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**NEW ZEALAND ELECTRICAL
CODE OF PRACTICE
for
THE INSTALLATION
of
RECESSED LUMINAIRES AND AUXILIARY
EQUIPMENT**

NZEC 54:2001

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Issued by:
Manager, Standards and Safety,
Energy Safety Service,
Ministry of Consumer Affairs,
Wellington, New Zealand

THE ELECTRICITY ACT 1992

Approval of the New Zealand Electrical Code of Practice for the Installation of Recessed Luminaires and Auxiliary Equipment 2001 (NZECP 54:2001)

Pursuant to section 38 of the Electricity Act 1992, I, hereby approve the New Zealand Electrical Code of Practice for the Installation of Recessed Luminaires and Auxiliary Equipment 2001 (NZECP 54:2001).

The New Zealand Electrical Code of Practice for the Installation of Recessed Luminaires and Auxiliary Equipment (NZECP 54:2001) was issued by the Manager of Standards and Safety, Ministry of Consumer Affairs, acting under delegated authority (pursuant to section 41 of the State Sector Act 1998) from the Chief Executive, Ministry of Economic Development on the 3rd day of April 2001.

Dated this 13th day of June 2001.

Minister of Energy

COMMITTEE REPRESENTATION

This Code of Practice was prepared by the Ministry of Consumer Affairs, in consultation with the following:

Building Industry Authority (*BIA*)
Building Research Association of New Zealand (*BRANZ*)
Recessed Luminaire Manufacturers and Importers
Retailers
Registered Electrical Personnel
Electrical Workers Licensing Group
Electrical Contractors Association of New Zealand
Electrical Institute of New Zealand
Electrical Safety Organisation

REVIEW

This Code of Practice will be revised as occasions arise. Suggestions for improvements of this Code are welcome. They should be sent to the Manager, Standards and Safety, Ministry of Consumer Affairs, PO Box 1473, WELLINGTON.

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INTRODUCTION

This Code sets out the electrical and physical installation requirements for recessed luminaires (“commonly known as downlights” or something similar) and their auxiliary equipment, such as transformers and control gear in residential, commercial and industrial buildings.

The Code gives guidance on the selection of recessed luminaires and their installation requirements to ensure that the integrity of the building is maintained. This integrity includes building elements, thermal, acoustic, fire and moisture.

INSTALLATION OF RECESSED LUMINAIRES AND AUXILIARY EQUIPMENT

SECTION 1

SCOPE, REFERENCE DOCUMENTS, INTERPRETATION AND GLOSSARY

1.1 SCOPE

1.1.1 This Code sets out the installation requirements for recessed luminaires and auxiliary equipment in residential, commercial and industrial buildings.

1.2.1 This Code does not apply to recessed luminaires that are:

- (a) Recessed into swimming pools;
- (b) Ground-planted in gardens, pavements and ducts; and
- (c) Fitted into surfaces that do not compromise part of a building.

1.2 REFERENCE DOCUMENTS

The following Standards are referred to in the text of this Code.

AS/NZS 3000:2000	Electrical Installations – Buildings, Structures and Premises.
NZS 3000:1997	Electrical Installations – Buildings, Structures and Premises.

1.3 INTERPRETATION

For the purposes of this Code, the definitions given below shall apply.

1.3.1 Auxiliary equipment – means equipment such as ballasts, transformers, high intensity discharge (HID) control gear, covers, “heatcans” and other control equipment.

1.3.2 Building element – means any structural and non-structural component or assembly incorporated into or associated with a building. Included are fixtures, services, drains, permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports. *(taken from New Zealand Building Code Handbook 2001). Refer Figure 1.*

1.3.3 Concealed space – means any part of the space within a building that cannot be seen from an occupied space. *(taken from New Zealand Building Code Handbook 2001). Refer Figure 1.*

1.3.4 Habitable space – means a space used for activities normally associated with domestic living, but excludes any bathroom, laundry, water-closet, pantry, walk-in wardrobe, corridor, hallway, lobby, clothes-drying room, or other space of a specialised nature occupied neither frequently nor for extended periods. *(taken from New Zealand Building Code Handbook 2001). Refer Figure 2.*

1.3.5 Utility space – means any water-closet, pantry, walk-in wardrobe, corridor, hallway, lobby, or other space of a specialised nature occupied neither frequently nor for extended periods. *Refer Figure 2.*

- 1.3.6 Moist area – means a room or space where excessive moisture vapour or where steam is generated or is frequently present (e.g. bathrooms, laundries, clothes-drying rooms etc) and includes, but is not limited to, damp areas. In open plan areas the moist area will extend to adjoining spaces for a distance of 2 m from the centre of any appliance, fixture or fitting which will generate water vapour. *Refer Figure 2.*
- 1.3.7 Fire separation – means any building element, which separates firecells or firecells and safe paths, and provides a specific fire resistance rating. (*taken from New Zealand Building Code Handbook 2001*).
- 1.3.8 Recessed luminaire – means a luminaire intended by the manufacturer to be fully or partly recessed into a mounting surface.
- 1.3.9 Heat dispersal cover (*or heatcan*) – means auxiliary equipment for enclosing a recessed luminaire to alter its heat dispersal characteristics.

1.4 GLOSSARY OF ABBREVIATIONS USED IN THIS CODE

AS/NZS	Joint Australian/New Zealand Standard
Kg	Kilograms
NZS	New Zealand Standard
m	Metres
mm	Millimeters

SECTION 2

INSTALLATION REQUIREMENTS

2.1 GENERAL

2.1.1 Recessed luminaires and their auxiliary equipment shall be installed and maintained so as to be electrically safe, prevent the risk of fire, not cause adverse effects to property and avoid causing excessive heat.

2.1.2 Recessed luminaire installations shall:

- (a) Not degrade the structural integrity of buildings;
- (b) Not degrade structural ceiling elements by cutting or notching joists, beams, rafters or battens; (*refer Figure 3*)
- (c) Not affect the durability of building materials or cause deterioration or combustion of building materials;
- (d) Not encourage the transmission of moisture from moist areas into concealed spaces;
- (e) Not degrade the thermal insulation of the space below the minimum required limit;
- (f) Not degrade the fire resistance rating of any space;
- (g) Not degrade the acoustic rating of any space; and
- (h) Not degrade the insulation of adjacent cabling.

2.1.3 Recessed luminaires and their auxiliary equipment may pose a risk of fire or damage to property if not installed and maintained correctly.

2.1.4 When combustible building elements are exposed to high temperatures for a long period of time, it can cause them to spontaneously combust.

2.1.5 Changes made to an existing building (*such as altering the structure of the building or adding thermal insulation*) may mean that the existing recessed luminaires do not comply with this Code, and so, will need to be made compliant with this Code.

2.2 ELECTRICAL SAFETY

Recessed luminaires and their auxiliary equipment shall be installed in accordance with the relevant requirements of AS/NZS 3000 or NZS 3000 and this Code.

2.3 CLEARANCES

2.3.1 Recessed luminaires and their auxiliary equipment shall be installed so that they have adequate clearances from structural members and building elements such as thermal insulation (*refer Figure1*), in accordance with the manufacturer's installation instructions.

2.3.2 Where no manufacturer's installation instructions are available a minimum clearance of 500 mm from the lampholder of the luminaire to the building elements shall be made.

- 2.3.3 Clearances from specific building elements and general installation requirements shall be in accordance with the manufacturer's installation instructions and this Code (*refer Figure 1*).

2.4 SUPPORTS

Recessed luminaires and auxiliary equipment shall be structurally supported in such a way as to not compromise any building elements.

2.5 MOISTURE

Recessed luminaires in moist areas shall be constructed and installed so as to prevent the transfer of moisture into concealed spaces.

2.6 THERMAL INSULATION

- 2.6.1 Recessed luminaires and any auxiliary equipment shall be constructed and installed so as not to compromise the thermal efficiency of buildings.

- 2.6.2 Recessed luminaires and any auxiliary equipment shall not be installed so as to compromise the thermal insulation requirements of BIA Approved Document H1, Energy Efficiency, by lowering the required thermal insulation values below the minimum required limit.

- 2.6.3 Recessed luminaires shall not be installed in loose, sprayed insulation or flammable insulation (*such as macerated paper*) unless a purpose built box or structure is mounted over the recessed luminaire.

2.7 FIRE RESISTANCE RATING

The installation of recessed luminaires, where building elements are fire resistance rated, shall not compromise the integrity of that fire resistance rating. Recessed luminaires shall be installed in accordance with the manufacturer's installation instructions and this Code.

2.8 ACOUSTIC RATING

The installation of recessed luminaires, where building elements are acoustic rated, shall not compromise the integrity of that acoustic rating. Recessed luminaires shall be installed in accordance with the manufacturer's installation instructions and this Code.

SECTION 3

RECESSED LUMINAIRES AND AUXILIARY EQUIPMENT - CLASSES AND APPLICATION

3.1 GENERAL

Recessed luminaires are categorised into five classes:

- (a) open: (O)
- (b) restricted; (R)
- (c) closed; (C)
- (d) fire resistance rated (FR); and
- (e) acoustic rated (AR).

3.2 RECESSED LUMINAIRE CLASSES

- (O) Open** - An open recessed luminaire is a luminaire in which the area that is open between the 'Occupied Space' and the 'Concealed Space' is greater than 15% of the area of the hole cut in the ceiling into which the luminaire is fitted.
- (R) Restricted** - A restricted recessed luminaire is a luminaire in which the area that is open between the 'Occupied space' and the 'Concealed Space' is greater than 5% but not more than 15% of the area of the hole cut in the ceiling into which the luminaire is fitted.
- (C) Closed** - A closed recessed luminaire is a luminaire in which the area that is open between the 'Occupied Space' and the 'Concealed Space' is not more than 5% of the area of the hole cut in the ceiling into which the luminaire is fitted.
- (FR) Fire resistance rated** - A fire resistance rated recessed luminaire is a luminaire that is sealed between the 'Occupied Space' and the 'Concealed Space' and does not compromise the fire resistance rating of the space.
- (AR) Acoustic rated** - An acoustic rated recessed luminaire is a luminaire that is sealed between the 'Occupied Space' and the 'Concealed Space' does not compromise the acoustic rating of the space.

3.3 THERMAL INSULATION MATERIAL CLEARANCE

Recessed luminaires are also categorised into three thermal insulation clearance classes:

- (A) Abutted** - The aperture made in the insulation material is of the same size as the hole made in the ceiling surface for recessing the luminaire into.
- (S) Standard 100 mm** - The aperture made in the insulation material is approximately 100mm larger on each side of the fitting, than the size of the hole made in the ceiling surface for recessing the luminaire into.
- (*) Specified** - The aperture made in the insulation material is that which is specified in the manufacturer's installation instructions.

3.4 APPLICATION

- 3.4.1 The recessed luminaires moisture transfer classes are cross-referenced with their permissible distances from thermal insulation. Table 1 gives sub-categories of recessed luminaires that can then be applied to various areas and ceiling construction types are shown in Table 2. (*Refer manufacturer's installation instructions for specific recessed luminaire details*).
- 3.4.2 Where no manufacturer's installation instructions are available for specific recessed luminaires a minimum distance of 500 mm shall apply to thermal insulation clearances.

TABLE 1

RECESSED LUMINAIRE CLEARANCES FROM THERMAL INSULATION

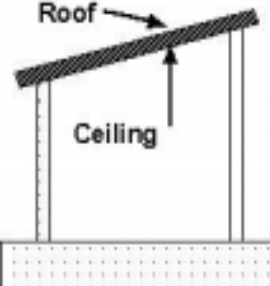
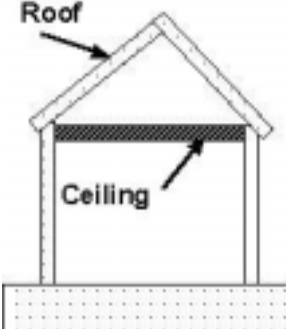
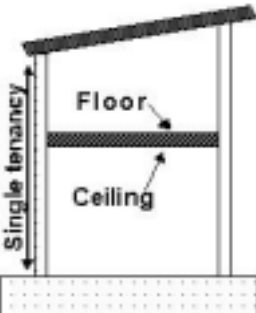
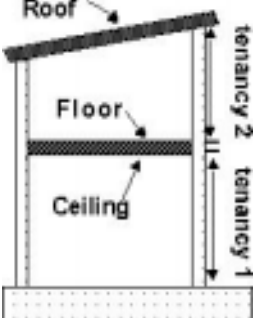
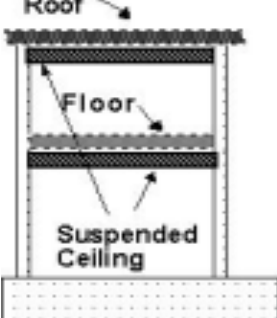
Thermal Insulation Clearance Distance	Recessed Luminaire Moisture Transfer Class		
	Open	Restricted	Closed
Abutted to recessed luminaire	OA	RA	CA
100 mm gap (standard)	OS	RS	CS
Specified by manufacturer	O*	R*	C*
Fire resistance rated	Refer Manufacturer's Installation Instructions		
Acoustic rated	Refer Manufacturer's Installation Instructions		

- * Denotes that the second classification is specified in the manufacturer's installation instructions.

3.5 AUXILIARY EQUIPMENT

- 3.5.1 Auxiliary equipment used with recessed luminaires shall be installed to:
- Be electrically safe;
 - Be adequately supported, ventilated and not covered by thermal insulation;
 - Prevent the risk of overheating and fire;
 - Be positioned so as not to be degraded or damaged by heat emitted by the luminaires or their lamps;
 - Ensure that transformers are not installed directly above lampholders;
 - Ensure that transformers are not installed within a fire barrier unless they are fire rated;
 - Not be degraded by the effects of moisture or vapour;
 - Be enclosed so that low voltage parts cannot be accessed without the use of a tool;
 - Ensure that cables supplying power to the luminaire or auxiliary equipment are kept away from heat sources such as the rear of lamps or too close to auxiliary equipment.
- 3.5.2 Auxiliary equipment, used with recessed luminaires shall have secondary circuits wired in compliance with AS/NZS 3000 or NZS 3000.
- 3.5.3 Auxiliary equipment such as heat dispersal covers (*heatcans*) shall be classified as per Table 1 and shall have manufacturer's installation instructions.

**TABLE 2
CROSS REFERENCE OF RECESSED LUMINAIRE CLASSES WITH CEILING TYPES**

Luminaire Type			Ceiling Types																											
			Skillion Roof			Ceiling Below Accessible Roof Space			Ceiling Within Floor - No Fire or Acoustic Separation			Ceiling Within Floor - Fire or Acoustic Separation Required			Suspended Ceiling															
																														
Thermally Insulated		No Insulation	Thermally Insulated		No Insulation	Thermally Insulated		No Insulation	Thermally Insulated		No Insulation	Thermally Insulated		No Insulation	Thermally Insulated		No Insulation													
Symbol	Moisture Transfer	Insulation Clearance	Utility	Habitable	Moist	Utility	Habitable	Moist	Utility	Habitable	Moist	Utility	Habitable	Moist	Utility	Habitable	Moist	Utility	Habitable	Moist										
OA	Open	Abutted	✓			✓						✓	✓	✓	Do not Penetrate Fire or Acoustic Separation Unless A Special Fire Resistance Rated or Acoustic Rated Luminaire is Used					✓	✓	✓	✓	✓	✓					
OS	Open	100mm				✓						✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
O*	Open	To spec				✓						✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RA	Restricted	Abutted	✓	✓		✓	✓					✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RS	Restricted	100mm				✓	✓					✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
R*	Restricted	To spec				✓	✓					✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CA	Closed	Abutted	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS	Closed	100mm				✓	✓	✓				✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C*	Closed	To spec				✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					

* Denotes that the second classification letter is not relevant to any installation in uninsulated ceilings, and that any recessed luminaire with the appropriate first letter can be used.

3.6 SUPPORTS

In suspended T-bar tiled ceilings, any recessed luminaires or auxiliary equipment (*ballasts etc*) over 1 kg in weight, shall be structurally supported and fixed in position, in such a way as to not compromise any building elements. No more than 1kg total mass shall be placed on a single tile unless the tile is rated to carry more than 1 kg. The total mass of all recessed luminaires and auxiliary equipment, supported by a ceiling system, shall not cause the load bearing capacity of the ceiling to be exceeded.

3.7 MOIST AREAS

Where recessed luminaires are installed in moist areas they shall be of a type that prevents the transfer of moist air, steam or water vapour into concealed spaces by:

- (a) Being physically enclosed or sealed and rated suitable for use in moist areas; or
- (b) Of the closed type; or
- (c) Of the restricted type where the space is provided with adequate mechanical ventilation, in accordance with the New Zealand Building Code G4.

SECTION 4

INSTALLATION INSTRUCTIONS

4.1 GENERAL

- 4.1.1 The seller shall provide installation instructions for each model of recessed luminaire.
- 4.1.2 Sample manufacturer's installation instruction sheet – required and optional information. (*See opposite page – This may be copied freely*).

MANUFACTURER'S INSTALLATION INSTRUCTION SHEET

Manufacturer or supplier name and contact details *(required)*
 Logo or other information *(optional)*

This data sheet contains information necessary to ensure compliance with the New Zealand Electrical Code of Practice for the Installation of Recessed Luminaires and Auxiliary Equipment NZECP 54.

Caution: Recessed luminaires and their auxiliary equipment may pose a risk of fire or damage to property if not installed and maintained correctly.

Voltage: *(required)* volts
 Maximum wattage: *(required)*watts
 Lamp type(s): *(required)* GLS, linear halogen, GU 10, HID, MR 16, etc.....
 Recommended lamp type: *(required)* R80, PAR25, MR16ALU etc
 Lamp base: *(required)* GU10, E27, B22, GX5.3, etc.....
 Installation hole diameter: *(required)* mm
 Minimum side clearance from combustible materials (SCB): *(required)* mm
 Minimum height clearance form lampholder (HCB): *(required)*..... mm
 Fire resistance rating or acoustic rating: *(as required)*

Recessed Luminaire Classification

Luminaire moisture transfer category: *(required)*
(O = open, R = restricted, C = closed, (or other as specified)
 Thermal insulation clearance class: *(required)*
*(A = abutted, S = standard – 100 mm, * = specified)*
 Classification upgraded towhen used with attachment.....
(optional)

AUXILIARY EQUIPMENT: *(required when relevant)*

Auxiliary equipment type: *(optional)* transformer, HID control gear.....
 Dimensions: *(optional)* H = mm, L= mm, W = mm
 Lamp type(s): *(required)* 12 volt, sodium, linear metal halide, etc.....
 Maximum lamp wattage: *(required)*.....watts
 Recommend clearance from luminaire: *(required)* mm
 Maximum output cable length: *(required)* mm
 Weight if over 1 kg: *(required)*..... kg
 Enclosure type: *(as required)*.....
 Recommended auxiliary equipment: *(optional)* mm

FIGURE 1

MINIMUM CLEARANCES FOR RECESSED LUMINAIRES

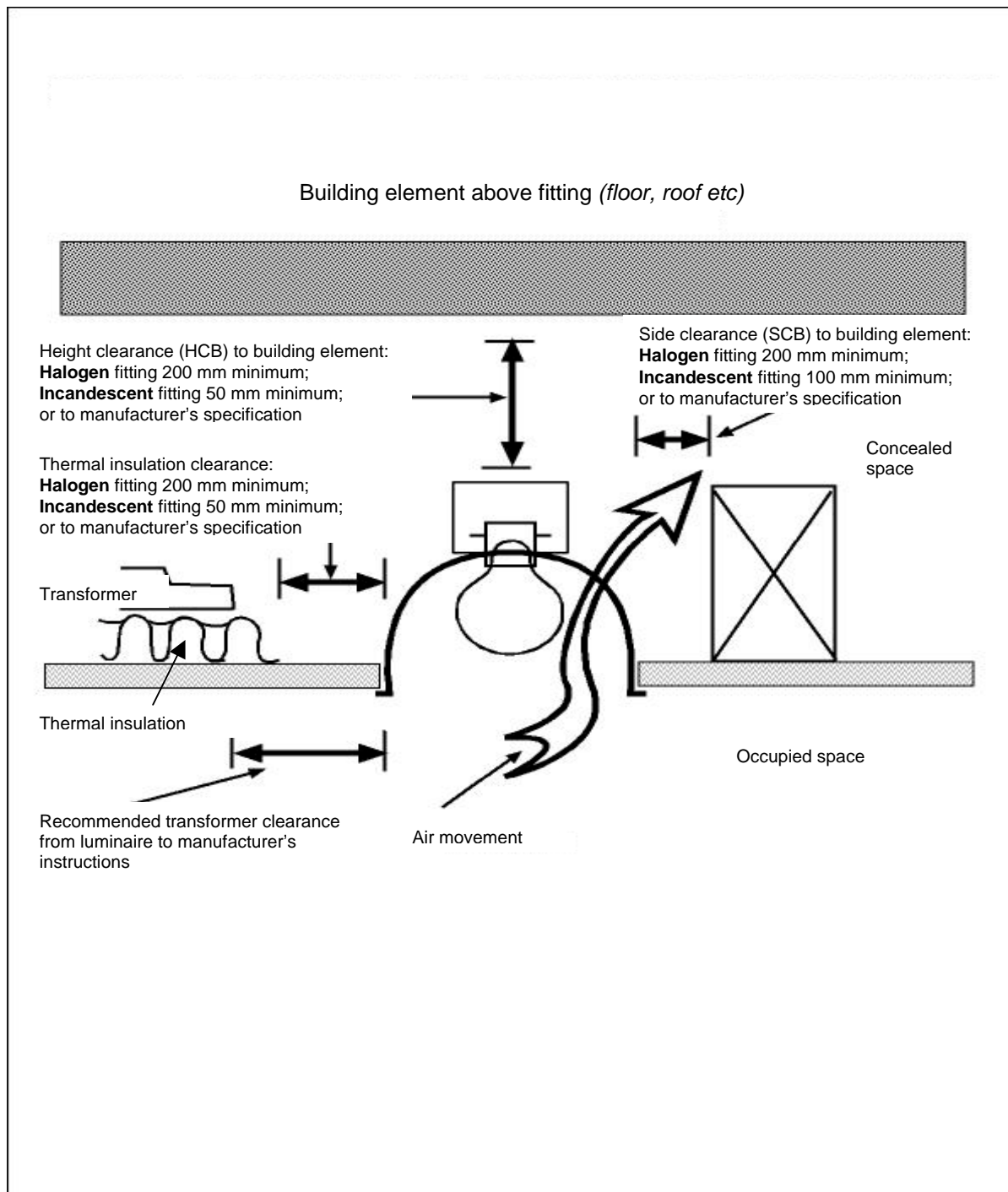


FIGURE 2

MOIST, HABITABLE AND UTILITY AREAS

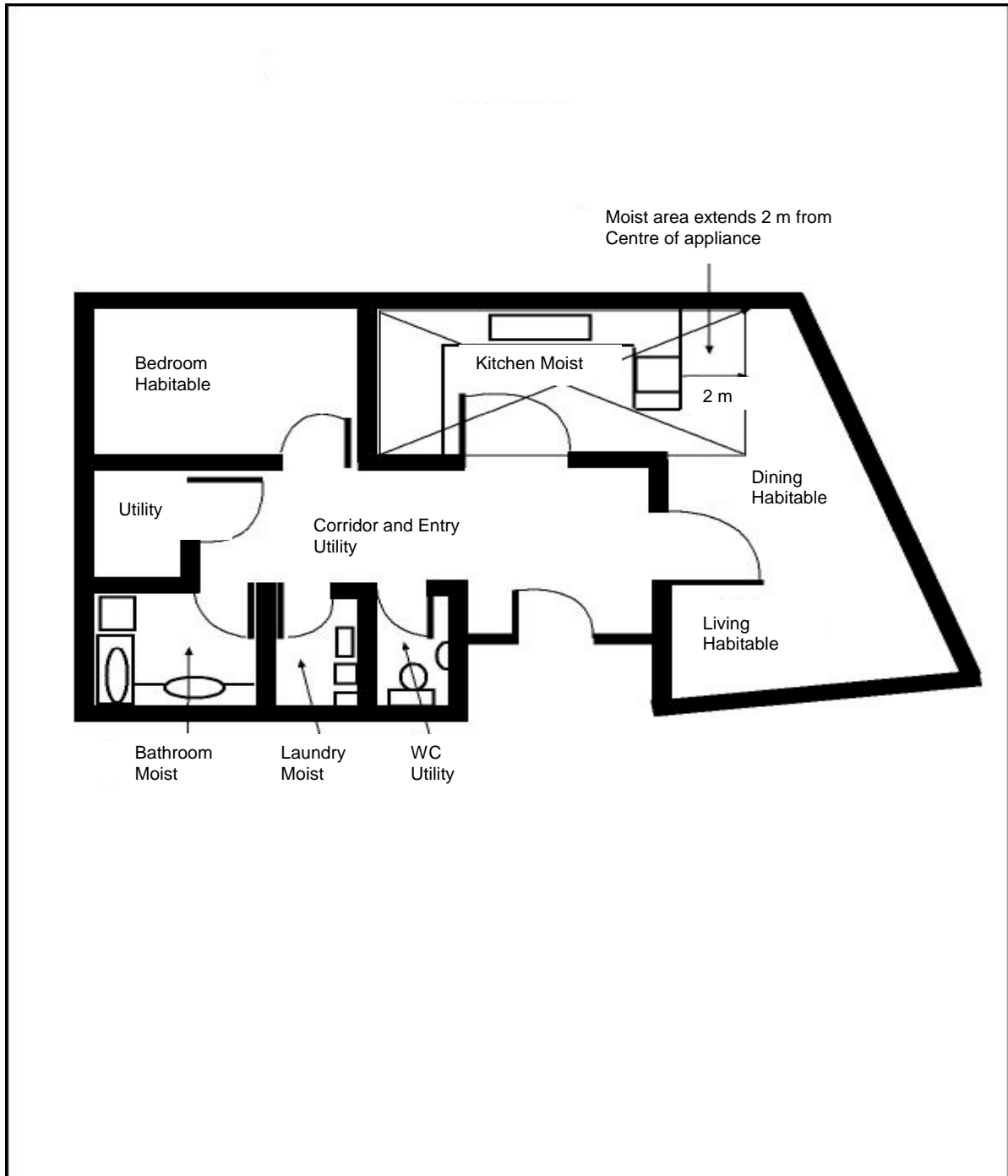


FIGURE 3

PROHIBITED CUTTING OR NOTCHING OF JOISTS, BEAMS, RAFTERS AND CEILING BATTENS

