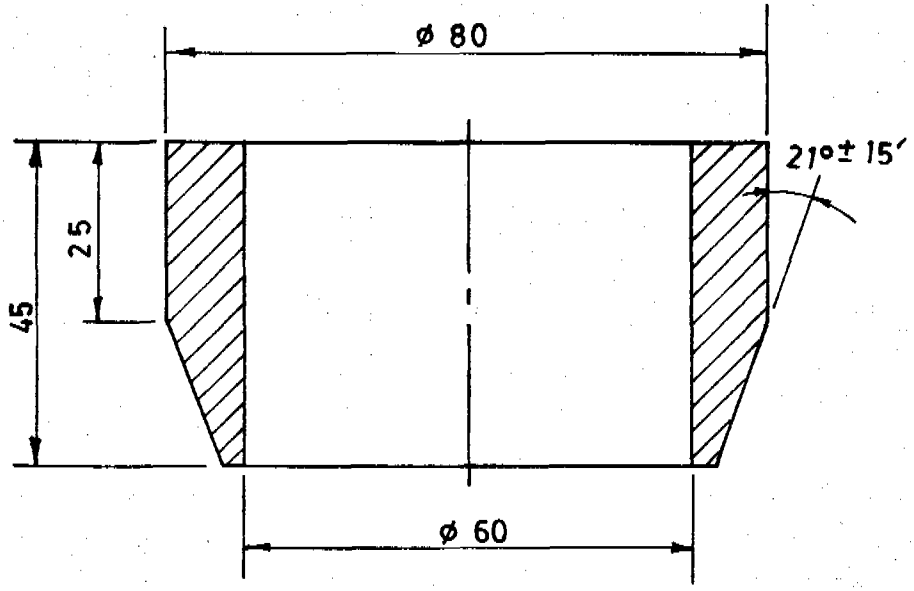
WATER GRADE CLASS "C" P.V.C PIPE TO BS 3505 WITH INTERNAL DIAMETER AND WALL THICKNESS TOLERANCES AS INDICATED

TARA HANDPUMP	1	SEE NOTE	ø 2"x 2000
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 ; 1	TOLERANCE U.O.S ± 1.0	DATE 29. 1. 87
	NAME : CYLINDER PIPE		PART NO. 6.11



USE WATER GRADE CLASS D P.V.C. PIPE BS 3505

TARA HANDPUMP	1	P.V.C. PIPE	ø 1½" x 75
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S ± 1.0	DATE 26. 1. 87
	NAME : BELL CONNECTOR		PART NO. 6.12



NOTE :

MAKE FROM ACRYLONITRILE BUTADIENE RUBBER BAYER PERBUNAN N3307 NS OR EQUIVALENT HARDNESS 55 -70 SHORE "A"

TARA HANDPUMP	1	SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE ± 0·5	DATE 26. 1. 87
	NAME : RUBBER SEAT		PART NO. 6.13

TUBEWELL ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

TUBEWELL ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and inspection
7.00(ND) Tubewell Assembly	Refer to installation instructions			

TUBEWELL ASSEMBLY

UPPER TUBEWELL SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of Production and inspection
7.10 Upper Tubewell Sub-Assembly	Refer to installation instructions			

TUBEWELL ASSEMBLY

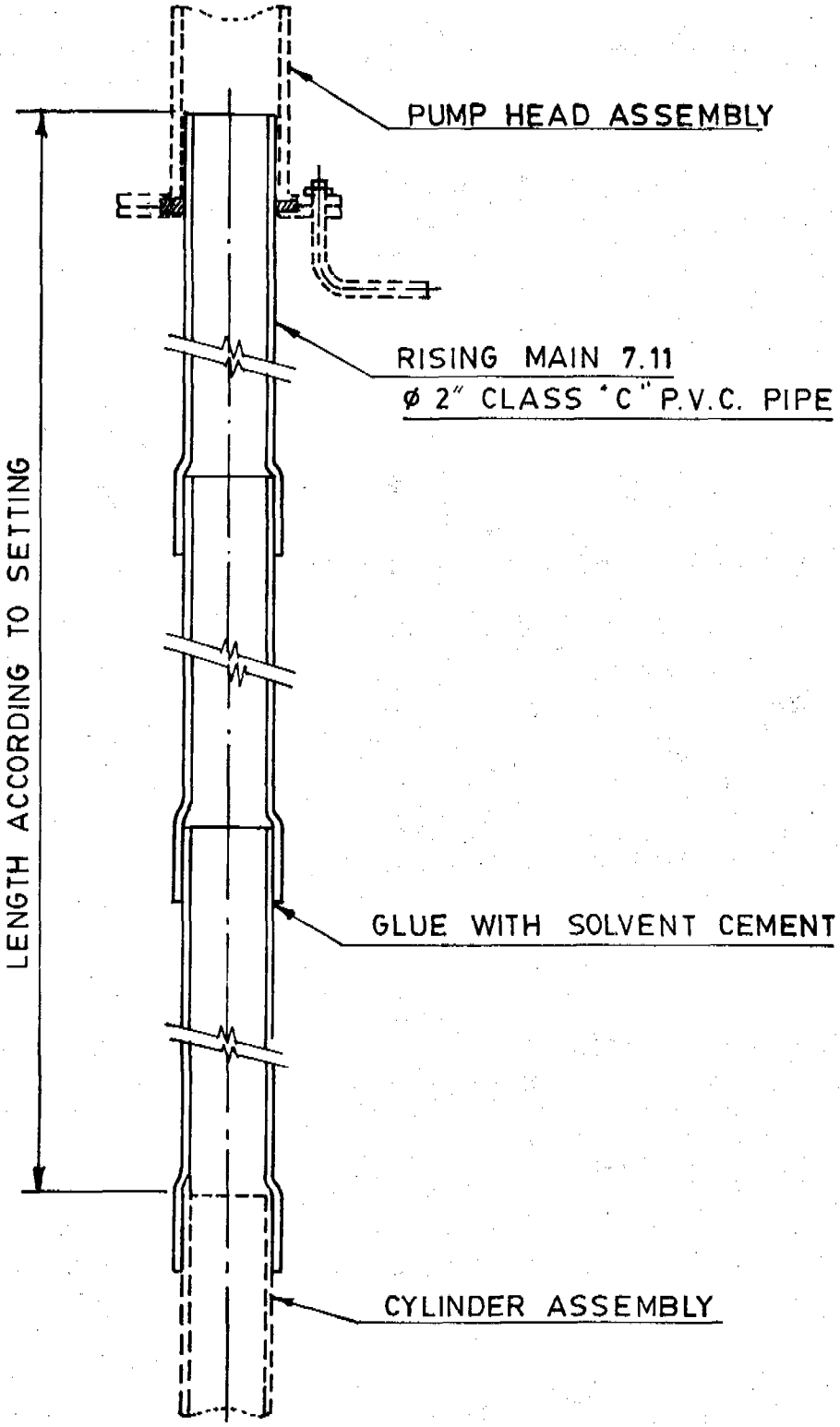
UPPER TUBEWELL SUB-ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
7. 11 (ND) 2" Rising Main	1 Extrude 2" Class C uPVC water grade pipe according to BS 3505 2 Form bell socket on one end (Lengths of pipes as specified in purchase order) 3 Inspect	1 PVC extrusion plant 2 Heating equipment 3 Bell socket forming die		**Check** 1 Dimensions to conform to BS 3505 2 Alignment of bell socket with pipe 3 Straightness of extruded pipe 4 Storage and packaging to avoid induced bending 5 Marking as specified by UNICEF
7.12 (ND) 3" Borehole Casing * * For extractable mode only.	1 Extrude 3" Class B uPVC water grade pipe according to BS 3505 2 Form bell socket on one end (Lengths of pipes as specified in purchase order) 3 Inspect	1 PVC extrusion plant 2 Heating equipment 3 Bell socket forming die		**Check** 1 Dimensions to conform to BS 3505 2 Alignment of bell socket with pipe 3 Straightness of extruded pipe 4 Storage and packaging to avoid induced bending 5 Marking as specified by UNICEF

TUBEWELL ASSEMBLY

UPPER TUBEWELL SUB-ASSEMBLY

Part No (without amendment) and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
7.13 Rising Main Centralizer*	1 Compound and roll rubber dough into sheets 2 Mould and vulcanize 3 Inspect	1 Mixing roller 2 Press machine 3 Die mould		**Check** 1 Hardness 55-70 Shore 'A' 2 Internal diameter
7.15/1 Reducing Socket* * For extractable mode only	1 Using heat and die moulds, form one 3" female × 2" male reducer and one 2" female × 1.50" female reducer from uPVC pipe dia 2.50" 2 Apply solvent cement together to form 3" female × 1.50" female reducing socket 3 Inspect	1 Heating equipment 2 Forming die		**Check** Dimension of 3" female and 1.50" female ends to suits pipes to BS 3505



TARA HANDPUMP

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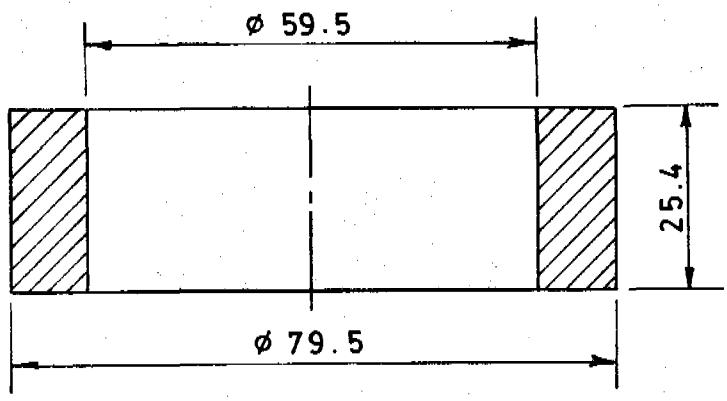
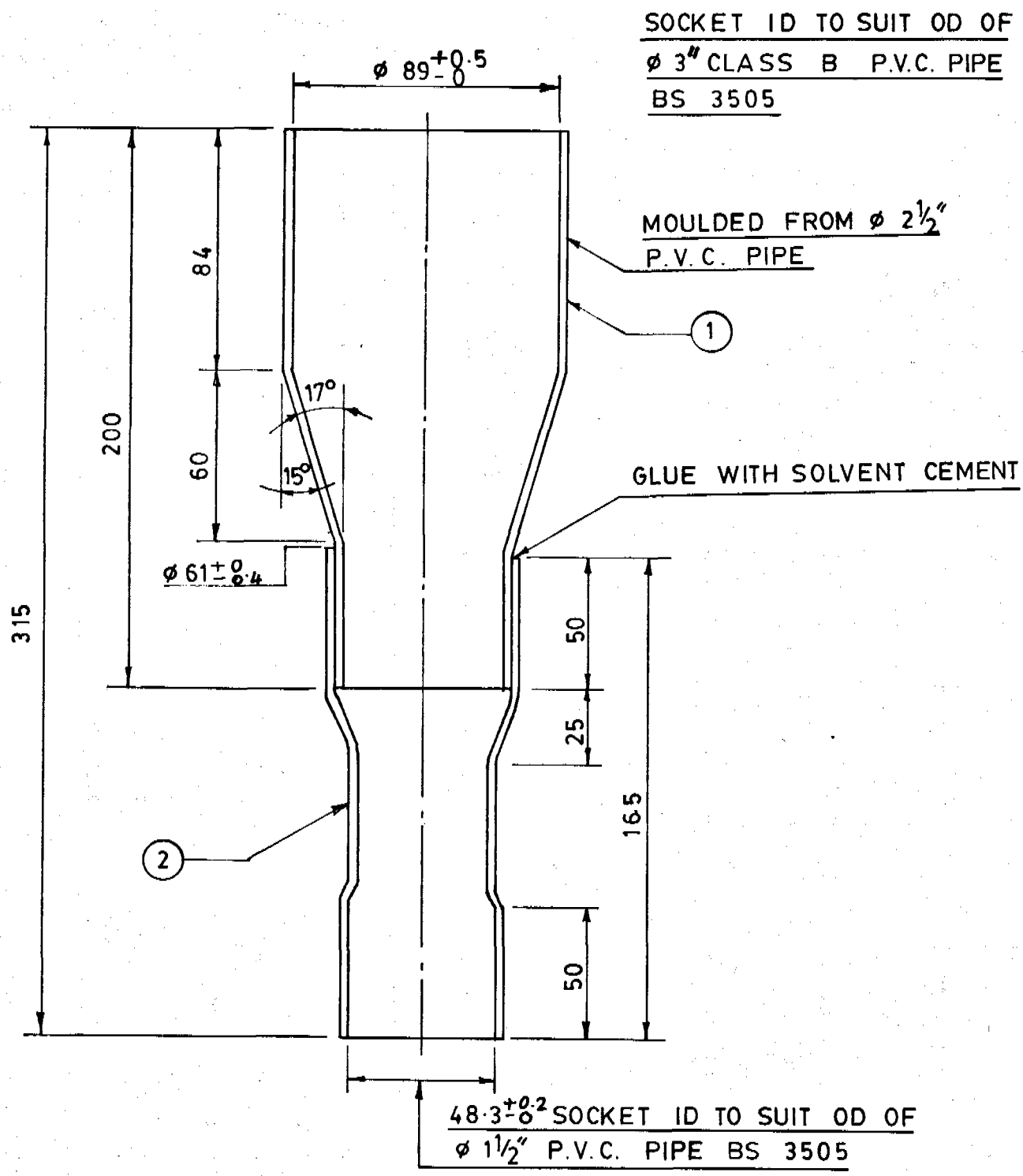
unicef

QUANTITY	MATERIAL	CUT OFF SIZE
SCALE 1 : 5	TOLERANCE	DATE 2. 2. 87
NAME : UPPER TUBEWELL SUB - ASSEMBLY (STANDARD MODEL)		PART NO. 7.10



NOTE: MAKE FROM ACRYLONITRILE BUTADIENE RUBBER BAYER PERBUNAN N3307 NS OR EQUIVALENT HARDNESS 55–70 SHORE 'A'

TARA HANDPUMP		SEE NOTE	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE ± 0·3	DATE 26. 1. 87
	NAME : RISING MAIN CENTRALIZER		PART NO. 7·13/1



TARA HANDPUMP	1	P.V.C. PIPE	
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 2	TOLERANCE	DATE 31. 1. 87
	NAME : REDUCING SOCKET		PART NO. 7.15/1

DPHE unicef

TUBEWELL ASSEMBLY

RETRIEVING ROD ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Inspection Production and
7.20 Lower Tubewll Sub-assembly	Refer to installation instructions			

TUBEWELL ASSEMBLY

UPPER TUBEWELL SUB-ASSEMBLY

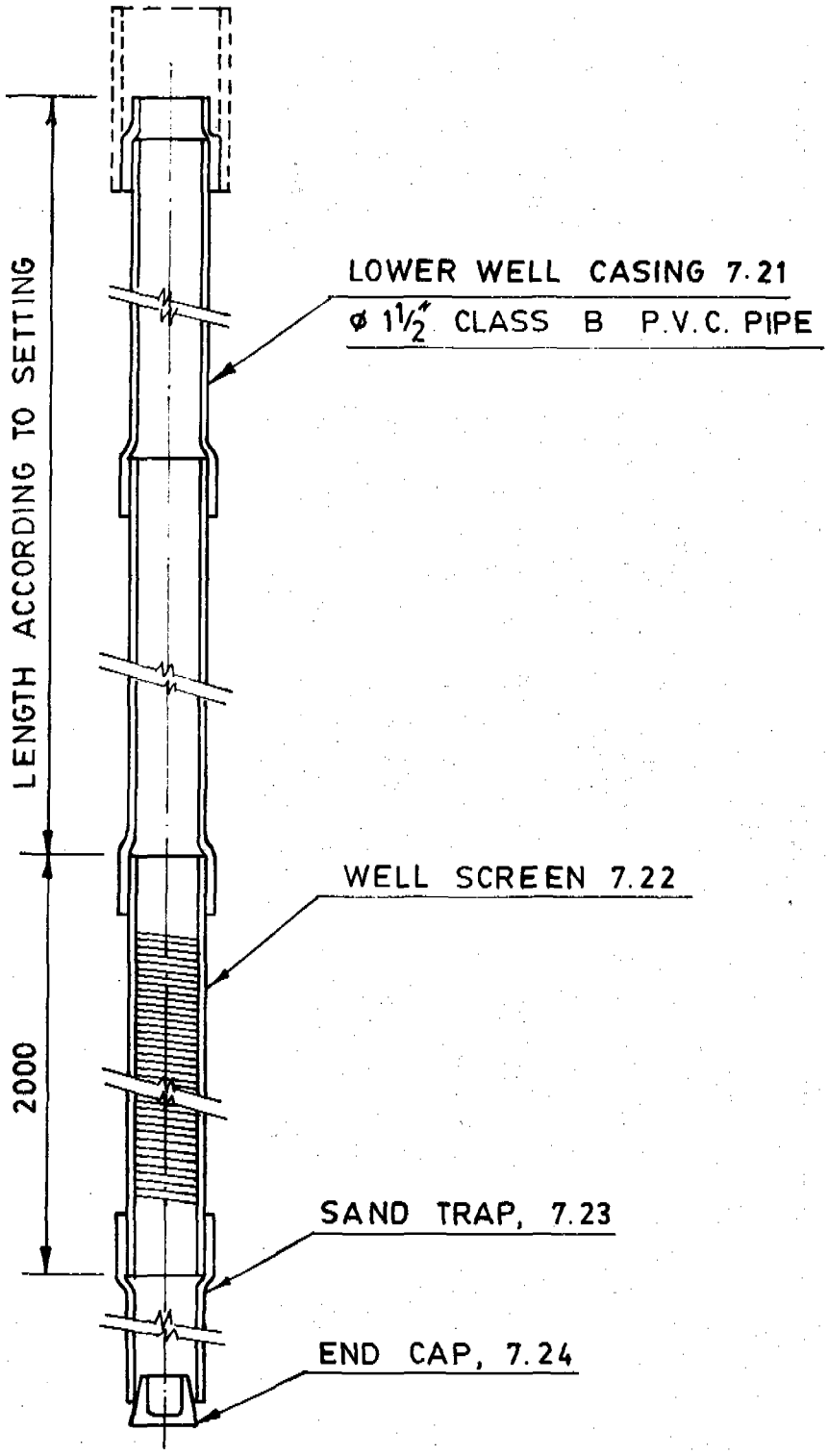
Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
7.21 (ND) 1.50" Lower Well Casing	1 Extrude 1.50" Class D uPVC water grade pipe according to BS 3505 2 Form bell socket on one end (Lengths of pipes as specified in purchase order) 3 Inspect	1 PVC extrusion Plant 2 Heating equipment 3 Bell socket forming die		Check 1. Dimenstions to conform to BS' 3505 2. Alignment of bell socket with pipe 3. Straightness of extruded pipe 4 Storage and packaging to avoid induced bending 5 Marking as specified by UNICEF

LOWER TUBEWELL SUB-ASSEMBLY

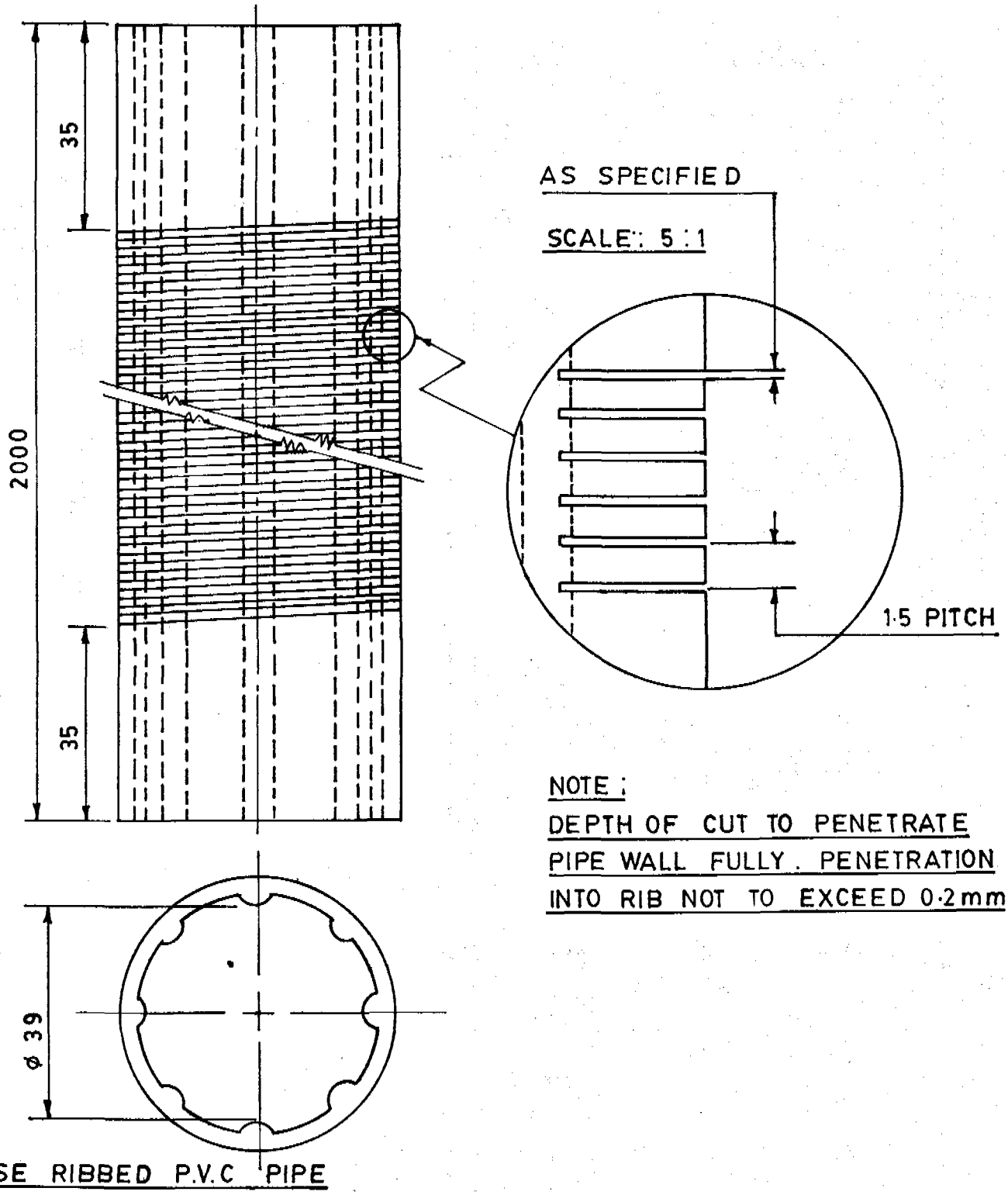
Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
7.22 Well Screen	UNICEF will specify Robo screen for which production process is as follows : 1 Procure ribbed uPVC pipe 2 Cut to size 3 Bore ends 4 Mount in lathe on a mandrel 5 Cut continuous slots while gauging slot width 6 Clean slot of uPVC cuttings and dust 7 Inspect	Lathe machine with attachment of slitting saws	Feeler gauge	Check 1 Pipe dimensions and internal rib dimensions 2 Width and pitch of slots as specified 3 Cleaning of slots from cuttings 4 For depth of slots into ribs as specified in drawing

TUBEWELL ASSEMBLY — **LOWER TUBEWELL SUB-ASSEMBLY**

Part No and Name	Production Process Sequence	Major Production Machine Tools/ Equipment	Major Production Aids	CRITICAL ASPECTS of Production and Inspection
7.23 (ND) Sand Trap	1 Use specified length of Standard 1.50" Class D uPVC pipe similar to part number 7.21 2 Inspect			
7.24 End Cap	1 Compression mould in preheated die with a hard plastic compund 2 Inspect	1 Hand injection moulding machine 2 Die mould		**Check** Taper dimensions



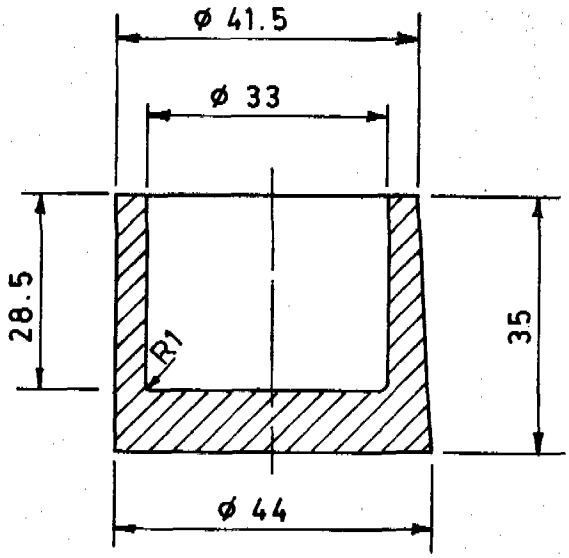
TARA HANDPUMP			
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1 : 5	TOLERANCE	DATE 1. 2. 87
DPHE unicef	NAME : LOWER TUBE WELL SUB ASSEMBLY		PART NO. 7. 20



NOTE :
DEPTH OF CUT TO PENETRATE PIPE WALL FULLY. PENETRATION INTO RIB NOT TO EXCEED 0·2mm

USE RIBBED P.V.C PIPE

TARA HANDPUMP	1	P.V.C. PIPE	ϕ 1½" x 2002
	QUANTITY	MATERIAL	CUT OFF SIZE
	SCALE 1:1 (5:1)	TOLERANCE	DATE 1.2.87
DPHE unicef	NAME : WELL SCREEN		PART NO. 7.22



TARA HANDPUMP	1	P. V. C.	AS MOULDED
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S. ± 0·3	DATE 25. 1. 87
	NAME : END CAP		PART NO. 7. 24

RETRIEVING ROD ASSEMBLY

PRODUCTION INFORMATION

DRAWINGS

RETRIEVING ROD ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine Tools / Equipment	Major Production Aids	CRITICAL ASPECTS of production and inspection
8.00 Retrieving Rod Assembly	1 Weld nut with rod as per assembly drawing 2 Clean welded joint 3 Inspect 4 Clean and paint with red oxide 5 Inspect (Approx production time 35 minutes)	Electric arc welder (Minimum 180A)	Thread gauge	**Check** 1 Alignment of nut with rod 2 Thread quality

TUBEWELL ASSEMBLY

RETRIEVING ROD ASSEMBLY

Part No and Name	Production Process Sequence	Major Production Machine tools / Equipment	Major Production Aids.	CRITICAL ASPECTS of Production and Inspection
8.11 (ND) Rod	1 Straighten bar stock 2 Chamfer 3 Cut off 4 Bend 5 Inspect	Lathe machine	Bending Jig	
8.12 (ND) Nut	1 Turn 2 Face 3 Bore 4 Form thread 5 Cut off 6 Inspect	Lathe machine	Thread Plug gauge	Check Thread for mating with top connector bolt (Part 3.12)

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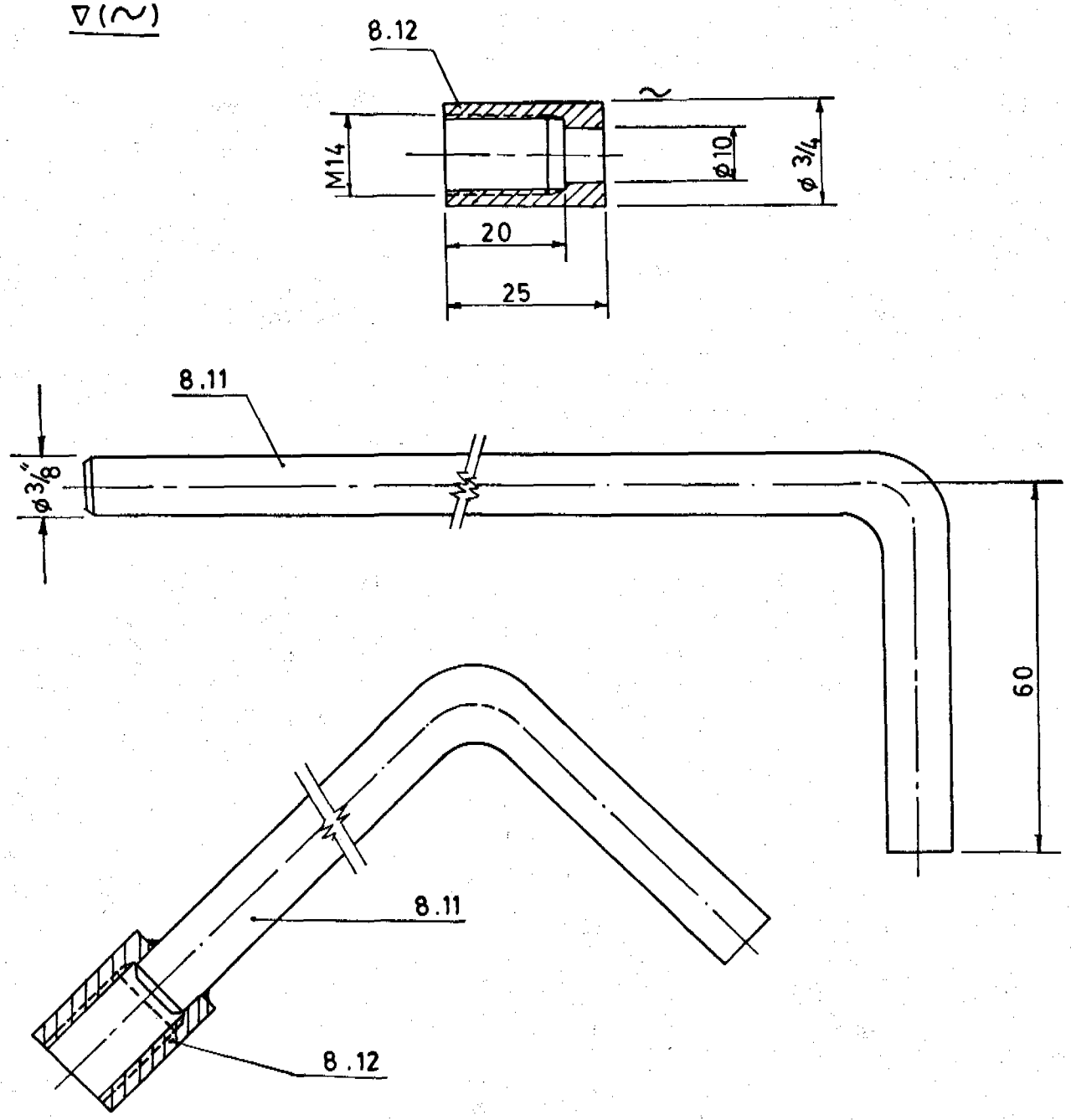

TARA HANDPUMP	1	M.S	ROD ø 3/8" x 2000 NUT ø 3/4" x 25
	QUANTITY	MATERIAL	CUT OFF SIZE
DPHE unicef	SCALE 1 : 1	TOLERANCE U.O.S. ± 0.3	DATE 31.1.87
	NAME : RETRIEVING ROD ASSEMBLY		PART NO. 8.00

AMENDMENT RECORD SYSTEM

AMENDMENT RECORD SYSTEM

PURPOSE

As the TARA is a new handpump, the process of improving its design will continue for some years, so as to further improve its performance and prolong its durability Consequently, occasional changes will be necessary in some material or dimensional specifications. This section describes how such changes should be incorporated in the Manual.

INCORPORATION OF AN AMENDMENT

An amendment is any change to a page of the Manual. The Purchasing Agency will issue amendments with a covering memo containing instructions. The amendments will be numbered in sequence. An amendment will be made by removing the old page and replacing it with a new page or by inserting an additional page after an existing page. On receiving instructions of amendment from the Purchasing Agency, the revised or additional page should be inserted in its correct place and the Amendment Record Sheet at the end of this section should be filled in. The Amendment Record Sheet will give a chronological record of all amendments. At the front of the Manual is a master checklist of pages. A new checklist will be provided by the Purchasing Agency every time there is an amendment.

PAGE NUMBERING SYSTEM FOR AMENDMENTS

Pages of text or tables are numbered by section and sequence. Drawings have the same page number as the part number. A revision to a page will have the original page number with suffix.../1(e.g. B3-5/1 or 3.11/1). Subsequent revisions will be shown as.../2,..../3,..../4 etc. An *addition* will have the same page number as the previous page, but with the suffix...A(e.g. B3-5A or 3.11A). Subsequent additions will be shown as .../B,.../C,.../D etc.

AUTHORITY FOR AMENDMENTS

Only amendments officially authorised by the Purchasing Agency are valid. Along with the covering memo containing instructions, the Purchasing Agency will also send either a duplicate or a counterfoil of the memo which should be signed by the Quality Control Supervisor of the manufacturer and returned to the Purchasing Agency. Manufacturers shall ensure that each amendment is properly recorded in the Manual. In the event of lapse in recording the amendment, manufacturers may be removed from the approved list of manufacturers. Ignorance of an amendment will not be permitted as an excuse for production of parts outside current specifications.

AMENDMENT RECORD SYSTEM

EXAMPLES OF AMENDMENTS

The following examples illustrate the method of making amendments and keeping the record updated.

Amendment 1 Revision to page (B3-5)

First time revision : replacing B3-5 by B3-5 / 1

ACTION :recording in the Amendment Record Sheet of the Manual

1 Enter "1" in the column 'AMENDMENT NO' (In this example this is the first Amendment issued by UNICEF).

2 Enter "Revision" in the column 'ADDITION/REVISION/DELETION'.

3 Enter the date which is identified as the effective date in the instruction of UNICEF, in the column 'EFFECTIVE DATE'.

4 Enter "B3–5" in the column 'OLD PAGE NO/DRG NO REMOVED'.

5 Enter "B3-5 /1" in the column 'NEW PAGE NO/DRG NO INSERTED'.

6 In the remaining three successive columns, the Quality Control Supervisor of the manufacturer should write his name, sign and write the date on which he is entering the record.

ACTION : removing and inserting

7 Remove B3-5 and insert B3-5/1.

AMENDMENT RECORD SYSTEM

Amendment 2 Second time revision : replacing B3 - 5 / 1 by B3 - 5 / 2

ACTION : recording in the Amendment Record Sheet of the Manual

1 Enter "2" in the column 'AMENDMENT NO'.

2 Enter "Revision" in the column 'ADDITION/REVISION/DELETION'.

3 Enter the date which is identified as the effective date in the instruction of UNICEF, in the column EFFECTIVE DATE'.

4 Enter "B3 – 5 / 1" in the column 'OLD PAGE NO/DRG NO REMOVED'.

5 Enter "B3 - 5 / 2" in the column 'NEW PAGE NO/DRG NO INSERTED'.

6 In the remaining three successive columns, the Quality Control Supervisor of the manufacturer should write his name, sign and write the date on which he is entering the record.

ACTION : removing and inserting

Remove B3 - 5 / 1 and insert B3 - 5 / 2.

AMENDMENT RECORD SYSTEM

Amendment 3 Additional page (drawing) between 4.11 and 4.12 (first time addition)

ACTION : recording in the Amendment Record Sheet of the Manual

1 Enter "3" in the column 'AMENDMENT NO'.

2 Enter "Addition" in the column 'ADDITION/REVISION/DELETION'.

3 Enter the date which is identified as the effective date in the instruction of UNICEF, in the column EFFECTIVE DATE'.

4 Enter "None" in the column 'OLD PAGE NO/DRG NO REMOVED'

5 Enter "4.11A" in the column 'NEW PAGE NO/DRG NO INSERTED'.

6 In the remaining three successive columns, the Quality Control Supervisor of the manufacturer should write his name, sign and write the date on which he is entering the record.

ACTION : removing and inserting

1 Insert 4.11A after 4.11

AMENDMENT RECORD SYSTEM

Amendment 3 Additional page (drawing) between 4.11A and 4.12 (second time addition)

ACTION : recording in the Amendment Record Sheet of the Manual

1 Enter "4" in the column 'AMENDMENT NO'.

2 Enter "Addition" in the column 'ADDITION/REVISION/DELETION'.

3 Enter the date which is identified as the effective date in the instruction of UNICEF, in the column EFFECTIVE DATE'.

4 Enter "None" in the column 'OLD PAGE NO/DRG NO REMOVED'.

5 Enter "4.11B" in the column 'NEW PAGE NO/DRG NO INSERTED'.

6 In the remaining three successive columns, the Quality Control Supervisor of the manufacturer should write his name, sign and write the date on which he is entering the record.

ACTION : removing and inserting

7 Insert 4.11B after 4.11A

AMENDMENTS RECORD SHEET

AMEND MENT NO	ADDITION/ REVISION DELETION	EFFECTIVE DATE	OLD PAGE NO./ DRG NO. REMOVED	NEW PAGE NO./ DRG NO. INSERTED	CHECKED BY QUALITY CONTROL SUPERVISOR		
					NAME	SIGNATURE	DATE
01	REVISIONS	1/12/87	1, 2 A1-1. A1-2 A1-4, A1-5	1/1, 2 /, 1 A1-1 / 1, A1-2 / 1 A1-4 / 1, A1-5 / 1	CER GLENNIE		
ditto	REVISIONS		A2-1 A2–2 A2-3, A2-4, A2-5	A2-1 / 1, A2-2 / 1, A2-3 / 1, A2-4 / 1, A2-5 / 1			
ditto	REVISIONS		A3-2, A3-3 A3-4, A3-5, A4-1 A4-2, A4-3, A4-7	A3 2 / 1, A3-3 / 1 A3 4 / 1, A3-5 / 1 A4-1 / 1, A4-2 / 1, A4-3 / 1, A4-7 / 1			
ditto	REVISIONS		1.00, B1-4, 1.10, 1.11, 1.12, 1.13, 1.14	1.00 / 1, B1 4 / 1, 1.10 / 1, 1.11 / 1, 1.12 / 1, 1.13 / 1, 1.14 / 1			
ditto	REVISIONS		1.30, 1.40, 1.41, B2-1, B2-3	1.30 / 1, 1.40 / 1, 1.41 / 1, B2-1 / 1, B2-3 / 1			
ditto	REVISIONS		2.00. 2.11, 2.12, B3-1, 3.00, B3-2, B3-4, 3.10, B3.12	2.00 / 1, 2.11 / 1, 2.12 / 1, B3-1 / 1, 3.00 / 1, B3-2 / 1, B3-4 / 1, 3.10 / 1, 3.12 / 1			

AMENDMENT RECORD SHEET

AMENDMENT NO	ADDITION/ REVISION DELETION	EFFECTIVE DATE	OLD PAGE NO./ DRG NO. REMOVED	NEW PAGE NO/. DRG NO. INSERTED	CHECKED BY QUALITY CONTROL SUPERVISOR		
					NAME	SIGNATURE	DATE
ditto	REVISIONS	1 / 12 / 87	B3-7, 3.22, 4.00, 4.11, B4-1, B4-9, 4.20, 4.26, B4-12, 4.33	B3-7 / 1, 3.22 / 1, 4.00 / 1, 4.11 / 1, B4-1 / 1, B4-9 / 1, 4.20 / 1, 4.26 / 1, B4-12 / 1 4.33 / 1			
ditto	REVISIONS		B5-4, 5.11, 5.14, B6-1, 6.00, B7-4 7.13, 7.15	B5-4/1, 5.11 / 1, 5.14/1, B6-1 / 1, 6.00/1, B7-4 / 1 7.13/1, 7.15 / 1			
ditto	DELETIONS		A4-8, B3-5, 3.14, 3.16, 3.23. B4-8, B4-9, 4.25, B7-5, 7.14				
ditto	ADDITIONS			2.14, 3.17, 6.13, B6-3			

AMENDMENT RECORD SHEET

AMEND MENT NO	ADDITION/ REVISION DELETION	EFFECTIVE DATE	OLD PAGE NO./ DRG NO. REMOVED	NEW PAGE NO./ DRG NO. INSERTED	CHECKED BY QUALITY CONTROL SUPERVISOR		
					NAME	SIGNATURE	DATE

TARA HANDPUMP PRODUCTION MANUAL

DHAKA BANGLADESH