

 **THORN LIGHTING**



MANUFACTURING SYSTEMS UNIT

The Manufacturing Systems Unit of the Light Sources Division, Thorn Lighting, is an Engineering Department set up to provide equipment to lamp making factories. It is comprised of three main sections, Design, Process Control and Production.

The association of electronic process control with the Design Department permits the selection of the appropriate level of technology for each task undertaken.

The experience of the Production Department in the building of machines and in lamp making provides a valuable feedback to design and process control ensuring that the final choice does not neglect the 'hands on' operator.

STUDIES

Including feasibility studies. Concept generation. Scrap reduction, supported by the use of a VHS video camera.

TROUBLESHOOTING

This service is available from any of the Unit's capabilities from the provision of a qualified observer for fault diagnosis to the 'rapid response' manufacture or repair and fitting of vital machine parts.

SPECIAL PURPOSE MACHINES

From a dedicated test rig or equipment for a flexible manufacturing cell through to automatic machinery.

CAPACITIES

TURNING

From 150mm dia x 300 long
through 350mm dia x 1800 long
To 1050mm dia x 450 long.

MILLING

Up to 1500 Long x 700 wide
x 550 High.

JIG BORING

Up to 750 x 750 x 750 at
Enfield and up to 1000 cube at
Leicester. (greater on circular
work).

HORIZONTAL BORING

Up to 1200 cube (without
special provision).

CYLINDRICAL GRINDING

Up to 250 dia x 1000 long.

2 AXIS CO-ORDINATE DRILLING

600 x 1000 in one setting

MICRO DRILLING

Down to 0.13 dia.

WELDING

T.I.G., arc and gas
welding. Plasma cutting up to
10mm. NC Flame cutting to 200
thick x 1250 x 2000.

DESIGN AND DRAUGHTING

From lamp components to machine
design or design modifications,
electronic, electrical,
mechanical, using CADD on
selected work.

CNC TURNING

Up to 300 dia x 600 long.

4 AXIS CNC MILLING

Up to 1500 long x 700 wide x
550 high.

SURFACE GRINDING

Up to 560 x 170 x 200 High.

CYLINDRICAL GRINDING

Up to 250 dia x 2000 long.

INTERNAL GRINDING

Up to 150 dia x 150 long.

Tool and cutter grinding, drill
point grinding.

RADIAL ARM DRILLING

Up to 64 dia over 1000 x 1500
in one setting.

HEAT TREATMENT

Up to 750 x 400 x 220 at up to
1100 degrees C. and up to 600 x
900 x 300 high @ 900 degrees C.

ELECTRICAL WORK

Control Cabinet and machine
wiring Circuit Design.

INSPECTION

All normal inspection
procedures, plus Shadowgraph,
certificated slips and a
Ferranti measuring machine.

TURNING

Our capacity is as stated, up to 1050 dia x 450 long (or 500 dia x 1000 long) on the largest lathe down to 150 dia x 300 long on a small precision machine. The majority of the machines are fitted with digital read outs to eliminate wear errors. All are manned by skilled and experienced turners, a combination that in many cases eliminates the need for grinding, so shortening process times and saving money. A vertical turning and boring mill can handle up to 1200 x 600 and is particularly suited to heavy work up to 2 tonnes.

CNC TURNING

We currently have two Harrison Lathes with Anilam Crusader 2 axis NC controllers enabling us to produce complex forms using a minimum of single point tools. Male and female spheres, tapers etc., are directly programmable while non spherical curvilinear shapes are generated from a series of approximations to a high degree of accuracy. Drawing office and computer assistance is available to determine tool paths.

MILLING

A range of milling machines is available including Bridgeport BR2J2's and Deckels, all with a wide range of equipment and all with digital readouts enabling them to be used for a wide range of jobs.

CNC MILLING

We have three Bridgeport CNC4 Vertical Spindle Milling machines and a Huron MU6 Universal machine all with Heidenhain 4 axis controllers. The fourth Axis is an NC rotary head. These enable us to cut scroll and index cams for rectilinear and curvilinear followers under full NC. Plate and box cams are cut directly on the machine tables using 2 axis. These machines make simple that which would be very difficult by orthodox means. Their inherent accuracy and repeatability ensure part matching and interchangeability. These machines too are programmed and used by skilled men ensuring good working practices on advanced equipment.

JIG BORING

One machine is a Swiss S.I.P. fully equipped as regards cutting tools and with high precision dividing tables so that turrets and rings may be accurately spaced. The second is a Newall machine handling up to 1200 work dia and is similarly equipped.

HORIZONTAL BORING

Up to 1200 x 1200 x 1200 can be accommodated on a machine without making special provision, but larger can be done by providing extra support or by removing the tail pillar.

GRINDING

Surface grinding is undertaken on a Jones & Shipman 1400 machine with a capacity of 560 x 170 x 200 high. With automatic downfeed and an accurate set point stop a high standard of repeatability is achieved with good metal removal rates.

Cylindrical grinding uses another J & S machine adaptable for external grinding with a 250 dia x 2000 long work envelope and internal grinding up to 150 dia x 150 long. Honing facilities are available as is tool and cutter grinding. Precision drill point grinding is done on a special purpose machine.

DRILLING

In addition to the normal range of drilling machines the radial arm drill can cover an area of 1000 x 1500 in one setting, drilling up to 64 dia.

Co-ordinate drilling covers an area 600 x 1000 in one setting with a positional accuracy of + or - .05 sq. Micro drilling is possible down to .12mm dia but practical considerations often indicate a somewhat larger limit.

HEAT TREATMENT

Two furnaces are available at Enfield, the smaller with a maximum temperature of 1100 degrees centigrade and the larger a temperature of 1050 degrees centigrade. The volume of the larger is 750 x 400 x 220. These are used for stress relieving and annealing castings and fabrications as well as hardening and tempering. The smaller has provision for the supply of (non hazardous) atmosphere. These permit the hardening and tempering of most tool steels to a reliable standard. They are mostly used for B01 tool steel (KE672, ARNE, GFS etc.,) but most steels with a simple quench/temper regime can be handled. High speed steels cannot be treated. At Leicester the capacity is 600 wide x 900 deep by 300 high, (weight being the limiting factor) at up to 900 degrees C.

WELDING

Using T.I.G., electric arc or gas welding satisfactory joints can be made on the usual engineering materials for the purpose of fabrication, repair or rebuilding as required. Plasma cutting equipment enables the cutting of mild or alloy steels, including stainless steel, up to 10mm thick.

An NC flame cutting machine will cope with the MDI controlled cutting of profiles up to 200 thick x 1200 x 200 in low alloy steels.

ELECTRICAL WORK

We have considerable experience in control cabinet and machine wiring including circuit design, the installation and programming of Saab and Mitsubishi PLCs and the computerised control and analysis of production machines.

INSPECTION

All normal inspection procedures are used with up to date digital readout equipment, a 'shadowgraph' for form and profile checking and certificated slip gauges so that lamp factory components can be checked to ISO standards.

These are backed up by a Ferranti co-ordinate measuring machine employing the Renishaw probing system.

DESIGN AND DRAUGHTING

A full design and draughting service is available, widely experienced in the design of lamp making and other special purpose machinery, able to produce formal drawings from clients sketches, modify existing designs or design totally from the clients brief.

The Anvil 5000 system of 3D Design/Draughting has been introduced and is used on selected work for detail and assembly drawings. The "Family of Parts" facility is used to promote standardisation of design features.

Electrical, electronic design and development work can be undertaken with particular emphasis on Photometry and allied processes. There is long experience in the use of video for inspection and/or positional control.

In addition to the larger facilities available at the Leicester works there is a normal complement of machine shop processes.

 **THORN LIGHTING**