

GUIDELINES ON THE USE OF DISPLAY SCREEN EQUIPMENT

1. Preamble

In view of the legislative requirements and growing concern on the health effects related to the use of display screen equipment (DSE), the following guidelines are prepared to give general information on its radiation emission, ergonomic design and work environment and job pattern.

2. Display Screen Equipment

Similar terms such as Visual Display Units (VDUs) have been used for Display Screen Equipment.

In the office setting, Display Screen Equipment, DSE for short, generally refers to the monitor which converts a digital electrical signal into an image and serves as communication link between the computer and human. There are several display technologies, such as liquid crystal (LCD) and thin film transistor (TFT) and the conventional cathode ray tube. As the vast majority of DSEs depends on cathode ray tube (CRT) technology, most of the research findings and radiation information have been focused on the this type of DSEs.

3. Radiation Emission

The principle of cathode ray tube technology involves the generation of electronic beams striking on a photo-sensitive screen. The process of electron beam generation, beam steering and the conversion of electrical energy into visible light results in the emission of electromagnetic radiations of the non-ionizing range (ultraviolet, visible, infrared radiation, radiofrequency fields, extremely low frequency fields and electrostatic fields). The non-ionizing radiation means that they are low frequency, low energy level and unable to cause ionization (removal of an electron from an atom) when reaching the body. As a matter of fact, DSE emits electromagnetic fields similar to many electrical appliances such as television.

In Hong Kong, there is no occupational exposure standards for DSEs' emission. Commonly accepted international standards include Threshold Limit Values of American Conference of Governmental Industrial Hygienists (ACGIH) and MPR II of Swedish Board for Technical Accreditation (SWEDAC). **Exposure to X-ray, infra-red, ultra-violet, radio frequency and microwave arising from the use of DSE had been investigated in the UK and USA. The results concluded that such exposure was below the international acceptable limits. In most cases the emissions detected were very substantially below the existing limits.** (*Health Guide on the Use of Visual Display Unit, Labour Department, Hong Kong*)

4. Recommendations on Equipment

- (a) Check the product information and standards before purchase. If such product has met certain standards, such as MPRII, manufacturers usually give such details in their product catalogue.
- (b) Desirable characteristics of screen:
 - adequate size for comfortable viewing
 - screen brightness and image contrast could be adjusted to meet the user preference
 - tilt and rotation could be adjusted to meet the user's preference
 - no flickering of displayed characters
 - non-reflective surface
 - energy saving features
- (c) Desirable characteristics of keyboards:
 - matt surface
 - detachable
 - stable
 - with separate numeric keys
 - shallow keyslope about 10 to 15 degree

5. Recommendations on Furniture

- (a) The principles of ergonomic should be applied to the design of furniture to encourage the comfortable positioning of fingers, wrist, arms, shoulders, and other body parts to attain work efficiency and safety.
- (b) Desirable characteristics of workstation:
 - separate vertical adjustable adjustment for keyboard, screen and source material
 - movable keyboards on the table
 - adequate space to support hands and forearms
 - height-adjustable seats with backrest, adjustable for height and inclination
 - documents to allow visual distance of 300 to 700 mm

6. Recommendations on the Working Environment

- (a) Office lighting should be adequate and properly focused at the source documents and screen without causing glare. An illuminance of 300 to 500 lux (unit of measuring light intensity) on the desk surface is considered adequate.
- (b) Glare from windows should be eliminated by means of film, curtains, blinds or the like.
- (c) The screen should be perpendicular to the light source or windows, that is, the direction of vision of the DSE user should be parallel to the light source.

7. Recommendations on the Posture and Job Pattern

- (a) User should be in correct posture to reduce muscle fatigue. Recommendations include:
 - viewing distance of 35-60cm
 - head inclined downward between 15 to 20 degree
 - upper arms and lower arms are at right angle
 - lower arms approximately horizontal
 - wrist incline no more than 10 degree
 - Thighs horizontal
- (b) Job rotation and work breaks are also effective means to reduce fatigue and eyestrain. User can perform DSE job and non-DSE job on alternate patterns. If the use of DSE is inseparable from work, appropriate work breaks should be taken. This helps relaxation of eye muscles and reduction of occupational stress.
- (c) Depending on the working environment and nature of work, DSE users are encouraged to discuss with their supervisors for implementation of the above recommendations.

8. Risk Assessment for DSE Users

- (a) DHSO or suitable person delegated by head of department is responsible to conduct risk assessments for DSE users in the department.
- (b) HSO will organise training courses for those who have to conduct risk assessment relating to the use DSEs.
- (c) DSE users are those who, by nature of their work, are required to use display screen equipment for the majority of their work periods. A brief guideline to determine users are: either they work with DSEs continuously for at least four hours during a day; or work cumulatively for at least six hours during a day. Any break not exceeding ten minutes in an hour is not considered as breaking the continuity of use of DSEs.

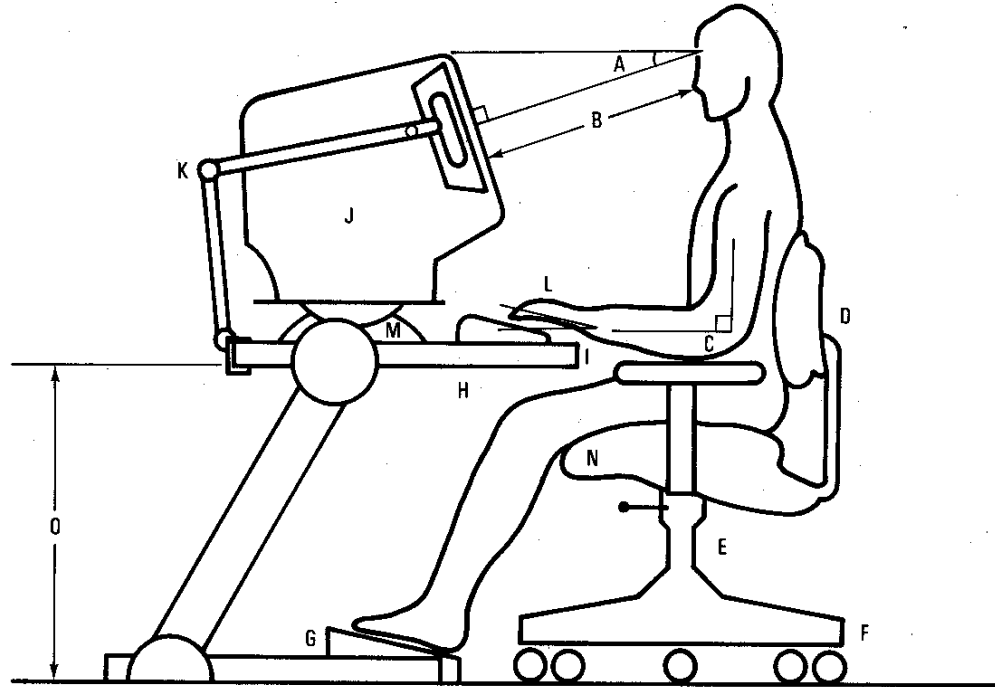
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- (d) Heads of department may include staff who does not fall into the above criteria for risk assessments if there is reason to do so.
 - (e) Risk assessment must be performed on all existing workstations in the department. For new staff, risk assessment must be performed as soon as possible when the staff is reported for duty.
 - (f) Risk assessment must be reviewed if there is a significant change in the workstation or work condition.
 - (g) Risk assessment should be performed using the checklist designed by HSO.
 - (h) After completion, a copy of the checklist should be given to the user concerned while the original should be kept by the department. The checklist must be kept for at least 2 years after the workstation ceased to be used. This checklist will form part of the evidence that the necessary risk assessment has been performed should the authority require proof of such assessment.
 - (i) In completion of the risk assessment checklist, if there is doubt on the work environment or need for follow-up action to reduce the risks, Head (HS) should be notified.
 - (j) The identified DSE user should be properly trained and instructed on the issue.

References:

1. *Health Guide on The Use of Visual Display Unit. Labour Department, 1991.*
2. *Display Screen Equipment & Health, A Management Guide. IOSH, 1992.*
3. *CAP 509 Occupational Safety and Health (Display Screen Equipment) Regulation, 2002*

Working Posture

Diagram



Reference 1

- A* Viewing angle 15°–20°
- B* Viewing distance 35–60 cm
- C* Forearm and arm about 90°
- D* Adjustable back rest
- E* Adjustable seat height 34–52 cm
- F* 5 pronged base with castors
- G* Firm foot rest if required
- H* Acceptable knee clearance
- I* Support for forearms/hands if required
- J* Screen at right angles to line of sight
- K* Adjustable document holder
- L* Wrist incline $\leq 10^\circ$
- M* Screen support adjustable for rotation and tilting
- N* Round or scrolled edged seat pad
- O* Adjustable table height