Monash University Procedure

Procedure Title	Ergonomic Design Procedures
Parent Policy	OHS Policy
Date Effective	1 March 2017
Review Date	1 March 2020
Procedure Owner	Manager, OH&S
Category	Operational
Version Number	3.0
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Scope	This procedure applies to staff, students, visitors and contractors that have input into the ergonomic design of existing space, refurbishment works or new building projects at Monash University.
Purpose	This procedure sets out the ergonomic design requirements for general and open plan office space, reception areas and computer laboratories.

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1. Abbreviations

ABW	Activity based work
AFRDI	Australasian Furnishing and Research Development Institute
DDA	Disability Discrimination Act
LCD	Liquid crystal display
OHS	Occupational Health and Safety
OH&S	Monash Occupational Health and Safety
PC	Personal computer

2. Definitions

Activity Based Work (ABW): ABW does not provide a specific space allocation per person. It is calculated on the overall needs of the activities to be conducted in the work area and the number of people who will use this space. Notionally there will be sufficient work points to provide one point for every 1.1 to 1.2 people who will use this area.

Head to Head Distance: Head to head distance is the distance between the heads of adjacent workstation users.

Project Manager: The project manager is the individual responsible for the day-to-day management of the project, usually from the Buildings and Property Division or the contracted company.

Smartphone: A smartphone is a mobile phone built on a mobile operating system, with more advanced computing capability and connectivity than a feature phone. They generally have high resolution touchscreens and include functionality such as media player, digital camera, GPS and high-speed data access via Wi-Fi or Mobile Broadband.

Sit/Stand Desk: These desks are designed to be adjusted frequently to allow users to alternate between the seated and standing position.

Tablet: A tablet is a one-piece mobile computer that is operated by touchscreen with onscreen, hide-able virtual keyboard. Alternatively, the tablet may be connected to a keyboard with a wireless link or a USB port.

3. Use of this procedure

- Whilst each project will bring together a different range of design challenges, the information contained in this procedure must be taken into account when new building or refurbishment works are undertaken.

- In addition, Project Managers are responsible for ensuring that plans comply with all other relevant requirements, e.g. the Building Code of Australia, Disability Discrimination Act (DDA), OHS legislation, Australian Standards and the latest edition of the Monash University Design and Construction Standards.

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4. Work area analysis

4.1. Space

When planning new offices, space provisions as outlined in AS1668.2: 2012 and *Officewise – A Guide to Health and Safety in the Office* should be used as guidance. In addition, a risk assessment of the specific activities should be conducted to determine the appropriate amount of space required.

There are two methods of calculating space per workstation in open plan areas.

4.1.1. Method 1

- Determine total area of floor space and divide by the number of workstations.

- For open plan areas involving corridors, shared storage, amenities, etc. the general recommendation is 10-14 m^2 per person.

4.1.2. Method 2

- Determine floor space per workstation then add in additional space for storage amenities, corridors, etc.

- This generally requires 6-8 m^2 per person plus the additional space.

Note: For enclosed offices, AS/NZS 1668.2:2012, Table A1 specifies an allocation of 10m^2 per person, based on ventilation requirements. In addition, functional needs such as technology, visitors, meeting chairs, etc. should be considered.

4.2. Circulation spaces

4.2.1. Corridor widths are dictated by:

- the Building Code of Australia, based on emergency escape requirements. Wider unobstructed corridors are required closest to emergency exits;

- AS1428.1:2009 which stipulates minimum widths based on disabled access needs;

- DDA: Guideline on the Application of the Premises Standard 2013.

The minimum recommended for access ways is an unobstructed width of 1000mm.

4.2.2. Current ergonomic practice recommends:

- Entrance to workstations or offices: 900mm - 1000mm;

- Corridors with frequent use in open plan area: 1200mm;

Corridors with storage units along one side: 1500mm.

4.3. Storage spaces

4.3.1. Ergonomic principles specify storage allocations as:

- Primary

  - Items of personal nature or frequently accessed at workstation;

- Secondary

  - Items shared by team or requiring occasional access;

  - Can be stored in corridor or nearby storage area, however stored items must not impede clear access and egress as defined in 7.2.2.

- Tertiary

  - Infrequently accessed items;

  - Stored in compactus, storeroom, archives, or amenities areas.

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4.3.2.   Shelving

- Only light items (easily lifted with one hand) are to be stored above shoulder height;

- Heavier items must be stored between shoulder height and mid-thigh height;

- Bookcases should generally be no higher than 2100mm. However, if they are up to 2400mm in height, they must be fixed to the wall securely in accordance with AS/NZS4443:1997

- Appropriate steps/ladders must be provided for use by staff to access high shelves.

4.4.   Head to head distances

4.4.1.   This is the distance between the heads of adjacent workstation users. The distance relates to the perception of 'personal space', as well as the functional interference due to noise and the space needed to move around a work area.

4.4.2.   Ideally, 1500mm or more should be provided from head to head of adjacent workstation occupants.

5.   Desk design

5.1.   Shape of desks

5.1.1.   Rectangular desks

The standard supplied desk through the Monash Furniture Catalogue is rectangular.

- Require PC across centre of desk to provide symmetrical posture;

- Can be provided with a desk return to increase surface area

5.1.2.   L-shaped desks

These are no longer supplied as new items of furniture, but are available through the Equipment Reuse Program.

- If the computer is placed in the apex of a rectangular desk and desk return, then a desk lozenge must bridge across the apex corner.

- 40% increase in useable surface area compared to a rectangular desk of same length;

- Enables multiple PC locations with laptop or LCD monitors;

- Suitable for users with multiple LCD monitors;

- Suits left and right hand users;

- Can be linked into clusters to facilitate team work and cable management.

5.2.   Strength of desk

5.2.1.   AS/NZS 4443:1997 requires that the design of the desk is sufficiently strong to withstand up to 90kg of load.

5.2.2.   Where practical, the manufacturer should provide certification relating to the design of desks through an independent agency, e.g. Australasian Furnishing and Research Development Institute (AFRDI).

5.3.   Edges, corners and desk thickness

5.3.1.   Edges or corners must be rounded to avoid contact injuries.

5.3.2.   The recommended thickness for the desk surface is 25 - 33mm.

5.4.   Desk length

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5.4.1. There is no specified length from an OHS perspective.

5.4.2. For mixed function tasks, and particularly if there is a large clerical or document handling component to the work, an L-shaped configuration (1800mm or 2100mm desk with return) is preferred.

5.4.3. For desks used only for PC-based tasks, 1500mm is adequate.

5.5. Desk depth and monitor type

5.5.1. The depth of the standard supplied desk is 800mm in accordance with AS/NZS 4443:1997. This is adequate for one or more flat LCD monitors of standard size.

5.5.2. The use of monitors (single or dual) greater than standard size must be risk assessed to ensure the desk dimensions are appropriate.

5.5.3. If more than one monitor is required, the primary, frequently accessed monitor must be located in the desk apex to best meet the ergonomic requirements.

5.5.4. If both monitors are equally used they must be placed side by side at the same height in a horseshoe configuration.

5.5.5. If more than two monitors are used the primary monitor must be positioned in front of the keyboard and the others on either side. Double stacking of monitors increases the risk of neck discomfort when looking up to the top row, thus should be avoided. If multiple monitors are used, then a specialist workstation design is required based on a task analysis and technology utilisation study.

5.6. Desk height for seated tasks

5.6.1. AS/NZS 4443:1997 stipulates a height range of 680mm - 735mm, with a preferable height of 710mm - 720mm;

5.6.2. A footrest may be required, together with a height-adjustable chair, to ensure that a fully supported seated position is achieved;

5.7. Leg space

5.7.1. Clear leg space should be provided under all desks where operators sit.

5.7.2. The minimum clear leg space width should be 800mm.

5.7.3. The minimum depth at the thighs should be 450mm and at the feet should be 600mm.

5.8. Cable management

5.8.1. Secure loose cables away from the leg space of the seated user. Use cable trays or electrical conduit for cable management.

5.8.2. The cables must be accessible to computer technicians with minimal manual handling risks.

5.8.3. Desks that have shared users should have access to the power and data from an accessible point on the desk surface.

5.9. Sit/stand desks

5.9.1. Sit/stand desks allow the user to alternate between sitting and standing which can minimise the problems caused by static posture.

5.9.2. Sit/stand desks are suitable for "hot-desking" environments.

5.9.3. Further information on Sit/stand desks can be found in the Sit/stand desks OHS Information sheet.

6.   Reception desks

6.1.   Desk/hob height

6.1.1.   For standing workstations, AS/NZS 4443:1997 requires approximately 950mm for fixed height workstation and a range of 900mm – 1100mm for adjustable height workstations.

6.1.2.   For seated workstations, the floor area behind the reception counter must be raised to allow eye-level contact between operator and customer. The height of the work surface must meet the requirements outlined in section 8.6.

6.1.3.   AS/NZS 4443:1997 requires the hob to be 1020mm - 1200mm high to avoid over shoulder reaching for the seated operator. The higher hob is to be used if potential occupational violence risks are identified at the reception area.

6.1.4.   Reception counters designed specifically for disability access must comply with AS1428.2:1992. This requires a height of 830mm - 870mm for the customer service area and under counter leg clearance of 800mm - 840mm to ensure disability access.

6.2.   Desk depth

6.2.1.   Reach distances:

- If required to sit at the desk and reach to the hob, a reach distance of less than 700 mm is recommended;

- Hence, the reception desk work surface depth should be less than 700mm and, preferably 500mm - 600 mm to the hob, where the reaching occurs. This can be most easily achieved by placing the computer into the apex of the counter and reducing the reach distance to the customer hob.

- If a security risk is identified with the customers then increase the depth of the hob. This requires the customer to be further away from the staff without increasing the reach distance for the staff.

6.2.2.   Apart from a depth of 500mm - 600 mm where reaching occurs, the remaining desk surface must be 800mm deep. Monitors should be positioned to suit the work flow whilst maintaining visual sightlines.

6.2.3.   Recessing monitors into the desk surface and covering with glass is not recommended due to reflections on the glass from lighting and excessive downward neck angles for the operator.

6.3.   Monitor type

6.3.1.   If a laptop or other hand held devices are used then a docking station and separate LCD monitor are required for longer durations.

6.3.2.   If the customer needs to view the monitor, determine how the monitor will swivel to enable this.

6.4.   Foot rest

6.4.1.   If a non-adjustable sit/stand surface is used, provide a foot rest across the entire width of the serving area.

6.4.2.   Mount the footrest 720mm below the work surface, angled at 15º and recessed back at least 300mm from the edge of the desk.

6.5.   Hard drive

6.5.1.   Provisions must be made for the hard drive to be located off the counter surface; preferably mounted away from the leg space under the counter surface.

6.5.2.   The hard drive needs to be accessible by computer technicians.

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6.5.3.   If the operator needs to regularly turn the computer off / on then the start button needs to be accessible without excessive bending or reaching.

6.6.   Document storage

6.6.1.   Frequently accessed forms, etc should be within the secondary reach zone (up to 700mm) from the seated position.

6.6.2.   Forms may also be positioned under the desk surface, but away from the leg space and within reach between the chair seated height and the desk.

6.6.3.   Although users can spin on their swivel seat to retrieve documents, they should not twist or over-reach.

6.7.   Security

6.7.1.   If the desk is in a public interface area, consider if:

- A duress alarm is required;

- Physical barriers to prevent persons reaching across or jumping the counter are required.

7.   Computer laboratory

7.1.   Workstation height

- The recommended set desk height for PC use is 720 mm high.

7.2.   Desk arrangement

- The orientation of the technology must enable the user a clear sightline to the lecturer and teaching displays.

7.3.   Monitor height

- The centre of the monitor should be around 400 mm above the desk height. This may require raising the monitor on a fixed height stand or the hard drive depending on their size.

7.4.   Work space

7.4.1.   The actual desk surface width is dependent on the layout and shape of the desk.

7.4.2.   A minimum width of 900 mm is required for the keyboard, mouse and personal space.

7.4.3.   Additional width must be provided if reference materials are required.

8.   Technology and Workstation Design

8.1.   Overview

8.1.1.   As desktop computer technology develops, the workstation requirements necessitate a high degree of adaptability. The range of current technologies includes:

- Laptops

- Tablets

- Smart phones

- Large hard drive

- Compact hard drive

- Scanners

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- Dual/Multiple monitors

8.1.2. It is appropriate that workstations be designed to suit all these technology options, as well as remain adaptable for future advancements.

8.1.3. It is no longer recommended to provide workstations with cut-out, separately adjustable sections (drop down keyboards). Instead, a single work area surface provides an acceptable ergonomic arrangement with low profile technology design.

8.1.4. It also provides flexibility for the operator to arrange their technology on the desk to suit their layout requirements.

The ergonomic requirements of these specific technologies are summarised below.

8.2. Computer monitors

8.2.1. When purchasing computer monitors, adjustable height stands are preferred, as these allow the monitor to be elevated to the correct height for the user.

8.2.2. Alternatively, the use of a suitable monitor arm should be considered.

8.3. Laptop/notebooks

8.3.1. While laptops are useful when moving between workplaces, their prolonged use has ergonomic implications.

8.3.2. Laptops should not be used continuously for more than 30 minutes at a time and for less than 2 hours in one day. In preference, a docking station with a PC configuration should be used.

8.3.3. Other options for layout include:

- Use the laptop keyboard, separate mouse and elevate a monitor above and behind the laptop;

- Raise the laptop on a stand and use a separate keyboard and mouse.

8.4. Tablets/smartphones

Tablets such as iPads and Smartphones have similar ergonomic implications to laptops and prolonged use should be avoided.

8.5. Hard drive

8.5.1. Locate under a monitor if the top of the screen is at seated eye height.

8.5.2. Locate at the rear of the desk surface in a horizontal or tower unit orientation.

8.5.3. Check with the computer technician to ensure the hard drive can be used in the vertical configuration.

8.6. Scanners

8.6.1. Scanners should be located on a work surface to avoid excessive overhead reaching to lift the cover.

8.6.2. The lid should be down when scanning.

9. Chairs

- The university recommends a range of task chairs, which meet the requirements of AS/NZS4438:1997 – Height adjustable swivel chairs and are certified to AFRDI Level 6 and include the traditional square back chairs and a range of mesh chairs.

- For further information on the mesh task chairs refer to the OHS Information sheet on Mesh Chairs.

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- The Procurement exemption form must be completed for the purchase of any chairs not listed in the Monash Furniture catalogue.

- Meeting room chairs are not suitable for use at desks and must only be used in meeting rooms or as visitors' chairs in an office area.

- 'Exercise balls' (Swiss/Fit balls) are not recommended due to safety risks. Further details are provided at the Worksafe Victoria website.

- To assist with the selection of suitable chairs, it is recommended that project managers contact the approved suppliers listed in the Monash Furniture catalogue and request a range of trial chairs, as part of the consultation process.

- Chairs will wear and require maintenance and repairs. These costs should be included in the budget.

- Glides are recommended for chairs to be used on hard smooth floor surfaces rather than castors, due to the risk of the chair slipping out from under the user.

10. Purchasing furniture

10.1.1. Furniture must meet the standard requirements outlined in sections 8-12 of this document.

10.1.2. All new furniture must be purchased through the University's Approved Supplier Panel.

10.1.3. The online exemption form must be completed for the purchase of non-standard furniture.

11. Work environment

11.1. Lighting quality

11.1.1. The overall level of illumination required for computer work is generally less than for clerical duties.

11.1.2. Glare and reflections may develop in higher luminance areas. LCD monitors and laptops perform better in these locations.

11.2. Natural light

11.2.1. It is desirable from a psychological perspective to retain an external view and to maintain natural light.

11.2.2. At times of direct sun glare, blinds may be used to control sunlight.

11.3. Task lighting

11.3.1. A desk lamp or similar may be used to supplement light levels in certain circumstances.

11.3.2. Orientation of globes should avoid a source of direct or reflected glare to the user.

Note: All electrical appliances used on campus must be tested and tagged in accordance with the Inspection, testing, tagging & repair of electrical equipment OHS Information sheet.

11.4. Noise in open plan areas

11.4.1. Conversational noise may result in distraction in open plan office areas.

11.4.2. Each work area should develop protocols relating to use of meeting rooms, breakout areas and control of excessive background noise in the open plan area.

11.4.3. Noisy equipment items, e.g. photocopiers should be located in utility rooms or similar, away from the workstation areas.

11.5. Partition height in open plan areas

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11.5.1.   Partitions between workstations do little to control noise but do provide some visual privacy.

11.5.2.   Heights between 1100mm - 1350 mm are recommended between members of work teams.

11.5.3.   High partitions, e.g. 1500mm can be used where partition shelving is required. Higher partitions are generally not recommended for open plan work areas.

11.5.4.   Partitions should be perpendicular to windows where possible to enable occupants in open plan areas to retain a view of windows over the 1100mm - 1350 mm high partitions.

11.6.   Thermal comfort

11.6.1.   There are considerable individual differences between people regarding thermal comfort and it is unlikely that a single temperature or level of humidity will suit everyone.

11.6.2.   Locating workstations directly in front of or below air conditioning outlets should be avoided.

11.6.3.   Further information is available in the Indoor thermal comfort OHS Information sheet.

12.   Responsibility for Implementation

A comprehensive list of OHS responsibilities is provided in the document OHS Roles, Committees and Responsibilities Procedure. A summary of the specific responsibilities relevant to this procedure is provided below.

Heads of academic/administrative units: Heads of academic/ administrative units are responsible for ensuring that staff are aware of the OHS Consultation Procedure and that these are implemented to ensure that input is sought from all staff when there are changes to the workplace, e.g. office space re-design.

Monash Occupational Health & Safety (OH&S): The responsibilities of OH&S include:

- providing information and advice on ergonomic design to stakeholders

- providing advice on the functionality of office furniture to stakeholders and project managers

- participating in review meetings in accordance with the OHS Consultation Procedure

Project managers: The responsibilities of project managers include:

- providing information regarding the workplace changes to the Health & Safety Representative;

- providing information regarding the workplace changes to OH&S;

- issuing the latest edition of the Monash University Design and Construction Standards to relevant parties;

- ensuring that the correct data collection/information gathering process has been undertaken at the commencement of each project. This shall determine the correct configuration of furniture components that are suited to the defined work tasks for each user.

- organising safety review and sign off meetings in conjunction with the academic/administrative unit and the local safety personnel;

- attending safety review and sign off meetings;

- incorporating issues into building plans as agreed at safety review meetings.

13.   Records

For OHS Records document retention please refer to:
Monash University OHS Records Management Procedure

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Status	Revised
Approval Body	**Monash University OHS Committee**
Legislation Mandating Compliance	This procedure is written to meet the requirements of: **Legislation** Occupational Health and Safety Act 2004 (Vic) Occupational Health and Safety Regulations 2017 (Vic) DDA (Disability Discrimination Act) Guideline on the Application of Premises Standards 2013
Related Policies	OHS Policy
Related Documents	**Australian standards** OHSAS 18001:2007 Occupational Health & Safety Management Systems – requirements AS/NZS4801:2001 Occupational Health and Safety Management Systems – specifications with guidance for use AS/NZS4438:1997(R2016) Height adjustable swivel chairs AS1428.1:2009 Design for access and mobility – Part 1: General requirements for access – New building work AS1428.2:1992(R2015) Design for access and mobility - Enhanced and additional requirements - Buildings and facilities AS/NZS4443:1997 Office Panel Systems – workstations AS 1668.2-2012 The use of ventilation and air-conditioning in buildings - Mechanical ventilation in buildings **Worksafe Victoria documents** Officewise – A guide to Health and Safety in the Office (November, 2011) Fitness balls – Guidance note (June, 2005) **Monash University OHS documents** • Inspection, testing, tagging & repair of electrical equipment OHS Information sheet • Indoor Thermal comfort OHS Information sheet • Mesh Chairs OHS Information sheet • Sit/Stand Desks OHS Information sheet This document should be read in conjunction with the following OHS Information sheets: • OHS Information sheet: Mesh Chairs • OHS Information sheet: Sit/Stand Desks • OHS information sheet: Inspection, testing, tagging & repair of electrical equipment • OHS Information Sheet: Indoor thermal comfort This procedure is based on the Ergonomic design guidelines prepared for Monash University by David Caple, Director, David Caple & Associates Pty Ltd

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14. Document History

Version	Date of Issue	Changes made to document
3	May 2011	Computer workplace design guidelines, v3
1	February 2013	Ergonomic Design Procedure, v1

2	September 2014	1. Added the following terms to Definitions section:
		
		    a. Activity- based work
		
		    b. Sit-to-sit desk
		
		    c. Sit/stand desk
		
		2. Specified the desk depth to be 800mm in accordance with AS/NZS 4443:1997, irrespective of monitor size or number of monitors.
		
		3. Updated sections 8.6 and 8.9 to clearly outline separate requirements for sit-to-sit and sit/stand desks.
		
		4. Updated section 9.1 on desk/hob height of reception areas in line with AS/NZS 4443:1997 and AS/NZS 1428.2:1992.
		
		5. Added information to section 11.8 on the correct set-up of dual/multiple monitors.
		
		6. Added Compliance section and removed reference to legislation/standards from Purpose

3	March 2017	1. Removed references to adjustable height (sit-sit) desks, as these are no longer part of the University's preferred suppliers' range. 2. Removed references to 'controlled entities' and updated 'Facilities and Services' to 'Buildings and Property' division. 3. Updated hyperlinks throughout the document. 4. Changed wording from 'must' to 'should' as appropriate throughout the document. 5. Updated section 7.1 to clarify that AS 1668.2 and Officewise should be used as guidance, but the specific activities to be conducted in the space should also be considered when determining space requirements. 6. Updated section 8.5 – Desk depth to include requirements for the use of monitors larger than standard size 7. Added link to Sit/stand information sheet to section 8.9 and removed superfluous information. 8. Moved section 11.8 – Two or more monitors to section 8.5 9. Added section 13 – Purchasing Furniture

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| | | 10. | Replaced table in Records section with hyperlink to OHS Records management procedure |
| | | 11. | Updated Compliance and Reference sections. |

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