RECOMMENDATIONS FOR
HABITUAL USE OF VDU SCREENS

INTRODUCTION

This note applies to habitual users of VDU screens, meaning those who use them for more than 20% of their working time spread throughout the day.

It is not intended to give details of all the problems caused by work in front of a screen but rather to help you settle the ones most often experienced at your work station. The General Safety Group and the Medical Service are at your disposal for particular problems.

In order to be able to work continuously in front of screens without excessive fatigue you must:

have good eyesight

be properly seated

use suitable equipment

have it properly set up

1. GOOD EYESIGHT

Reading from a screen, unlike reading a printed document, requires the eye to adapt to a low lighting level. This condition makes the eye particularly sensitive to lighting conditions and any existing visual problems.

Surveys

The Medical Service makes regular precautionary age-linked surveys of known visual disorders and the type of work done.

Refractive defects like myopia (short sight) and presbyopia must be corrected by means of spectacles or contact lenses prescribed by an oculist.

Normal or corrected eyesight is not adversely affected by working in front of a screen, but such work may reveal obscure visual difficulties.

Eye fatigue

Eye fatigue makes itself felt by burning or pricking feelings in the eyes, photophobia or headaches. If it occurs prematurely, a fresh medical examination is indicated and working conditions should be reviewed as a whole.
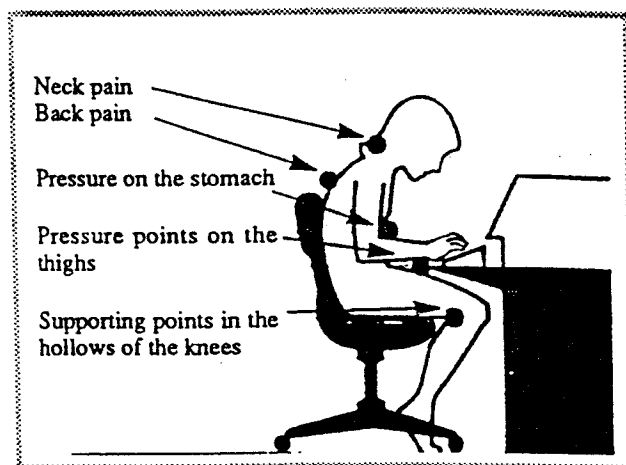
Spectacles

Optically neutral tinted spectacles are not advisable as they reduce contrast and legibility.

Progressive lenses are not suitable for work on the screen and single-focus lenses are to be preferred. The optical industry has developed progressive lenses designed for working on screens but they cannot be recommended in all cases.

2. PROPER SEATING

This is essential, as many users complain of neck, back and shoulder pains. It is caused by the stresses linked to the posture adopted in front of the screen and the lack of movement.

Posture at the work station will be all the better, the lower the stress on the skeleton and muscles. As any static posture is undesirable,

Neck pain
Back pain
Pressure on the stomach
Pressure points on the thighs
Supporting points in the hollows of the knees

it is important to have a break from time to time by alternating work on the screen and other tasks.

The chair

The chair must be selected for comfort and proper allowance for anatomy and physiology.
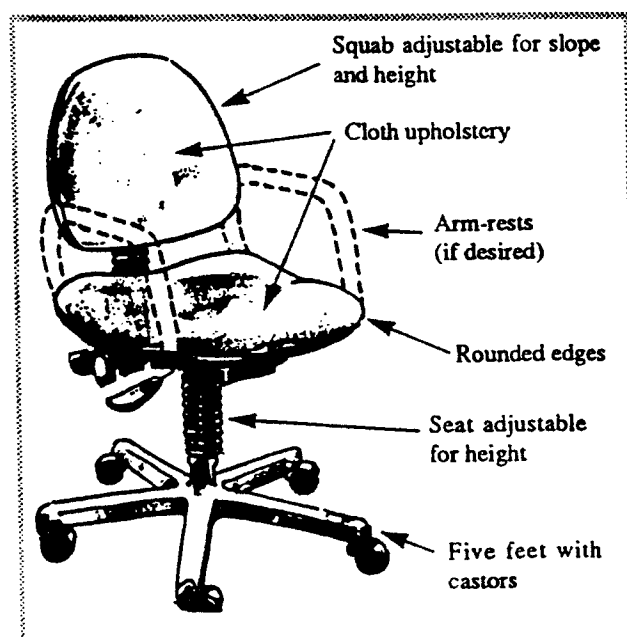
The seat must be adjustable and its upper edge must be rounded.
- It must be adjustable for height between 400 and 600 mm.
- Its area should be about 400 × 400 mm.

The squab must be designed to give firm support to the back and be adjustable for angle and height.

The chair must have five feet to provide maximum stability.

It must be possible to make all the adjustments without leaving the chair.

Squab adjustable for slope and height
Cloth upholstery
Arm-rests (if desired)
Rounded edges
Seat adjustable for height
Five feet with castors

3. USE SUITABLE EQUIPMENT

Screen

- The screen must be large enough for the work to be done.

- It must be adjustable horizontally and vertically

- The surface of the screen should be 60–70 cm in front of and slightly inclined (at 5–10°) towards the user to prevent reflections.

- The image must be stable with well-defined characters of adequate size. The brightness of the characters, the contrast between them, the designs and the background must be adaptable to ambient conditions.

- The screen must show no reflections or flicker.

- Colour screens should be used only for work which really needs them.

- The screen must be regularly cleaned and maintained. Ageing screens must be changed (lack of focus).

* *Anti-reflection filters*

If the screen has been given an anti-reflective treatment such filters must not be used as they reduce contrast and legibility.

If the screen has not been treated, polarising or micro-mesh filters may be used, but must be regularly and carefully cleaned.

* *The keyboard*

The keyboard must be separate from the screen and movable about the desk. It must be light enough to be easily moved but heavy enough not to move about when in use.

The keys must be square and have a 3 to 4 mm range of movement. The symbols must be legible and contrast sufficiently with their background.

The keyboard must also be cleaned from time to time.

* *The mouse*

The mouse must be placed on the right or left, depending on the user's handedness, and have an adequate range of movement.

* *The working surface*

The working surface must be suitable for the work to be done and the equipment used. Although adjustable furniture is basically recommended, it is often found in practice that it is inadequate owing to its restricted size. It is preferable to have a solid and stable desk on which it is safe for the user to lean and place his or her equipment.

The depth of the working surface should be 2.5 times the diagonal of the screen. For a 13" screen, its area should be at least 1.60 × 0.90 m and 1.80 × 1.10 m for work stations with 21" screens (cf. SPS/LEP, OPAL and L3 control room installations).

The covering of the working surface must have a low coefficient of reflection (less than 50%).

Position of screen and keyboard
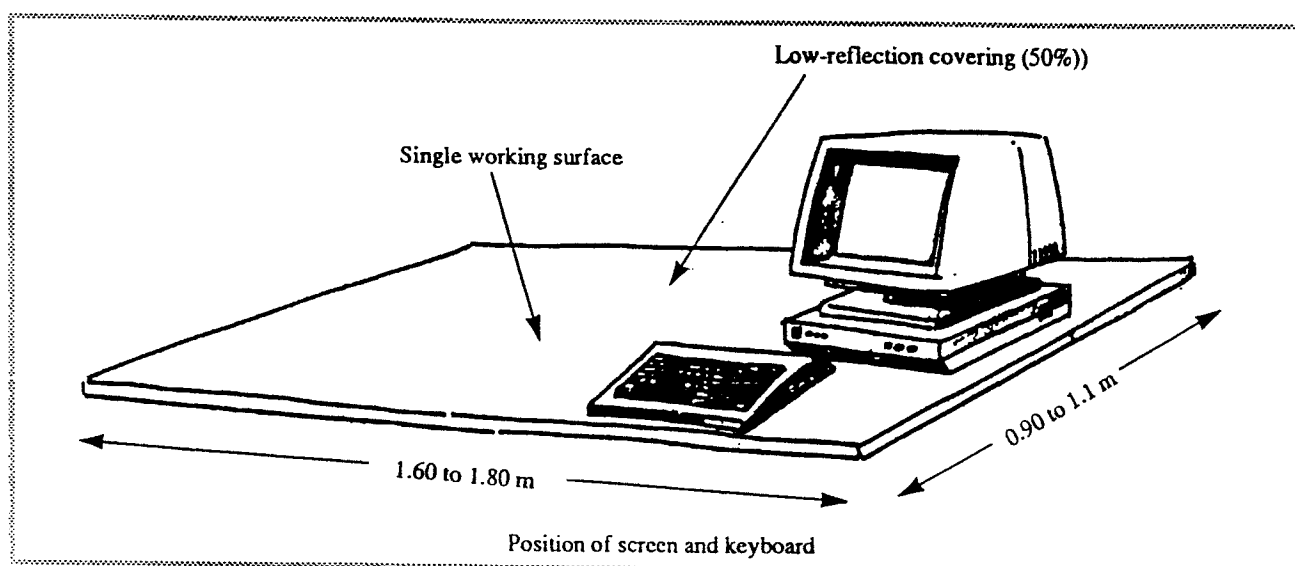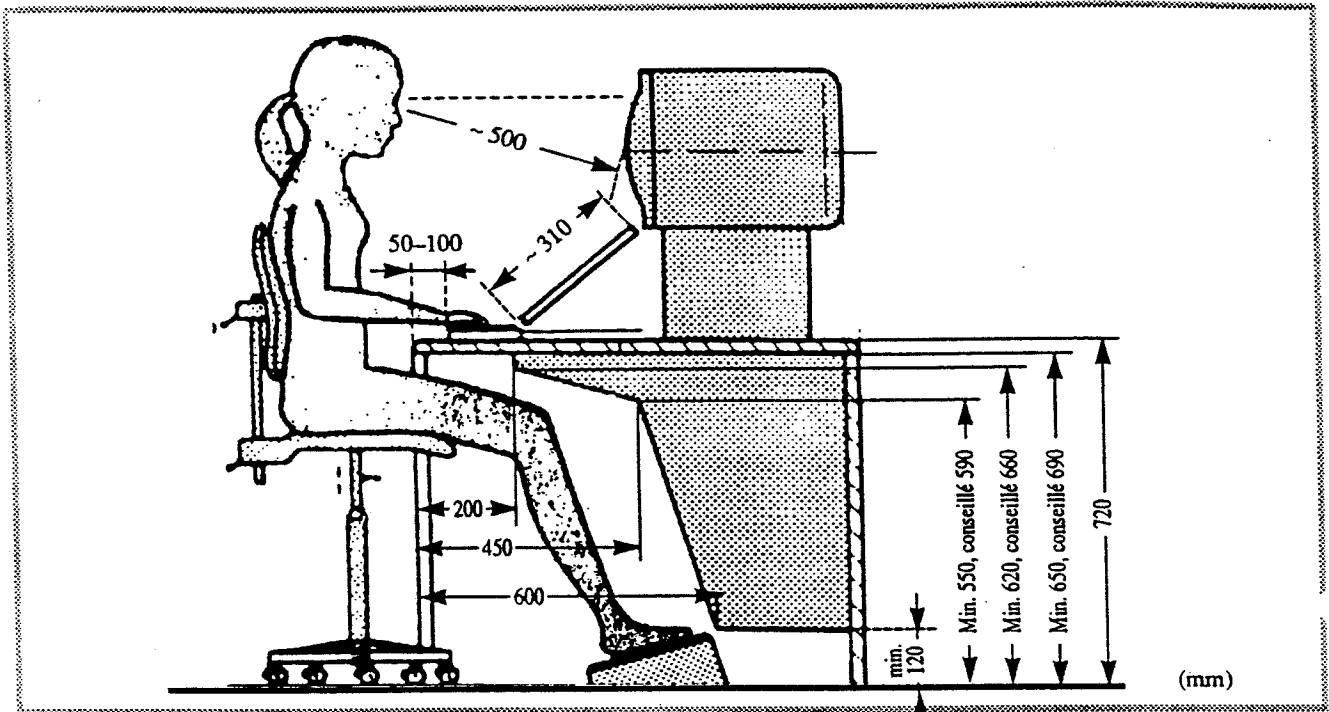
Example of an ergonomic work station with a desk not adjustable for height

4. FITTING OUT OF VDU WORK STATIONS – ENVIRONMENT – RADIATION

* Radiation

Like television sets, VDUs are not dangerous because the screen is thick enough to stop soft X-rays. The radiation produced is hardly measurable at the screen surface as it is far lower than the natural radiation level.

* Ambient warmth

The idea of a comfortable temperature is subjective and depends on environment and physiological conditions (activity, clothing). It varies from season to season.

The air temperature should be at least 19°C.

The relative humidity should be between 40 and 60% and lower, the higher the temperature. The airflow rate will depend on the outside temperature.

Like the staff themselves, the screen, CPUs and lighting fittings are sources of heat and must be taken into account in selecting the premises.

* Noise

The fans and discs used with computer screens and CPUs usually emit steady noises (whistles and humming). Even if their intensity is below the recommended limit (55 dB) and does not affect the hearing, they may become a nuisance and hamper concentration.

The average local noise level must be suited to the occupational environment (research, development, creative and productive work).

Excessive noise may be dealt with:

- by reducing it at the source, which is the best method: non-clattering printers, quieter machines, preventive main tenance, absorbent working surfaces;
- by fitting noisy machines in a separate room;
- by reducing noise propagation by spacing work stations out and limiting noise propagation by reflection.

It is possible to fit hoods over printers, but this often complicates access to them and makes them less easy to use.

* Lighting

- Natural lighting: as it is highly variable, some kind of variable blinds must be provided.
- Artificial lighting: this supplements natural lighting and may be direct, indirect or a combination of the two, essentially with discontinuous-spectrum

Examples of the heat given off by people according
to their metabolic working activity and by equipment

Activity[1]	Power generated (watt)
Seated and inactive	106
Sedentary work (office, home, laboratory, school)	128
Standing, inactive `	128
Standing, gentle activity (shopping, laboratory, light industry)	170
Standing, medium activity (sales, domestic work, machine operation)	214
Equipment[2]	
Screen-keyboard	100
Heavy printer	150 à 200
Microcomputer	200
Minitel	50
Fluorescent lamp	15 à 45

(1) To NF X 35-203 Appendix 1 - Total power generated by the standard operator.
(2) According to the D.A.G. real-estate bulletin (sheet N° 3.01.03).

sources (fluorescent tubes). It may be adjustable, either by variable selective switching or by the addition of grids to prevent dazzle.

The ambient lighting must allow the screen to be read in the best possible visual conditions, avoiding sources of reflections and dazzle so as to maintain a good degree of contrast between the screen and the document. The lighting for the working surface should be about 300 lux and may be supplemented by a desk lamp.

– Luminance: the luminance ratios must not exceed:
  – between the keyboard-screen and the document: 1 to 5
  – between the work station and the environment: 1 to 10
  – between light fittings and walls: 20 to 1, taking into account the average luminance at the work station.

* Work station layout

In laying out the work station, account must be taken of lighting, job organization, communications and movement (see layout diagram).
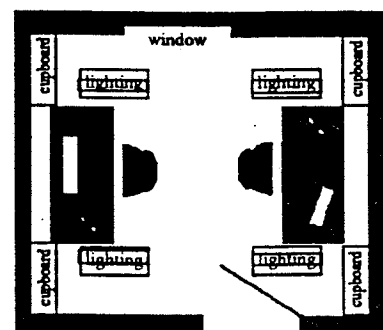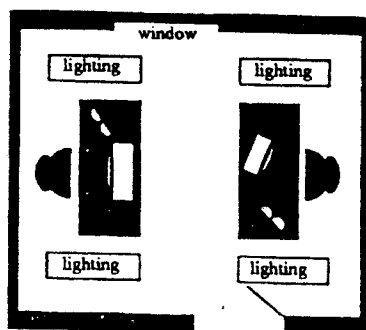
The distance between the screen and the window must be at least 1.5 to 2 m.

If this is impossible owing to the size of the room, attention must be paid to sun blinds.

Desks should never face directly towards or directly away from the window, since this produces reflection or dazzle (cf. diagram).
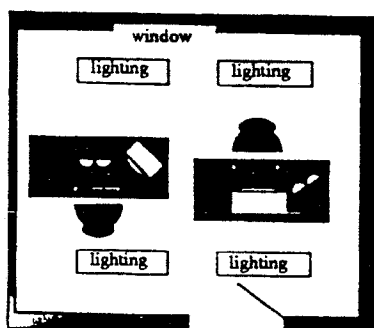
Poor desk position

Examples of good desk positions

* *Working time*

Working time must be adapted to the nature of the work itself:

- data taking
- programming
- CAD, text correction
- word processing.

It is generally advisable to organize the work so as to alternate between the use of the VDU and other jobs to relieve the monotony.
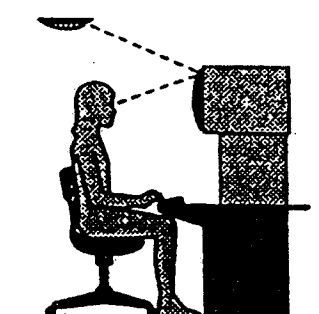
Bibliography

- Federal decree dated 14 November 1989 (CH)
- European directive 90-270 dated 29 May 1990, incorporated into French legislation on occupational hazards (14 May 1991)
- CNA handbook
- WHO docume.:s
- D. Bukanovsky, Bildschirmarbeitsplätze (VDU work stations), Karlsruhe Nuclear Research Centre, 1990
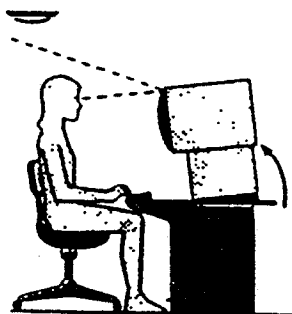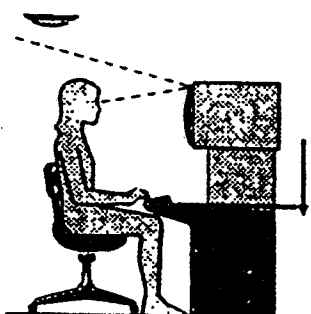
| Right | Right | Wrong |

Preventing reflection by adjusting the height or inclination of the screen