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Student’s Book
N2

Engineering Drawing

Student’s Book

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# Contents

**Module 1 Drawing terminology, abbreviations and Computer Aided Drafting (CAD)** ........................................ 1

1.1 Abbreviations and terms used in Engineering Drawing ..................................................... 1
1.2 Basic computers .................................................................................................................. 3
1.3 Plotters and pointers used in industry ................................................................................ 4
1.4 Storage devices .................................................................................................................. 5
1.5 Backup systems ................................................................................................................ 5

**Exercise** ..................................................................................................................................... 5

**Module 2 Fastening devices and welding** ................................................................................. 6

2.1 Introduction .......................................................................................................................... 6
2.2 The construction of hexagonal nuts, bolts, studs and drilled and tapped holes ................. 7
2.3 Bolt heads ............................................................................................................................ 9
2.4 Machine screw heads .......................................................................................................... 10
2.5 Locking devices ................................................................................................................ 10
2.6 Welded joints ...................................................................................................................... 11
2.7 Types of welding symbols and representation .................................................................... 11
2.8 Supplementary welding symbols ...................................................................................... 13

**Exercise** ..................................................................................................................................... 13

**Module 3 Screw threads** .......................................................................................................... 15

3.1 Introduction ........................................................................................................................ 15
3.2 Construction of external and internal single start V-screw threads .................................. 16
3.3 Construction of external and internal single start square threads ..................................... 17
3.4 Screw thread terminology .................................................................................................. 19

**Exercise** ..................................................................................................................................... 19

**Module 4 Machining symbols** .................................................................................................. 21

4.1 Introduction .......................................................................................................................... 21
4.2 The basic machining symbol .............................................................................................. 21
4.3 Identification and correct use of the machining symbol ...................................................... 21
4.4 Roughness values and grade numbers ............................................................................... 22
4.5 Application of machining symbols including roughness values ..................................... 22
4.6 Production method, treatment and coating ....................................................................... 22
4.7 The placing of machining symbols .................................................................................... 23

**Exercise** ..................................................................................................................................... 23

**Module 5 First angle orthographic projections** ...................................................................... 24

5.1 Introduction .......................................................................................................................... 24
5.2 First angle primary orthographic views ............................................................................. 24
5.3 Projection symbol ............................................................................................................... 26

**Exercise** ..................................................................................................................................... 27
Module 6 Isometric drawing

6.1 Introduction .......................................................................................................................................37
6.2 Construction of an isometric drawing ...........................................................................................37
6.3 Angles in isometric projection ........................................................................................................38
6.4 Isometric projection of circles .........................................................................................................39
Exercises ..................................................................................................................................................41

Module 7 Third angle orthographic projection .................................................................................45

7.1 Introduction .......................................................................................................................................45
7.2 Primary orthographic views ............................................................................................................45
7.3 Projection symbol .............................................................................................................................46
Exercises ..................................................................................................................................................46

Module 8 Interpenetrations ................................................................................................................ 51

8.1 Introduction .......................................................................................................................................51
8.2 Tee-ends .............................................................................................................................................53
8.3 Forked ends ........................................................................................................................................54
Exercises ..................................................................................................................................................55
LEARNING OBJECTIVES:
On completion of this module you will be able to:
- identify and apply the abbreviation for some terms used in engineering drawing
- name types of plotters and printers used in industry and give one advantage and one disadvantage of each
- list and describe different types of storage devices used in microcomputers
- explain why backup systems are necessary.

1.1 Abbreviations and terms used in engineering drawing

- Across flats
  A/F

- Across corners
  A/C

- Assembly
  ASSY

- Chamfered
  CHAM
- **Countersunk**
  CSK

- **Countersunk head**
  CSK HD

- **Counter-bore**
  C'BORE

- **Hexagon head**
  HEX HD

- **Pitch circle diameter**
  PCD
1.2 Basic computers

**INPUT**
Input devices allows you to communicate with your computer.

**OPERATING SYSTEM**
Like a conductor, the operating system (Win 95) allows the hardware and software to work together.

**PROCESSING**
The Central Processing Unit (CPU) performs calculations, processes instructions and manages information.

**SOFTWARE**
Software allows you to write books, make drawings, do accounts etc.

**OUTPUT**
Output devices allows your computer to communicate with you.

**STORAGE**
Like a filing cabinet, a computer stores information.
1.3. Plotters and printers used in industry

1.3.1. Pen plotters

**Advantages:**
Excellent quality possible.
Colour plotting possible.

**Disadvantages:**
Very expensive.
Replacement pens rather expensive too.

1.3.2. Inkjet plotters

**Advantages:**
Print quality is very high, and quality colour printing is possible.
Printer operates relatively quietly.

**Disadvantages:**
Printers are rather expensive and ink usage can be excessive.
The ink needs an amount of drying-out time, so smudging is easy.

1.3.3. Thermal printers

**Advantages:**
Low noise levels.

**Disadvantages:**
Special paper must be used which reacts to heat, so normal paper cannot be used.
Special coated paper is rather expensive.

1.3.4. Laser printers

**Advantages:**
Unsurpassed quality is possible.
Quiet operation.
Colour printing also possible.

**Disadvantages:**
Expensive.
Ink cartridges relatively expensive.
1.4. Storage devices

1.4.1. Removable storage devices
Removable storage has been around almost as long as the computer itself. Early removable storage was based on magnetic tape like that used by an audio cassette. New removable storage devices can store gigabytes of data on a single disk.

There are several reasons why removable storage is useful:
• Making back-up copies of important information
• Transporting data between two computers
• Storing software and information that you don’t need to access constantly
• Copying information to give to someone else
• Securing information that you don’t want anyone else to access

Some types of removable media are designed to be read by removable readers and drives. Examples include:
• Optical discs (Blu-ray discs, DVDs, CDs)
• Memory cards (CompactFlash card, Secure Digital card, Memory Stick)
• Floppy disks / Zip disks
• Magnetic tapes
• Paper data storage (punched cards, punched tapes)

Some removable media readers and drives are integrated into computers, others are themselves removable. Removable media may also refer to some removable storage devices, when they are used to transport or store data. Examples include:
• USB flash drives
• External hard disk drives

1.4.2. Hard/fixed drives
These disks are fixed to the computer and can essentially be described as fixed disks. The capacities of these drives, is constantly expanding. Data can also be accessed much faster than with removable storage devices.

1.5. Backup systems
Why are backup systems necessary?
Should problems occur with the hard disk drive, all data could be lost. It is thus of the utmost importance to make copies (backup) of work done on the computer on a regular basis.

Exercise

1. Make freehand sketches to illustrate what is meant by the following:
   across flats, across corners, chamfered, countersunk, countersunk head, counter-bore, hexagon head, across flats and pitch circle diameter.
2. Give one advantage and one disadvantage of the following printing devices:
   • pen plotters
   • ink jet printers
   • thermal printers
   • laser printers.
3. Describe what is meant by removable storage devices.
4. Explain why backup systems are a necessity.
Left view:
- Draw in the semi-circles using a radius of ‘D’.
- Note that the corners of the two-faced view are not chamfered.

![Diagram showing a bolt and nut with dimensions labeled]

**Note**
Do not forget centre lines!

### 2.2.2 The construction of a hexagonal bolt

When constructing a hexagonal bolt, the only proportion that changes is the bolt head thickness, which is now 0.7D. Draw in the rest of the proportions as shown in the figure below. Note the difference between the top view of a nut and the right view of a bolt.

![Diagram showing a hexagonal bolt with dimensions labeled]

### 2.2.3 The construction and conventional representation of a stud

When constructing a stud, use the same convention as used with the front part of a bolt. The drawing below shows a front and top view of a stud.

![Diagram showing a stud with dimensions labeled]