CARDIFF COUNCIL

CODE OF GUIDANCE

<u>**DISPLAY SCREEN EQUIPMENT**</u>

The purpose of this Code of Guidance is to outline the requirements to be met to ensure "users" of display screen equipment work safely.

The Code of Guidance addresses the following:-

1.0   Definition of Display Screen Equipment
2.0   The Health and Safety (Display Screen Equipment) Regulations 1992 as amended by the Health and Safety (Miscellaneous Amendments) Regulations 2002
3.0   The main hazards associated with display screen equipment
-               Visual discomfort
-               Musculoskeletal problems
-               Stress and fatigue
-               Other concerns
4.0   The avoidance of risks associated with display screen equipment
-               Workstation
-               Use of Workstation by "User"
5.0   Working with laptops, notebooks or tablet PC's
6.0   Eye and Eyesight Tests
7.0   Action to take in event of a problem
8.0   Suggested exercises that can be carried out in the office

[4.C.048](#) - Health and Safety (Display Screen Equipment) Regulations 1992 (amended 2002) Risk Assessment Form

1.0   Definition of Display Screen Equipment

"Display Screen Equipment" means any alphanumeric or graphic display screen, regardless of the process involved. Display Screen Equipment is equipment where a display screen is used, usually forming part of a computer, to show text, numbers or graphics. It includes conventional (cathode ray tube) style screens, flat screens, LCD's and other display processes such as plasma screens. Non-electronic display systems such as microfiche are also included as is DSE equipment in non-office type situations such as factories.

2.0   The Health and Safety (Display Screen Equipment) Regulations 1992 (amended 2002)

The Health and Safety (Display Screen Equipment) Regulations 1992 (amended 2002) relate specifically to display screens where there is a "user".

A "user" is an employee who habitually uses display screen equipment as a significant part of normal work (i.e. where use is daily for continuous spells of an hour or more).

The Regulations require Cardiff Council to:

■ Carry out a 'risk assessment' of user's Display Screen Equipment workstations and reduce the risks to health and safety that are identified. (This needs to be done in conjunction with the "user" and there is a Cardiff Council - Health and Safety (Display Screen Equipment) Regulations Risk Assessment Form – 4.C.048).

■ Make sure workstations (display screen, laptop/notebook/tablet PC, keyboard and other peripheral equipment; the desk and chair; the working environment, task design and software used) satisfy the minimum requirements that are specified in the schedule to the Regulations for all users of DSE equipment not only for those who fall into the definition of "users" as defined by the Regulations. This also applies to DSE equipment provided to Home workers.

■ Plan display screen equipment work so that there are breaks or changes of activity.

■ Provide all display screen equipment "users" with appropriate health and safety information and training and new "users" before they become "users". (This code can be used to supplement the guidance provided to "users" by their manager.)

■ Make provision for new "users" to have appropriate eye and eyesight tests before they become "users" and for existing "users" as soon as practicable after the request. Special spectacles if they are needed for work at display screen equipment ONLY.

Employees need to be aware of: -

■ hazards and risks associated with the use of display screen equipment

■ minimum requirements for workstations

■ use and arrangement of workstation components to facilitate good posture; prevent over reaching and avoid glare and reflections on the screen

■ desirability of correct posture and the importance of postural changes

■ use of adjustment mechanisms on equipment, particularly furniture

■ the need for regular cleaning of screens and the maintenance of other equipment

■ the need to take advantage of breaks and changes of activity

■ organisational arrangements by which ill health symptoms or problems with the workstation can be communicated to management.

3.0   The Main Hazards Associated with Display Screen Equipment

The introduction of display screen equipment (DSE) has been associated with a range of symptoms of ill health. These often reflect bodily fatigue. They can easily be prevented by applying ergonomic principles to the design, selection and installation of display screen equipment; the design of the workplace and the organisation of the task.

The following outlines a number of health concerns related to the use of DSE and advises on the steps that can be take to reduce the risk of ill health.

(i)   **Visual Discomfort**

Medical evidence shows that using display screen equipment is <u>not</u> associated with damage to eyes or eyesight and it does not make existing defects worse. Some workers may experience **temporary** visual fatigue, leading to a range of symptoms such as impaired visual performance, red or sore eyes and headaches, or the adoption of awkward posture which can cause further discomfort in the limbs. These may be caused by: -

- staying in the same position and concentrating for a long time;
- poor positioning of the display screen equipment;
- poor legibility of the screen or source documents;
- poor lighting, including glare and reflections;
- a drifting, flickering or jittering image on the screen;
- incorrectly positioned document holder;
- an unsatisfactory thermal environment.

Wearers of contact lenses may have a greater susceptibility to visual discomfort. This is often due to a reduced blink-rate that results in drying of the lenses.

Steps to reduce risks of visual discomfort include: -

- ensuring eyes have been tested and any special corrective appliances for use at display screen equipment are suitable;
- ensuring breaks are taken from work on display screen equipment;
- adjusting the workstation;
- the user adjusting their posture

(ii)   **Musculoskeletal problems**

Upper limb pains and discomfort

A range of conditions of the arm, hand and shoulder areas linked to work activities are now described as Work Related Upper Limb Disorders (WRULD). These range from temporary fatigue or soreness in the limb to chronic soft tissue disorders like peritendinitis or carpal tunnel syndrome. Some keyboard operators have suffered occupational cramp.

Symptoms of upper limb disorders include:

- muscle weakness
- feeling of weakness in arms/wrists/fingers
- tingling sensation at the fingertips
- numbness
- pain in wrists/arms/fingers/shoulders and neck
- swelling
- tenderness
- joint restriction
- crackling feeling
- hand swelling

WRULD is a progressive, long-term condition that can generally be divided into three stages. However, the symptoms experienced by each individual do not necessarily conform exactly to the pattern outlined below:

Stage 1 (Mild)

Pain, aching and tiredness of wrists, arms, shoulders or neck during work which improves overnight. This stage may last weeks or months but is reversible.

Stage 2 (Moderate)

Recurrent pain, aching and tiredness occur earlier in the working day; persists at night, and may disturb sleep. Physical signs may be visible, such as swelling of tendon areas. This stage may last several months.

Stage 3 (Severe)

Pain, aching, weakness and fatigue are experienced even when resting completely, sleep is often disturbed, and the sufferer may be unable to carry out even light tasks at home or work. This stage may last months or years. Sometimes it is irreversible and full use of the affected parts is never regained.

If allowed to develop, WRULD does more than cause pain. Many daily tasks or activities become impossible or difficult to do e.g. turning taps, washing up, shopping, gardening, fastening clothes, caring for and playing with children, opening jars and packets, etc.

Suffering from WRULD can also increase tension at work and home because of the disbelief amongst colleagues and family about a condition that can have no visible sign of injury.

Factors which contribute to upper limb pains and discomfort include: -

- poorly arranged workstation e.g. inappropriate height of chair, poorly sited screen, long term use of a laptop/notebook/tablet PC

- insufficient consideration of job design e.g. high workload with tight deadline
- incorrect posture by user
- insufficient work breaks

Steps to reduce the risks of upper limb pains and discomfort include: -

- adjusting the workstation
- re-designing the job
- adjusting posture
- ensuring breaks are taken from work on display screen equipment

Other musculoskeletal problems

Prolonged static posture of the back, neck and head has been shown to cause musculoskeletal problems. To prevent fatigue in any part of the body, it is essential that regular breaks away from the screen are taken; the workstation is correctly arranged and the user adopts the correct posture.

(iii) **Stress and Fatigue**

Many symptoms described by display screen workers reflect stresses arising from their tasks. They may be secondary to upper limb or visual problems but they are more likely to be caused by poor job design or work organisation, particularly lack of sufficient control of the work by the user, under-utilisation of skills, high-speed repetitive working or social isolation. All these have been linked with stress in display screen work, although clearly they are not unique to it. Attributing individual symptoms to particular aspects of a job or workplace can be difficult.

Stress can manifest itself in a number of ways:

- increased error rates
- irritability
- over sensitivity to criticism
- increased short-term absences
- regular lateness
- working exceptionally long hours
- excessive smoking/alcohol consumption
- self imposed isolation
- exaggeration of minor problems
- irrational behaviour
- unjustified criticism of colleagues/management
- manifestation of physical problems

The risk of display screen users experiencing physical stress and fatigue can be minimised by:

- careful design, selection and disposition of display screen equipment
- good design of the workstation
- environment and task

- ensuring breaks are taken away from work on display screen equipment
- good job design
- training, consultation and involvement of user

(iv) **Other Concerns**

Epilepsy
Display screen equipment has not been known to induce epileptic seizures. People suffering from the very rare (1 in 10,000 population) photosensitive epilepsy who react adversely to flickering lights and patterns can work safely with display screens.

Facial dermatitis
Some DSE users have reported facial skin complaints such as occasional itching or reddened skin on the face and/or neck. These complaints are relatively rare and the limited evidence available suggests they may be associated with environmental factors, such as low relative humidity or static electricity near the DSE.

Electro magnetic radiation
Anxiety about radiation emissions from display screen equipment and possible effects on pregnant women has been widespread. However, there is substantial evidence that these concerns are unfounded. The Health and Safety Executive has consulted the National Radiological Protection Board, which has the statutory function of providing information and advice on all radiation matters to Government Departments and the advice below summarises scientific understanding.

"The levels of ionising and non-ionising electromagnetic radiation which are likely to be generated by display screen equipment are well below those set out in international recommendations for limiting risk to human health created by such emissions and the National Radiological Protection Board does not consider such levels to pose a significant risk to health. No special protective measures are therefore needed to protect the health of people from this radiation."

Effects on pregnant women
There has been considerable public concern about reports of higher levels of miscarriage and birth defects among some groups of DSE workers in particular due to electromagnetic radiation. Many scientific studies have been carried out, but taken as a whole their results do not show any link between miscarriages or birth defects and working with DSEs.

In light of the scientific evidence pregnant women do not need to stop work with DSE. However, to avoid problems caused by stress and anxiety, women who are pregnant or planning children and are worried about working with DSE should be given the opportunity to discuss their concerns with someone adequately informed of current authoritative scientific information and advice.

4.0 Avoidance of Risks Associated with Display Screen Equipment

In order to reduce the risks associated with work with display screen equipment it is important to consider the workstation and the way the user uses the workstation.

(i) **Workstation**

Display Screen

Choice of display screen should be considered in relation to other elements of the work system, such as the type and amount of information required for the task, and environmental factors.

The characters on the screen shall be well defined and clearly formed, of adequate size and with adequate spacing between the characters and lines.

The image on the screen should be stable, with no flickering or other forms of instability. Individual perceptions of flicker vary and a screen, which is flicker-free to 90% of users, should be regarded as satisfying the minimum requirement.

The brightness and the contrast between the characters and the background shall be easily adjustable by the user, and also be easily adjustable to ambient conditions.

The screen must swivel and tilt easily and freely to suit the needs of the user.

It shall be possible to use a separate base for the screen or an adjustable table.

The screen shall be free of reflective glare and reflections liable to cause discomfort to the user.

Keyboard

Keyboard design should allow workers to locate and activate keys quickly, accurately and without discomfort. The choice of keyboard will be dictated by the nature of the task and determined in relation to other elements of the work system. Hand support may be incorporated into the keyboard, may be provided in the form of a space between the keyboard and the front of the desk, or may be given by a separate hand/wrist support attached to the workstation.

The keyboard shall be tiltable and separate from the screen so as to allow the user to find a comfortable working position avoiding fatigue in the arms or hands.

The space in front of the keyboard shall be sufficient to provide support for the hands and arms of the user.

The keyboard shall have a matt surface to avoid reflective glare.

The arrangement of the keyboard and the characteristics of the keys shall be such as to facilitate the use of the keyboard.

The symbols on the keys shall be adequately contrasted and legible from the design working position.

Mouse, Trackball and other Pointing Devices

In most cases the mouse will be an appropriate device to use to move the cursor around the screen. In choosing a pointing device there will be a number of factors to consider:

The environment in which it will be used. There must be enough space for the user to use it easily whilst adopting a safe comfortable working posture. There must be a suitable surface on which to use the device

Individual Characteristics. The device must be the right size and shape for the user.

Task Characteristics. If the task is very demanding on the use of the pointing device and fast accurate positioning is required, careful consideration will be required when selecting the type of pointing device to be used.

A pointing device should be placed so that it is fairly close to the midline of the user's body. The users arm should be close to the side of the body with the elbow bent at approximately 90°. For devices such as the mouse, the forearm or wrist can be supported by the work surface, or the elbow, by the arm of the chair. If a keyboard is in use, the mouse needs to be positioned close to the keyboard, on whichever side suits the user. If the keyboard is not in use, move it to one side and place the mouse or trackball closer to the centre.

The speed and sensitivity of the pointing device should be configured to suit the needs of the user.

As with all DSE work, periods of using the pointing device should be interspersed with other activities.

Users may need training in how to set up their pointing devices and instruction regarding any cleaning requirements.

Mousemats

These should have a smooth surface and be large enough to accommodate the task being performed. They should not have sharp edges, which could put pressure on the soft tissue of the forearm or wrist. Special wrist rests are not a requirement, however if they are used then care should be taken in their selection to ensure that they do not increase risks to the user.

Touchscreens

These require regular maintenance and cleaning if they are to be effective displays which comply with the Schedule. The screen's sensitivity to touch needs to be suitable, to ensure the screen is easy to use.

The positioning of touch screens may need to be a compromise between the optimal position for viewing and for use as a touchscreen. It is important that the screen is positioned so that the user has easy access to it and does not have to adopt awkward postures in order to access it. Reflections and glare will need to be minimised in a similar way to normal PC monitors.

Soft ware needs to be suitably designed for the task being performed e.g. active areas should be big enough to respond equally accurately to users with large or small fingers. The layout of information on the screen also needs care as the hands often obscure information at the bottom of the screen.

Work desks or work surface

Work surface dimensions should take account of:

i)   the range of tasks performed (e.g. screen viewing, keyboard input, use of other input devices, writing on paper, etc.);

ii) position and use of hands for each task;

iii) use and storage of working materials and equipment (documents, telephones, etc.).

There shall be adequate space for users to find a comfortable position.

The work-desk or workstation shall have a low reflectance surface.

Document holders

Document holders are useful for work with hard copy, particularly for workers who have difficulty in refocusing.

Document holders should be positioned at a height, viewing distance and visual plane similar to those of the screen so as to minimise uncomfortable head and eye movements, be of low reflectance; be stable; and not reduce the readability of source documents.

Work Chair

The work chair should allow the user easy freedom of movement and a comfortable position.

The work chair shall be stable.

The seat shall be adjustable in height.

The seat back shall be adjustable in both height and tilt.

A footrest shall be made available to any user who requires one.

Space requirements

The workstation shall be dimensioned and designed so as to provide sufficient space for the user to change position and vary movements. Adequate clearances for thighs, knees, lower legs and feet under the work surface and between furniture components are necessary. The height of the work surface should allow a comfortable position for arms and wrists if a keyboard is used.

Lighting reflections and glare

Lighting should be appropriate for all the tasks performed at the workstation. It is recommended that illuminance in the range of 300-500 lux is present at the work surface. General lighting should illuminate the entire room to an adequate standard. Any supplementary lighting provided to cater for personal needs or a particular task should not adversely affect visual conditions at nearby workstations. Lighting shall ensure an appropriate contrast between the screen and environment, taking into account the type of work and vision requirements of the user.

Workstations should be located in such a way so as to avoid reflections or glare on the screen. If a screen is near a window, the user should sit at right angles to the window if possible. Light absorbent film on windows can reduce sunlight coming in through a window. All windows adjacent to display screen equipment should be fitted with adjustable coverings to attenuate the daylight that falls in the workstation. Adding diffusers or deflectors can diffuse artificial lighting. Screens should be sited so that the line of sight is parallel to light fittings, and between rather than under, a row of lights. Anti-glare filters can reduce glare. The colour or reflectance of walls, ceilings, furnishings, etc can be modified to reduce glare and reflections. Anti-glare screens should be considered only if other measures fail to solve a problem.

Noise

Noise from equipment such as printers at display screen workstations should be kept to levels which do not impair concentration or prevent normal conversation (unless the noise is designed to attract attention, e.g. to warn of a malfunction).

Heat and humidity

Electronic equipment can be a source of dry heat, which can modify the normal environment at the workstation. Ventilation and humidity should be maintained at levels that prevent discomfort and problems of sore eyes.

User/computer interface

In designing, selecting, commissioning and modifying software, and in designing tasks using display screen equipment, the following principles will be taken into account:

i) software must be suitable for the task;

ii) software must be easy to use and where appropriate, adaptable to the user's level of knowledge or experience; no quantitative or qualitative checking facility may be used without the knowledge of the users;

iii) systems must provide feedback to users on the performance of those systems;

iv) systems must display information in a format and at a pace which are adapted to users;

v) the principles of software ergonomics must be applied, in particular to human data processing.

Additional health and safety standards

Cable management

An important element in the positioning of a desk is to consider how power and network connection cables can be run so they are not a safety hazard. Ideally, the desk and computer terminal will be positioned against the wall from which service is provided and the desk will have some in-built cable trays. Where it is essential for a workstation to be positioned in the middle of the room, consideration should be given to underfloor trunking and flush sockets, or "power pillars"; both of which provide a safe and aesthetically pleasing way of providing the service. On no account should loose cables trail across the floor, as this constitutes a serious safety hazard. Purpose designed rubber floor strips can be used to minimise the risk of people tripping where leads pass across walkways.
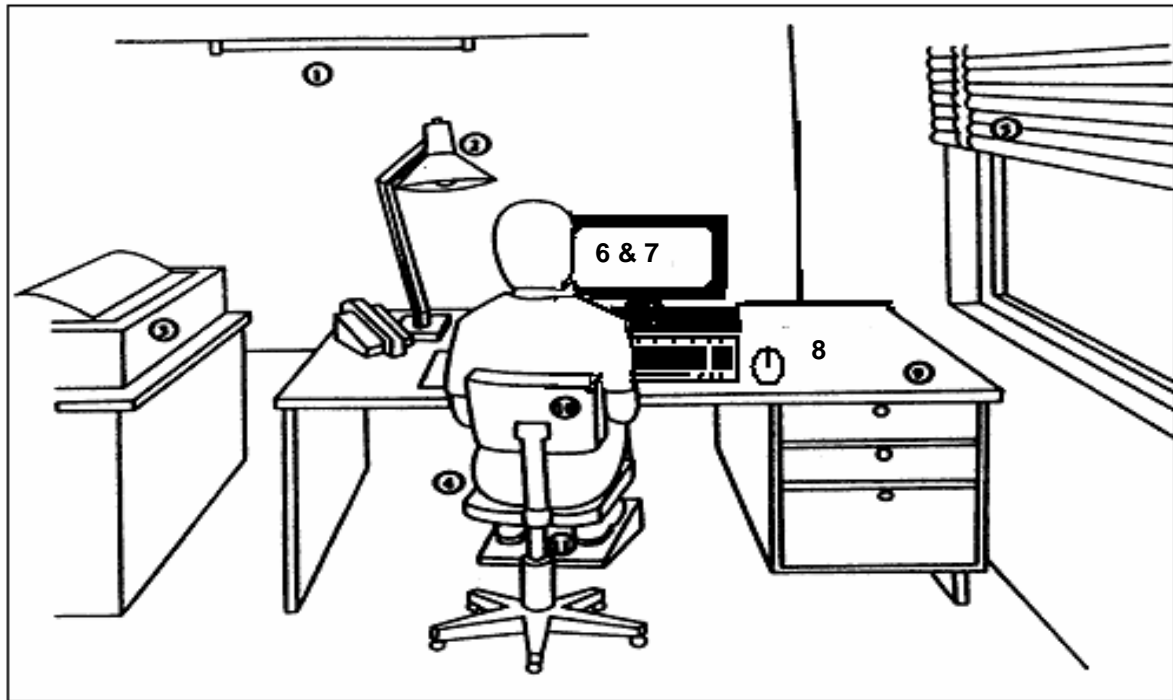
Cleaning the Screen

The equipment should be switched off before the screen is cleaned.

Drinks

Drinks should be kept away from all electrical equipment. Liquids and electricity do not mix.

THE REQUIREMENTS ARE SUMMARISED IN THE FOLLOWING DIAGRAM

1. ADEQUATE LIGHTING

2. ADEQUATE CONTRAST, NO GLARE OR DISTRACTING REFLECTIONS

3. DISTRACTING NOISE MINIMISED

4. LEG ROOM AND CLEARANCES TO ALLOW POSTURAL CHANGES

5. WINDOW COVERING

6. SOFTWARE, APPROPRIATE TO TASK, ADAPTED TO USER, PROVIDES FEEDBACK ON SYSTEM STATUS, NO UNDISCLOSED MONITORING.

7. SCREEN: STABLE IMAGE, ADJUSTABLE, READABLE, GLARE/REFLECTION FREE

8. KEYBOARD: USABLE, ADJUSTABLE, DETACHABLE, LEGIBLE

9. WORK SURFACE: ALLOW FLEXIBLE ARRANGEMENTS, SPACIOUS, GLARE FREE

10. WORK CHAIR: ADJUSTABLE

11. FOOTREST

(ii)   **Use of Workstation by User**

User Position

It is important that the person using display screen equipment adopts a suitable posture.   Poor posture can lead to static loading on the musculoskeletal system and eventual fatigue and pain and can cause eye discomfort.

Each time a user works at display screen equipment he/she should adjust furniture as necessary and ensure a good posture.

Users should follow the guidelines detailed below.

General Posture

The user should be comfortable.

The user should not slouch but should keep a curve in the lower back using the backrest to support the lower back.

The workstation should be organised so an upright position is kept and there is no twisting of the body and there is adequate space in which to work. The keyboard and screen should be adjusted to obtain a good keying and viewing position.

Work should be broken up with informal postures, e.g. stretching in the seat, walking around, at regular intervals.

Head and Eyes

Eyes should be 350-600 mm from the screen and cast downward at an angle of 15-20 degrees (approximately).

Eyes should be relaxed regularly by looking away from the screen or by "cupping", i.e. covering eyes with hands.

Neck and head movements should be kept to a minimum and should not be awkward.

Upper Body

The forearms should be horizontal with the hands aligned to the forearms so the wrists are straight.

The angle between the forearm and upper arm (elbow) should be approximately 70-90 degrees.

Keys should be touched lightly and not "hammered".

A space in front of the keyboard is helpful for resting hands and wrists when not keying.
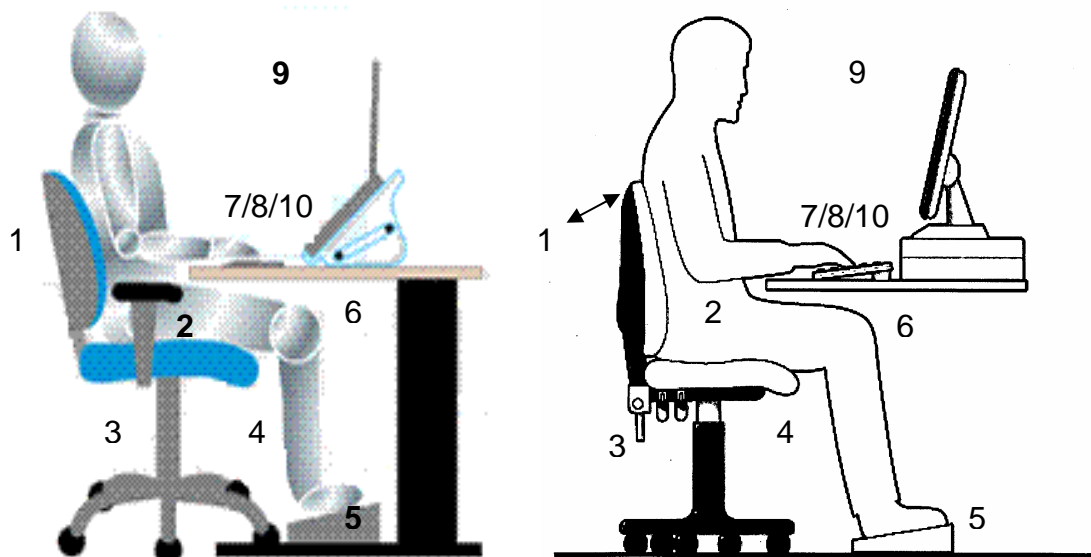
Lower Body

There should be adequate clearance between the underside of the desk and the "users" thighs.

The angle between the calves and thighs should be approximately 90 degrees.

A footrest may be useful to enable the legs to be correctly positioned.

SEATING AND POSTURE FOR TYPICAL OFFICE TASKS

LAPTOP WORKSTATION

1. SEAT BACK ADJUSTABILITY

2. GOOD LUMBAR SUPPORT

3. SEAT HEIGHT ADJUSTABILITY

4. NO EXCESS PRESSURE ON UNDERSIDE OF THIGHS AND BACKS OF KNEES

5. FOOT SUPPORT IF NEEDED

6. SPACE FOR POSTURAL CHANGE, - NO OBSTACLES UNDER DESK

7. FOREARMS APPROXIMATELY HORIZONTAL

8. MINIMAL EXTENSION, FLEXION OR DEVIATION OF WRISTS

9. SCREEN HEIGHT AND ANGLE SHOULD ALLOW COMFORTABLE HEAD POSITION

10. SPACE IN FRONT OF KEYBOARD TO SUPPORT HANDS/WRISTS DURING PAUSES IN KEYING

Cleaning of Screen

The user should keep the screen clean to ensure clarity of the image.

Breaks in Display Screen Use

The daily workload by each user on a display screen should be planned so it is periodically interrupted by breaks and changes in activity. These breaks may be used to carry out other work such as filing, answering the telephone, reading or other documentation work.

A break of 5-10 minutes after 1 hour continuous display screen work or a complete break after 2 hours continuous display screen work is recommended. If possible, breaks should be taken away from the screen.

5.0   Working with laptops, notebook and tablet PC's

There is an increased use of laptops, notebooks and tablet PC's for both temporary and permanent use by staff. This equipment is subject to the Display Screen Equipment Regulations.

The equipment is portable so it is of necessity small, lightweight and compact. The reduced size of both screen and keyboard makes it difficult to achieve a comfortable working position. Although adequate for temporary and short term use, the equipment is not intended for prolonged 'office' use either at work or at home.

Where this equipment is used regularly for periods of more than an hour, it must meet the requirement to the Schedule of the Regulations, and to achieve this, additional equipment is required

i   A laptop docking station or laptop support cradle to raise the laptop screen to a suitable height and angle.

ii   A separate full size keyboard and mouse

iii   A desk table or work surface of a suitable height, with adequate space under and around it to sit properly.

iv   Appropriate adjustable chair to provide adequate back support.

Where staff are Home working, appropriate equipment must be provided, and display screen equipment assessments made annually or as appropriate. Further guidance can be found in the Home working Policy and Procedures and the Home working Code of Guidance and risk assessment/checklist.

Practical points to consider when selecting a portable computer:

 i. Look for a lightweight model and keep accessories to a minimum.

 ii. Choose as large a screen as possible.

 iii. Where possible, opt for a detachable or height adjustable screen.

 iv. Select a lightweight bag with handle and shoulder strap for transporting the computer.

 v. Avoid manufacturer branded laptop cases to reduce risk of theft and assault.

 vi. Look for tilt adjustable keyboards.

 vii. Choose portables which have docking ports enabling use of external keyboards and mouse.

 viii. Check that it has friction pads to avoid slipping.

 ix. Ensure that it has sufficient memory and speed for the task to be performed avoiding unnecessary operator stress.

 x. For work which involves significant use of a mouse, choose an external mouse or trackball/touchpad/isometric joystick.

6.0 Eye and Eyesight Tests

"Users" are entitled to an appropriate eye and eyesight test to be carried out by the, optician specified by the Council. The test is free to the employee and should be carried out before a person commences work as a "user", at regular intervals or if a "user" experiences visual difficulties from using display screen equipment. To arrange an eye test "Users" should contact their Service Area Admin / Finance section to raise an order with the specified Optician on SAP. The User should take the order number with them which they can then quote when they arrive at the specified Optician.. If the eye and eyesight test shows that the "user" requires special corrective appliances for display screen equipment use, the Council will pay the cost of a basic appliance..

7.0 Action to Take in the Event of a Problem

Any problems regarding the use of display screen equipment should be reported to the supervisor, who will ensure appropriate action is taken. In the event of health and safety problems, it may be necessary to consult an optician or a doctor.

8.0   Exercises for the Office

The following are suggested exercises for users of display screen equipment to improve posture.

1. Pull your chin in, turn your head slowly to one side, do not jerk it and then slowly turn it to the opposite side. Repeat 3-4 times.

2. Raise your shoulders up towards your ears then push them back and relax. Repeat 2-3 times.

3. Tighten tummy muscles as you breathe out fully and count to five before releasing (this helps to provide a good posture).

4. When having a break from sitting in one position, stand tall with feet slightly apart. Place your hands in the small of your back. Keep your knees straight and push your hips forward and your shoulders backward. (This will help stretch the spine and release the tension).

Further Information:

Health and Safety (Display Screen Equipment) Regulations 1992 (amended 2002)
4.C.048 Display Screen Equipment Risk Assessment Form