Part 9

External works

Part 9 External works

Chapter 9.1

Garages

9.1 Garages

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SCOPE

This Chapter gives guidance on meeting the Technical Requirements and recommendations for integral, attached and detached garages.

DESIGN STANDARDS

9.1 - D1 Design shall meet the Technical Requirements

Design that follows the guidance below will be acceptable for garages.

STATUTORY REQUIREMENTS

9.1 - D2 Design shall comply with all relevant statutory requirements

Design should be in accordance with relevant Building Regulations and other statutory requirements.

GARAGE FOUNDATIONS

9.1 - D3 Garage foundations shall transmit all loads to the ground safely and without undue movement

Garage foundations should support adequately the imposed loads, taking account of ground conditions. Further guidance is given in:

- Chapter 4.4 'Strip and trench fill foundations' (Design), and
- the guidance given below.

Items to be taken into account include:

(a) hazardous ground
For foundations on hazardous ground, the following Chapters are relevant:
4.1 'Land quality - managing ground conditions'
4.2 'Building near trees'
4.5 'Raft, pile, pier and beam foundations' (Design).

Any existing fill on the site of the garage should be examined and identified. Where any potential health hazard or risk of damage is indicated, appropriate precautions should be taken, as described in the following Chapters:
4.1 'Land quality - managing ground conditions'
5.1 'Substructure and ground bearing floors' (Design).

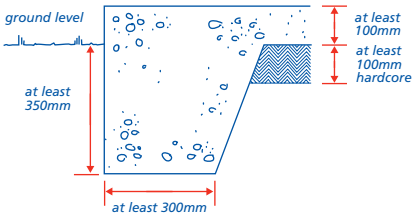
(b) type of foundation required for integral/attached garages
Foundations for integral or attached garages should be the same as those for the dwelling unless proper consideration is given to each foundation and the possibility of differential movement between them.

(c) type of foundation required for detached garages and blocks of garages
Design of foundations for detached individual garages or blocks of garages should avoid damage caused by differential loads and uneven settlement.

An unreinforced edge thickened concrete slab may be used where the ground is uniform and provides a satisfactory foundation bearing.

Unreinforced concrete slabs should:

- have a minimum thickness of 100mm
- have a minimum downstand thickening of 350mm below ground level around the whole perimeter of the slab
- have a minimum width of edge thickening of 300mm
- be constructed on 100mm minimum of properly compacted hardcore
- have dimensions not exceeding 6m in any direction - for dimensions greater than this, movement joints should be provided.



(d) adjacent structures
Foundations for garages should not impair the stability of the dwelling or any other adjacent structure.

(e) underground services
Garage foundations that are to be above or near services should be constructed so that no settlement of foundations or damage to services occurs (see Chapter 5.3 'Drainage below ground' (Design)).

(f) provision for movement
Movement joints in foundations should be provided:

- between dwellings and attached garages where there is a change of foundation type or depth
- at approximately 6m intervals where unreinforced concrete slab foundations are used.

GARAGE FLOORS

9.1 - D4 Garage floors shall transmit all loads to either the foundations or the ground safely and without undue movement

Garage floors will be acceptable if they are in accordance with:

- Chapter 5.1 'Substructure and ground bearing floors' (Design), and
- Chapter 5.2 'Suspended ground floors' (Design), and
- the guidance given below.

Unless ventilation is specifically required for some other reason the void beneath a garage floor which is suspended precast concrete may be unventilated if:

- the floor has adequate durability, and
- the ground beneath is well drained, and
- there is unlikely to be a build up of soil gases.

Items to be taken into account include:

(a) bearing capacity of the ground
Where the depth of fill exceeds 600mm, concrete floors should be designed in accordance with Chapter 5.2 'Suspended ground floors' (Design) and BS 8103:Part 4.

Supporting fill should comply with the requirements of Chapter 5.1 'Substructure and ground bearing floors' (Sitework).

Where protection is needed to prevent attack by sulfates in either the ground, ground water or fill below the slab, an impervious isolating membrane should be provided between the concrete and the ground.

(b) resistance of the floor to moisture from the ground
Generally, a dpm is unnecessary except where:

- it is necessary to prevent dampness entering the dwelling, or
- the floor has to be protected against chemical attack from the ground.

Where no dpm is provided, the floor may show signs of dampness.

Where the floor is below ground level, precautions should be taken to prevent the entry of ground water by:

- tanking
- the use of dpcs and dpms
- drainage of the ground behind the wall to a level below the floor.

(c) thickness of floor slabs
Ground bearing floors, where provided, should not be less than 100mm thick, including a float finish.

(d) floor drainage
When practicable, garage floors should to be laid to falls to ensure that water or spillage is directed out of the garage via the vehicle doorway.

(e) structural topping
Where reinforced screeds are to be incorporated as structural topping, they should be designed by an Engineer in accordance with Technical Requirement R5.

GARAGE WALLS

9.1 - D5 Walls for all garages shall transmit all loads to foundations, safely and without undue movement

Garage walls will be acceptable if they are in accordance with:

- Chapter 5.1 'Substructure and ground bearing floors' (Design), and
- Chapter 6.1 'External masonry walls' (Design), and
- the guidance given below.

Items to be taken into account include:

(a) stability of walls above ground
Walls for detached garages and external walls for attached garages should:

- be not less than 90mm thick

- in the case of walls up to 200mm thick, have piers at corners (unless buttressed by a return) and at intermediate centres not exceeding 3m
- have adequate lateral restraint against wind loading.

(b) stability of walls retaining ground
Garage walls retaining ground should be:
- suitable for the ground conditions
- structurally adequate.

Where garage walls act as retaining walls, they should be designed in accordance with Chapter 5.1 'Substructure and ground bearing floors' or by an Engineer in accordance with Technical Requirement R5.

(c) provision for movement
Movement joints in garage walls, as described in BS EN 1996-2, should be provided:
- between dwellings and attached garages as required by Clause D3(f)
- where there are movement joints in foundations (reference should be made to Clause D3(f)).

(d) adequate resistance to rain and ground water
A damp-proof course should be provided at a level at least 150mm above the level of adjacent ground. This dpc will protect the wall from rising ground moisture.

Garage walls constructed from a single leaf of masonry, such as brickwork or blockwork approximately 100mm thick, will not be impervious to wind driven rain and consequently could become damp.

In areas of severe exposure, single leaf walls may require a high standard of workmanship and possibly surface treatment to prevent an unacceptable level of rain penetration.

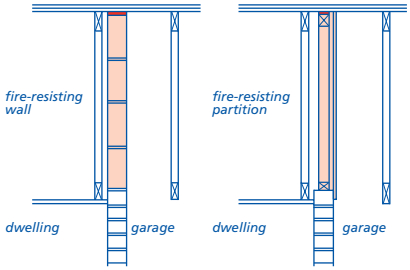
Where a garage is integral or attached, the design should ensure that dampness cannot enter the dwelling.

Where a wall is below ground level, precautions should be taken to prevent the entry of ground water by:
- tanking
- use of dpcs and dpms
- drainage of ground behind the wall.

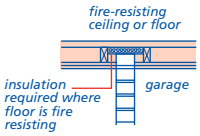
RESISTANCE TO FIRE SPREAD

9.1 - D6 Garages shall be constructed so as to prevent fire spread to the dwelling from the garage

Fire resistance between dwellings and integral or attached garages, may be provided by:
- a wall in brickwork, blockwork or fire-resisting studwork up to the underside of the roof covering



- a half-hour fire-resisting floor or ceiling



- any proposal which gives nominal half-hour fire resistance.

SECURITY

9.1 - D7 Garages shall be constructed to provide reasonable security against unauthorised entry, in particular where garages are linked

Where garages in different ownership are linked, walls should prevent direct access from one garage to another.

DOORS AND WINDOWS

9.1 - D8 Garage doors and windows shall be adequate for their purpose

Doors and windows will be acceptable if they are in accordance with:
- Chapter 2.3 'Timber preservation (natural solid timber)' (Design), and
- Chapter 6.7 'Doors, windows and glazing' (Design), and
- the guidance given below.

Items to be taken into account include:

(a) robustness
Frames should be selected and fixed having regard to the type and weight of the garage door.

(b) ease of operation
Proprietary doors and door gear should be installed in accordance with manufacturers' recommendations.

Care should be taken to ensure that garage doors are in proper working order at the time of handover of the dwelling.

GARAGE ROOFS

9.1 - D9 Garage roofs shall satisfactorily resist the passage of rain and snow to the inside of the building, support applied loads and self weight and transmit the loads to the walls safely and without undue movement

Garage roofs will be acceptable if they are in accordance with:
- Chapter 7.1 'Flat roofs and balconies' (Design), and
- Chapter 7.2 'Pitched roofs' (Design), and
- the guidance given below.

Items to be taken into account include:

(a) holding down
To prevent uplift flat roofs and, where necessary, pitched roofs should be provided with holding down straps at not more than 2m centres where the roof members bear on the supporting wall. Straps should have a minimum cross section of 30mm x 2.5mm, be at least one metre long and have three fixings to the wall.

(b) bracing
The building designer should specify all bracing. Trussed rafter roofs should be braced in accordance with Table 1 in Appendix 7.2-C, unless the roof is designed and braced in accordance with BS 5268-3 (or PD 6693-2 when published).

All timber bracing to trussed rafters should be at least 100mm x 25mm in section and twice nailed to each trussed rafter. Nailing should be 3.35mm (10 gauge) x 65mm long galvanized round wire nails.

(c) fixing of corrugated roof coverings
Framing for corrugated coverings should be constructed and sheets laid to falls in accordance with manufacturers' recommendations.

(d) detailing at abutments
The following precautions should be taken at abutments between a garage roof and the main building or between stepped garages:
- flashings and weatherproofing should allow for differential movement
- cover flashings should be of metal or other approved material
- aprons and eaves fillers for corrugated coverings should fit the corrugation profile of the roofing
- cavity trays should divert water from inside the cavity to the external surface of the roof.

(e) movement
Movement joints should be provided:
- between dwellings and attached garages which have different types or depths of foundations (reference should be made to Clause D3(f))
- at approx 6m intervals where unreinforced slab foundations are used (reference should be made to Chapter 7.1 'Flat roofs and balconies' (Design)).

Movement joints in roofs should be continued through roof coverings and be provided with appropriate weather protection.

(f) adequate disposal of rainwater
The provision of rainwater disposal is at the discretion of the Builder, subject to statutory requirements and the paragraphs below.

Individual roofs, or combinations of roofs that drain from one to another with a total area greater than 6m^2, should have a rainwater drainage system.

Where rainwater from a large roof surface discharges onto a garage roof, precautions should be taken to prevent premature erosion of the lower surface.

Rainwater should not discharge from the roof directly to a drive or path.

For details on the design of rainwater disposal systems, reference should be made to the following Chapters, as appropriate:
7.1 'Flat roofs and balconies' (Design)
7.2 'Pitched roofs' (Design).

(g) acceptable forms of construction
Garage roofs should be designed, specified and constructed as described in Chapter 7.1 'Flat roofs and balconies' (each section) or Chapter 7.2 'Pitched roofs' (each section), as appropriate.

PERMANENT PREFABRICATED GARAGES AND CARPORTS

9.1 - D10 Permanent prefabricated garages and carports shall be suitable for their intended purpose

Permanent prefabricated garages and carports should:
- have appropriate foundations
- be structurally adequate
- provide appropriate weathertightness
- provide adequate separation between linked garages in different ownership.

Prefabricated garages should be erected in accordance with manufacturers' recommendations.

Particular care should be taken to ensure adequate holding down of carports and other light structures against wind action.

SERVICES

9.1 - D11 The provision of any service or appliance within a garage shall be in accordance with relevant regulations

Where services or appliances are provided in garages, they should comply with the guidance below and with the following Chapters, as appropriate:
5.3 'Drainage below ground' (Design)
8.1 'Internal services' (Design).

Items to be taken into account include:
(a) protection of water services against frost
A rising main should not be located within a garage.

A water supply or outlet in a garage should have adequate provision for isolating and draining down.

Pipes should be insulated and located so as to minimise the risk of freezing.

(b) provision of electricity
The provision of electric lighting and socket outlets in a garage is at the discretion of the Builder.

All electrical installations should comply with BS 7671, formerly the Institution of Electrical Engineers (IEE) Wiring Regulations, operative on the date when the foundations of the dwelling are laid.

(c) risk of fire or explosion
Installation in a garage of an oil or gas burning boiler or heating appliance should be in accordance with any relevant Statutory Regulations.

PROVISION OF INFORMATION

9.1 - D12 Designs and specifications shall be produced in a clearly understandable format and include all relevant information

Design information should include all necessary details of the following:
- exact location of garages
- all relevant levels, related to an agreed reference point
- foundations
- waterproofing, where applicable
- walls
- roof structure and coverings
- external and internal finishes
- services, where applicable.

9.1 - D13 All relevant information shall be distributed to appropriate personnel

Ensure that design and specification information is issued to site supervisors and relevant specialist subcontractors and/or suppliers.

MATERIALS STANDARDS

9.1 - M1 All materials shall:
(a) meet the Technical Requirements
(b) take account of the design

Materials that comply with the design and the guidance given in the Chapters listed below will be acceptable for garages.

FOUNDATIONS
4.4 'Strip and trench fill foundations' (Materials)
4.5 'Raft, pile, pier and beam foundations' (Materials)
5.1 'Substructure and ground bearing floors' (Materials)
6.1 'External masonry walls' (Materials).

FLOORS
5.1 'Substructure and ground bearing floors' (Materials)
5.2 'Suspended ground floors' (Materials).

WALLS
5.1 'Substructure and ground bearing floors' (Materials)
6.1 'External masonry walls' (Materials).

ROOFS
7.1 'Flat roofs and balconies' (Materials)
7.2 'Pitched roofs' (Materials).

SITEWORK STANDARDS

9.1 - S1 All sitework shall:
(a) meet the Technical Requirements
(b) comply with the design
(c) follow established good practice and workmanship

Sitework that complies with the design and the guidance given in the Chapters listed below will be acceptable for garages.

FOUNDATIONS
4.4 'Strip and trench fill foundations' (Sitework)
4.5 'Raft, pile, pier and beam foundations' (Sitework)
5.1 'Substructure and ground bearing floors' (Sitework)
6.1 'External masonry walls' (Sitework).

FLOORS
5.1 'Substructure and ground bearing floors' (Sitework)
5.2 'Suspended ground floors' (Sitework).

WALLS
5.1 'Substructure and ground bearing floors' (Sitework)
6.1 'External masonry walls' (Sitework).

ROOFS
7.1 'Flat roofs and balconies' (Sitework)
7.2 'Pitched roofs' (Sitework).

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