BRITISH STANDARD

BS 5906:2005

Waste management in buildings — Code of practice

ICS 13.030.40

BSI British Standards

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Subcommittee, B/508/1, Waste containers and associated lifting devices on refuse collection vehicles, upon which the following bodies were represented:

Association of Refuse Vehicles Manufacturers
BRE — Building Research Establishment
British Plastics Federation
CIWM — Chartered Institution of Wastes Management
Container Handling Equipment Manufacturers
Environmental Services Association
Galvanizers Association
ODPM — Represented by WRc
Public Authority Transport Network
Freight Transport Association
Society of Motor Manufacturers and Traders Limited

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Contents

Foreword

This British Standard has been prepared by Subcommittee B/508 and supersedes BS 5906:1980, which is withdrawn.

In preparing this revision, the opportunity has been taken to add new clauses based upon information that is now available on non-residential buildings, and to revise the clauses dealing with residential buildings. The types of healthcare waste dealt with in this standard are those that are similar to household and non-residential waste. Due to statutory targets for recycling and legislation covering provision within buildings for disabled persons, reference to these important issues have been incorporated into the appropriate clauses.

The material with which the standard is concerned is now designated "waste" rather than "refuse". This terminology has been adopted so as to agree with that of the Environmental Protection Act 1990 [1].

As a result of experience gained, the requirements of convenience, hygiene, amenity, sound insulation and safety from fire risk, which are accepted as common practice, are incorporated in the methods described in this code.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

It is assumed that in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and competent people.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Attention is drawn to the following statutory regulations:

— Controlled Waste Regulations 1992 [2];

— Packaging (Essential Requirements) Regulations 2003 [3];

— Manual Handling Regulations 1992 [4];

— Integrated Pollution Prevention and Control (England and Wales) Regulations 2000 [5];

— Road Vehicles (Construction and Use) Regulations 1986 [6];

— Environmental Protection Act 1990 [1];

— Control of Pollution (Amendment) Act 1989 [7];

— Disability Discrimination Act 1995 [8].

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 26, an inside back cover and a back cover.

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1 Scope

This British Standard is a code of practice for methods of storage, collection, segregation for recycling and recovery, and on-site treatment of waste from residential and non-residential buildings and healthcare establishments. This British Standard is applicable to new buildings, refurbishments and conversions of residential and non-residential buildings, including but not limited to retail and offices. It should not be used as the only source of information.

The management of healthcare waste from hospitals and waste oil from any establishment are not included within the remit of this code of practice.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 476-21, *Fire tests on building materials and structures — Part 21: Methods for determination of the fire resistance of loadbearing elements of construction.*

BS 476-22, *Fire tests on building materials and structures — Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction.*

BS 792, *Specification for mild steel dustbins.*

BS 1703, *Specification for refuse chutes and hoppers.*

BS 4998, *Specification for moulded thermoplastics dustbins (excluding lids).*

BS 6642, *Specification for disposable plastics refuse sacks made from polyethylene.*

BS 8300:2001, *Design of buildings and their approaches to meet the needs of disabled people — Code of practice.*

BS EN 840-1, *Mobile waste containers — Part 1: Containers with two wheels with a capacity from 80 l to 390 l for comb lifting devices — Dimensions and design.*

BS EN 840-2, *Mobile waste containers — Part 2: Containers with four wheels with a capacity from 500 l to 1 200 l with flat lid(s), for trunnion and/or comb lifting devices — Dimensions and design.*

BS EN 840-3, *Mobile waste containers — Part 3: Containers with four wheels with a capacity from 770 l to 1300 l with dome lid(s), for trunnion and/or comb lifting devices — Dimensions and design.*

BS EN 840-4, *Mobile waste containers — Part 4: Containers with four wheels with a capacity from 750 l to 1 700 l with flat lid(s), for wide trunnion or BG- and/or wide comb lifting devices — Dimensions and design.*

BS EN 840-5, *Mobile waste containers — Part 5: Performance requirements and test methods.*

BS EN 840-6, *Mobile waste containers — Part 6: Safety and health requirements.*

BS EN 12574-1, *Stationary waste containers — Part 1: Containers with a capacity from 1 700 l to 5 000 l with flat or dome lid(s), for trunnion, double trunnion or pocket lifting devices — Dimensions and design.*

BS EN 12574-2, *Stationary waste containers — Part 2: Performance requirements and test methods.*

BS EN 12574-3, *Stationary waste containers — Part 3: Safety and health requirements.*

BS EN 13071, *Selective waste collection containers — Above-ground mechanically-lifted containers with capacity from 80 l to 5 000 l for selective collection of waste.*

BS EN 60529:1992, *Specification for degrees of protection provided by enclosures (IP code).*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1
baler
device that compresses waste into a chamber to form bales, which are then retained in compression by a tying material prior to ejection

3.2
biodegradable waste
waste that is capable of undergoing anaerobic or aerobic decomposition

NOTE Examples include garden and kitchen waste (including fruit and vegetables peelings, meat scraps, bone, paper and dairy products).

3.3
bulky waste
single household items of such size and weight that cannot be accommodated in an individual waste container

NOTE The definition for an individual waste container is given in **3.11.4**.

3.4
chute
ventilated, essentially vertical pipe passing from floor to floor of a building with openings as required to connect with hoppers, and normally terminating at its lower end at the roof of the waste storage chamber

NOTE See BS 1703.

3.5 Compactors

3.5.1
portable compactor
<for interior use>
re-usable metal container having a minimum volume of approximately 50 l and incorporating a permanently in-built compactor

3.5.2
portable compactor
<for exterior use>
re-usable metal container having a minimum volume of approximately 10 m^3 and incorporating a permanently in-built compactor

3.5.3
sack/carton packer
small device for compacting lightweight dry waste into plastic or paper sacks

3.5.4
static compactor
permanent or semi-permanent installation comprising of a compactor with receiving chamber and a facility for attaching a removable compacted-waste container (see **3.11.3**)

NOTE The compactor might be fed by hand, hopper or mechanically by means of a bin lift.

3.6
composting
biodegradable waste aerobically processed to form a stable, granular material containing organic matter and plant nutrients

NOTE It results in a final product that has been sanitized and stabilized, is high in humic substances and can be beneficially applied to land, to improve the soil structure, enrich the nutrient content of soil and enhance biological activity.

3.7
crusher
device, normally stationary but can be portable, that reduces the volume of brittle waste by breaking it into smaller pieces

NOTE In a hospitality application, including pubs, clubs and hotels, it would normally be used for crushing glass bottles.

3.8
food waste disposer
method of direct disposal of biodegradable kitchen waste, used in household and non-residential establishments, powered by electrical motors, where food waste is fed into them by a stream of water and reduced to a pulp

3.9
hopper
fitting into which waste is placed and from it passes into a chute, waste processor or waste container

NOTE See BS 1703.

3.10
shredder
device used for volume reduction of waste by cutting or flailing

NOTE The final particle size can be up to 150 mm depending on the material being shredded and the design of the machine.

3.11 Waste containers

3.11.1
bulk waste container
movable container for the storage of large volumes of uncompacted waste awaiting collection

NOTE Examples of bulk waste containers are skip type containers, which have a capacity range of approximately 1.5 m^3 to 20 m^3, and hook type containers with a capacity range of approximately 6 m^3 to 30 m^3.

3.11.2
communal waste container
movable wheeled container having a capacity of 500 l to 1 300 l, normally situated within a waste storage chamber into which waste is placed by hand or via a chute

NOTE The container may be of plastic, painted steel or galvanized steel. It may be fitted with a flat, hinged or curved, sliding lid and suitable handles for manoeuvring by hand. Four-wheeled containers should have foot-operated brakes fitted to at least two wheels [see BS EN 840 (all parts)].

3.11.3
compacted waste container
closed, strengthened interchangeable container into which waste is packed under compression by means of a static compactor. The container is provided with suitable brackets for pinning to the compactor and is designed for handling and transportation by specially equipped vehicles

NOTE The containers normally have a capacity of between 10 m^3 to 30 m^3.

3.11.4
individual waste container
container having a capacity of not more than 360 l in which waste is stored awaiting collection

NOTE The container may be a disposable paper or plastic sack, a galvanized steel or plastic dustbin with a loose or captive lid or a plastic wheeled bin with a hinged lid [see BS 792, BS 4998 and BS EN 840 (all parts)].

3.11.5
kerbside recycling box
box, usually of plastic, having a capacity of up to 55 l into which recyclable materials are stored, awaiting collection. The box is provided with handles and is sized to ensure safe manual handling

NOTE The box might have a lid and one or more internal dividers (see **4.5.3**).

3.11.6
underground waste container
closed container having a capacity of not more than 7 m^3, situated in a specially constructed pit such that the top of the container is level with the surrounding paved area. The container top incorporates a "litter bin" or other appropriate type of chute, and a trap door to provide access to the lifting mechanism

3.12 Waste storage

3.12.1
waste storage area
place for storing waste

3.12.2
waste storage chamber
annex to a building, or a separate building, designed to accommodate one or more communal waste containers and bulky waste

NOTE The chamber might contain equipment such as a compactor, baler, crusher or shredder for on-site treatment of waste prior to collection. For the purpose of this standard, on-site treatment is limited to manual segregation, compacting, baling, crushing or shredding.

3.13 Waste

3.13.1
waste
substance which constitutes a scrap material or effluent or other unwanted surplus substance arising from the application of any process and any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled, as defined in the Environmental Protection Act 1990 [1].

NOTE 1 It does not include a substance that is an explosive under the Explosives Act 1875 [9].

NOTE 2 Anything that is discarded or otherwise dealt with as if it were waste is presumed to be waste unless the contrary is proved.

3.13.2
clinical waste
any waste which consists wholly or partly of human and animal tissue, blood or other bodily fluids, excretions, drugs and other pharmaceutical products, swabs or dressings, or syringes, needles or other sharp instruments, being waste which unless rendered safe may prove hazardous to any person coming into contact with it; and any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care, teaching or research, or the collection of blood for transfusion, being waste which may cause infection to any person coming into contact with it

[Controlled Waste Regulations 1992 [2]]

3.13.3
controlled waste
household, industrial and commercial waste or waste of a similar composition, as defined in the Environmental Protection Act 1990 [1]

3.13.4
healthcare waste
solid or liquid waste arising from healthcare

3.13.5
healthcare risk waste
waste that is biological (recognizable anatomical waste), infectious, chemicals, toxic or pharmaceutical (including cytotoxins) in nature, sharps or radioactive

NOTE 1 Healthcare and healthcare risk waste are definitions from the European Priority Waste Project and although they are not defined in EU Directives, they are used in general to describe healthcare waste.

NOTE 2 Examples of sharps include needles, scalpels, and broken materials.

3.13.6
household waste
waste from:

a) domestic property which is used wholly for the purposes of living accommodation;

b) a caravan situated on a caravan site;

c) a residential home;

d) premises forming part of a university or school or other educational establishment; and

e) premises forming part of a hospital or nursing home;

and other wastes to be treated as household waste as detailed in Schedule 1 and Schedule 2 of the Controlled Waste Regulations 1992 [2]

3.13.7
non-residential waste
any waste other than household waste

4 General principles of the design of facilities

4.1 General

It is essential that suitable waste management facilities be provided. Such facilities should provide adequate storage and, where appropriate, sufficient space to allow for the on-site treatment of commercial and/or household waste, recyclable waste, and equipment and containers should be accommodated to enable efficient management of waste.

Waste storage areas should be located in a position that provides easy and safe access for both waste producers and collectors. Special consideration needs to be given to access and ease of use for older persons, persons of short stature and people with disabilities (see Clause **5**).

Facilities should be designed so as to minimize the potential for nuisance to occupants and neighbouring premises. The waste storage area should be maintained at the highest practical standard of hygiene, and be clearly designated as a waste storage area through the use of signage and/or floor markings.

Designers should consider:

— easy and safe access for waste producers, including older persons or persons with disabilities;
— easy and safe access for collectors and collection vehicles;
— location and space (including avoidance of opportunity to cause nuisance or injury);
— protection against animal scavenging of waste;
— aesthetics of the development;
— noise (e.g. glass handling);
— ease of maintenance, including cleaning;
— robust construction;
— safety from fire risk and smoke;
— lighting;
— ventilation;
— sound insulation; and
— special requirements (e.g. separate storage and collection of healthcare waste and bulky waste).

NOTE 1 Attention is drawn to Section 34 (Duty of Care) of the Environmental Protection Act 1990 [1], which places a duty on non-domestic waste producers to ensure that controlled waste is managed properly and recovered or disposed of safely, and that suitable facilities are provided to meet this duty.

NOTE 2 With regards to suitable facilities for assisting in managing controlled waste, attention is also drawn to the Packaging (Essential Requirements) Regulations 2003 [3].

4.2 Initial consultation

Waste management issues can have a major impact on the layout of any residential or non-residential development. To ensure that storage space for the efficient management of waste and recyclable material is incorporated into the layout it is essential that liaison between planning authorities and architects, as

well as collection authorities, takes place. The developer or his agent should reach agreement with all appropriate authorities, particularly upon the following points.

a) The methods of storage, segregation, on-site treatment and collection of waste, including recyclable material, to be used for the form of layout and building density adopted.

b) A designated location for waste including recyclable material storage, segregation and treatment areas to be provided and means of access to them for waste collection staff and vehicles.

c) The storage capacity to be provided with allowance for the frequency of collection specified by the collection authority, the volume and nature of waste including recyclable material expected and the size and type of containers to be used.

d) The responsibility for cleansing and maintenance of storage facilities.

e) Environmental aspects, e.g. air pollution, indoor air quality, noise control, and litter abatement.

f) The discharge of waste into sewers (e.g. food waste disposers).

g) Means of escape and fire-fighting arrangements in waste and recyclable material storage and collection areas.

h) Appropriate arrangements for older persons and persons with disabilities.

4.3 Consultees

To ensure that all relevant issues are addressed, the developer or his agent should consult the following bodies:

a) local authority planning department;

b) local authority environmental health department;

c) waste collection authority;

d) local authority building control department;

e) local authority highways department;

f) fire brigade;

g) sewerage undertaker.

This list is not intended to be fully exhaustive and consideration should be given in respect of consulting on other related issues.

4.4 Sustainable waste management

4.4.1 *Introduction*

Increased industrial production and increased wealth and consumer spending, coupled with population growth, has generally lead to increased waste. This is exacerbated by societal behaviour that favours the best and most up-to-date equipment but is reluctant to retain old or worn items, or to repair or reuse them, leading to the unsustainable management of waste.

Sustainable waste management should take responsibility for the waste produced, the way it is managed, and reducing its impact on the environment. In doing this, the environment is protected now and for future generations.

4.4.2 *Waste hierarchy*

By ranking different waste management options into a hierarchy, a broad indication of their relative environmental benefits can be illustrated (see Figure 1).

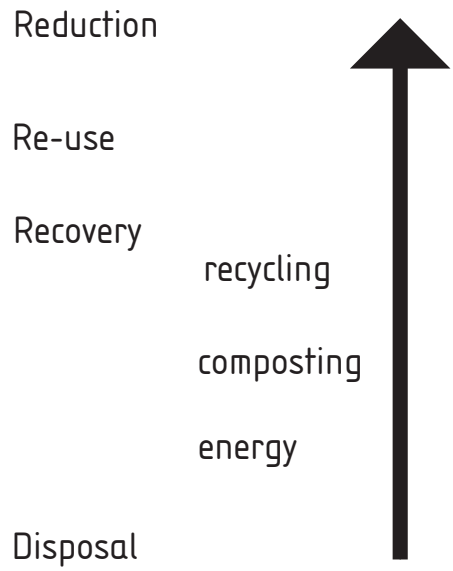

Figure 1 — Hierarchy of waste management options

Sustainable waste management is defined as the reduction of the production of waste to a minimum whilst retaining economic viability.

Re-use is defined as putting objects back into use so that they do not enter the waste stream. For example, this includes tyre re-treading, or re-filling bottles (e.g. milk bottles).

Recovery is a broad category that includes recycling, composting and energy from waste. These options should not be used in preference to each other, and their implementation should depend on whichever is the best practicable environmental option.

Disposal (e.g. landfill) is the least attractive waste management option. If implemented, the priority for disposal should be to ensure that it is carried out to a high standard .

NOTE May 2000 saw the publication of the Government report Waste Strategy 2000 [10]. The Strategy, together with other guidance, set statutory targets for England and Wales for recycling household waste. This Strategy also outlined the requirements for implementing the European directives on waste, packaging and landfill.

4.5 Recycling

4.5.1 *General*

Household and non-residential waste contains a considerable proportion of recyclable material which can be used or recycled and therefore should be viewed as a resource. Statutory regulations require local authorities and private sector organisations to reach increasing recycling targets to further increase the amount and types of recyclables and reusable wastes being re-processed as useful materials. In order to meet these statutory regulations it is essential to incorporate suitable and adequate provision for the segregation and storage of both recyclable materials and residual waste when designing and planning for both new developments and refurbishments (see Clause **6**). While segregation and collection systems vary from authority to authority, under the Household Waste Recycling Act 2003 [11], English authorities are required to provide facilities for their residents to separate different materials for recycling. The main types of provision are likely to be:

— "bring facilities" for use, where householders or employees bring material from home or work to centralized recycling containers, such as bottle and paper banks (see **4.5.2**);

— "kerbside facilities", for example kerbside recycling boxes, wheeled bins or sacks, which allow householders to separate their recyclable material in the home and then have it collected from the kerbside (see **4.5.3**).

The design requirements when planning for either system may be administered differently, and many areas might want to provide a combination of different types of facilities in order to maximize public participation in both recycling and composting (which might require the provision of additional facilities). Special consideration should be given to access and ease of use for older persons and people with disabilities (see Clause **5**). Space should be set aside that, in the short or medium term, might not be used, but will enable additional facilities to be deployed in the future.

4.5.2 *Bring facilities*

Bring facilities are often provided on residential estates at a number of locations, in the car park of a multiple-occupancy building and outside communally used buildings. Commercial operations benefit from central collection of recyclables, ease of pick up and bulked material can mean contract advantages with collection companies.

Key considerations from a planning perspective of any new building or refurbishment should include:

— the size and type of the containers provided;

— the number of containers; a number will often be provided together in a line to allow people to deposit a number of different recyclable materials in one place;

— vehicle access; turning circles and free side access;

— the need for sufficient free headroom to allow lifting of the containers into the recycling collection vehicle;

— provision of relevant informational signage;

— sufficient wall space to allow some types of containers to be fixed together and bolted to a wall for security purposes;

— hard standing for users and collection vehicles;

— ease of maintenance, especially cleaning (e.g. litter, graffiti).

4.5.3 *Kerbside facilities*

Kerbside recycling boxes, wheeled bins or bags should be provided to the householder to encourage them to recycle from home.

NOTE 1 Storage is commonly either within the home (typically within the kitchen) or outside (adjacent to the storage of waste containers).

Key considerations from a planning perspective of any new building or refurbishment should include:

— the size and type of containers provided;

— the number of containers provided; for example, a householder may be given more than one wheeled bin or kerbside recycling box to allow people to separate different recyclable materials;

— location, with regard to minimizing environmental impact and nuisance resulting from anti-social behaviour; and

— sufficient space and ergonomic positioning to allow a crew member from the recycling collection vehicle to safely collect the full containers from the outside of the property; for example, the contents of a kerbside recycling box should not exceed 15 kg (see Figure 2).

NOTE 2 With respect to the lifting of kerbside recycling boxes, attention is drawn to the Manual Handling Regulations 1992 [4]. See the Health and Safety Executive publication, *Getting to Grips with Manual Handling* [12].

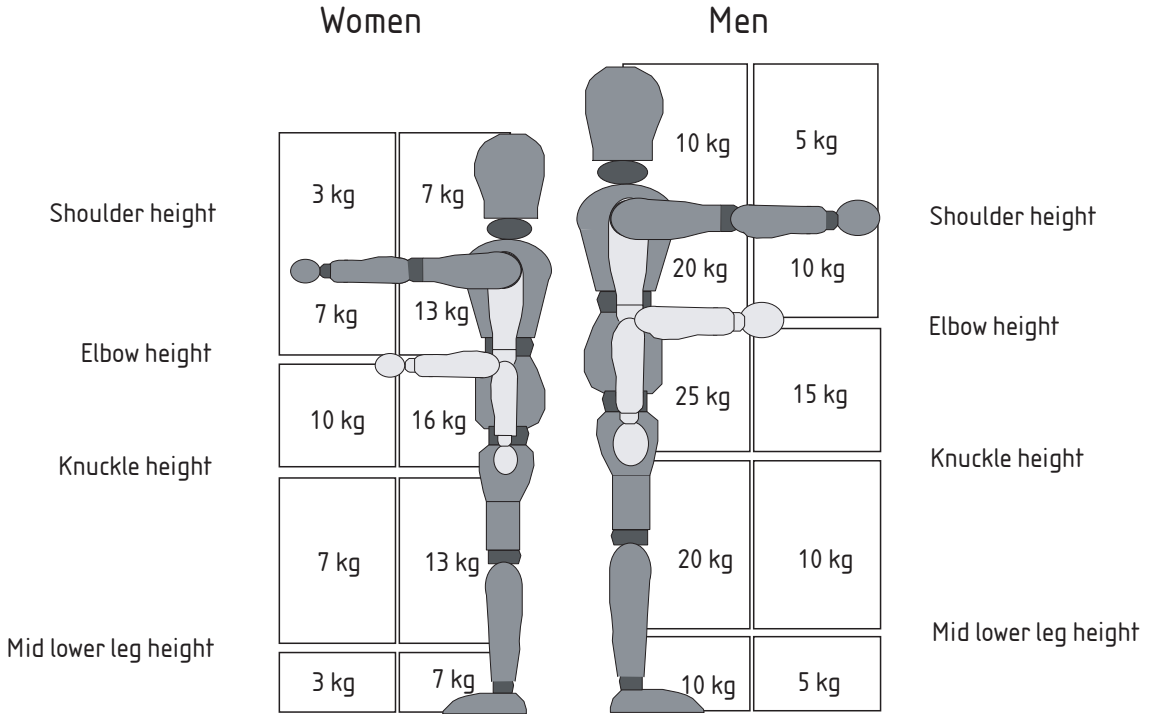

Figure 2 — Lifting and lowering weight guidelines

Individual kerbside recycling boxes may be provided for residents in multiple occupancy dwellings, rather than communal bring facilities. Sufficient space should be provided at the boundary of the property to allow the recycling collection crews easy access for picking up a number of boxes, and to minimize risks from slips, trips and falls by passing residents or members of the public.

Consultation with the relevant local authority should be carried out to ensure that sufficient space and provision has been made for both current and future recycling provision and collections.

4.6 Frequency of collection

4.6.1 *General*

The frequency of collection should be considered a major factor in determining the space required for the storage of waste and installation of on-site equipment requirements.

4.6.2 *Recyclable household and commercial material*

The frequency of collection can vary depending upon the volume and nature of the material being collected, and advice should be sought from the body responsible for its collection.

4.6.3 *Household non-recyclable waste*

The collection frequency should be specified by the waste collection authority, and is generally once a week. However, practices vary between collection authorities and it is essential that designers contact the relevant local authority at an early stage, e.g. some might have extensive recycling schemes, and the frequencies of collection for the different fractions might vary considerably.

4.6.4 *Commercial non-recyclable waste*

A charge is made for the collection of commercial and industrial waste and those responsible for arranging for its collection have the option of using the local waste collection authority, or alternatively, a waste carrier registered with the Environment Agency under Section 2 of the Control of Pollution (Amendment) Act 1989 [13]. The frequency of collection should be considered depending upon the method of storage and collection adopted, e.g. the amount and types of waste being generated and the cost of more frequent collection.

4.7 Determination of storage space requirements

To calculate the storage, containment and equipment requirements for effective waste management, the following should be considered:

— need for a temporary designated collection point (see **7.2.1**)

— volume and composition of waste;

— frequency of collection;

— degree of waste segregation required;

— degree of container separation required (see **8.2**);

— type of on-site treatment proposed.

Guidance in respect of waste generation for commercial premises is contained within Table 1. Note that these figures are typical examples and should not be taken as definitive. However, the developer or his agent should consult with the appropriate authorities (see **4.2**).

NOTE Where recycling capacity is provided, the waste capacity may be reduced, but only by up to one quarter of the recycling capacity provided.

Table 1 — Typical weekly waste arisings and subsequent storage requirements

Building	Equation for weekly waste arisings litres	Typical example of the size of concern	Weekly waste arisings litres	80 l bin/bag/ box equivalent	120 l bin equivalent	240 l bin equivalent	660 l bin equivalent	720 l bin equivalent	1 100 l bin equivalent	7.6 m^3 compactor equivalent (ratio 3:1)
Domestic	number of dwellings × {(volume arising per bedroom [70 l] × average number of bedrooms) + 30}[a]	number of dwellings = 1, average number of bedrooms = 3	240	3.0	2.0	1.0	0.36	0.33	0.22	0.01
Office	volume arising per employee [50 l] × number of employees	number of employees = 40	2 000	25.0	16.67	8.33	3.03	2.78	1.82	0.09
Shopping centre	volume arising per m^2 of sales area [10 l] × square meterage	sales area = 25 000 m^2	250 000	3125.0	2083.3	1041.7	378.8	247.22	227.3	11.11
Fast food outlet	volume per sale [5 l] × number of sales	number of sales = 45 000	225 000	2812.5	1875.0	937.5	340.9	312.5	204.6	10.0
Department store	volume per m^2 of sales area [10 l] × sales area	sales area = 3 700 m^2	37 000	462.5	308.3	154.2	56.1	51.4	33.6	1.64
Restaurant	volume per number of covers [75 l]	number of covers (i.e. dining space) = 8	600	7.5	5.0	2.5	0.91	0.83	0.55	0.03
4/5 star hotel	volume per bedroom [350 l] × number of bedrooms	number of bedrooms = 370	129 500	1618.8	1079.2	539.6	196.2	179.9	117.7	5.76
2/3 star hotel	volume per bedroom [250 l] × number of bedrooms	number of bedrooms = 100	25 000	312.5	208.3	104.2	37.9	34.7	22.7	1.11
1 star hotel/B&B	volume per bedroom [150 l] × number of bedrooms	number of bedrooms = 5	750	9.38	6.25	3.13	1.14	1.04	0.68	0.03
Supermarket (small)	volume per m^2 of sales area [100 l] × sales area	sales area = 800 m^2	8 000	100.0	66.7	33.3	12.1	11.1	7.3	0.36
Supermarket (large)	volume per m^2 of sales area [150 l] × sales area	sales area = 2 000 m^2	30 000	375.0	250.0	125.0	45.4	41.7	27.3	1.33
Industrial unit	volume per m^2 of floor area [5 l] × floor area	floor area = 2 000 m^2	10 000	125.0	83.3	41.7	15.1	13.9	9.1	0.44
Entertainment complex/ leisure centre	volume per m^2 of floor area [100 l] × floor area	floor area = 3 500 m^2	17 500	218.8	145.8	72.9	26.5	24.3	15.9	0.78

[a] Based on average household occupancy.

4.8 Identification of containers

There are a number of industry standard colours that are accepted for different categories of waste and these colours should be avoided wherever possible for uses other than those listed in the Table 2.

Table 2 — Identification of containers

Container colour	Disposal method
Yellow	Clinical (for incineration or treatment)
Yellow with black stripe	Group E clinical waste (for landfill or treatment)
Red	Asbestos
Blue or light blue	Group C clinical waste for autoclaving (prior to landfill or treatment)
Sources: *Coloured Refuse Sacks* [14] and *Healthcare Waste Management and Minimisation* [15].	

4.9 Fire risks

4.9.1 *Storage*

Stored waste and recyclable materials are often the largest single source of combustible material within a building, and pose a significant fire hazard (see Table 3). These stored materials should be identified as a potential hazard in any fire risk assessment. The potential hazard can be reduced with a good design that limits the scope for arson.

NOTE The contents of waste containers can include mixtures of paper, textiles, packaging and plastics that produce very toxic gases and smoke during a fire. These products of combustion are often more dangerous than the fire itself, particularly when the smoke escapes into the building and interferes with evacuation.

Residents should be made aware of the fire risk using signage and of the dangers when waste materials are stored carelessly.

Table 3 — Maximum output in kilowatts of various waste fire scenarios

Waste container	Contents	Fire output kW
Individual waste container (0.1 m^3)	Household	200
Wheeled container (1.1 m^3)	Loose paper	930
Skip container (10.0 m^3)	Cardboard	8 500
Source: Estimated Fire Outputs [16].		

4.9.2 *Prevention and control*

Where waste storage chambers are used, the amounts of combustible material will be much larger. Ignition sources include static electricity, sparking, spontaneous combustion, carelessness, or arson.

NOTE Statistics show that up to 50 % of all waste fires are started deliberately (Fire Protection Yearbook 2001 [17]).

Internal waste storage rooms should be constructed within a fire compartment structure, which is designed to contain a fire. Where risks are greater, for example in multi-storey buildings or in hospitals or hotels, suitably sized manual fire extinguishers should be deployed. For larger risks, a dedicated automatic fire sprinkler or water mist system should be considered.

Care should be taken if uncontrolled sprinkler deluge systems are employed, as the disposal of excess water might be an issue. In keeping with good design practice, the drainage requirements in this situation should be considered.

Standard sprinkler systems operate when a fire becomes established, but a better solution is the prevention of fire using a dedicated system that is designed to detect and extinguish the very early signs of smouldering fires. These systems should be installed within the umbrella of an existing sprinkler system as a first level of defence.

In addition to the proper storage of waste in suitable containers, arrangements should be made to have the containers emptied regularly, to prevent overfilling. Security (see **8.4**) should limit access to the storage areas to prevent deliberate arson, and smoking should be strictly prohibited.

Consultations with a fire safety officer should be made, to confirm if any active fire protection measures are needed.

4.10 Household waste

4.10.1 *General*

Information concerning the quantity of household waste being produced, as well as advances in packaging technology and the effects of recycling schemes, should be considered when designing a waste management system. Local authorities might be able to assist in this regard.

The individual waste container is typically the 240 l wheeled bin; it is recommended to check with the local authority if systems are in place to provide a 120 l wheeled bin, as the amount of waste produced reduces with increased recycling and waste minimization. All containers used for the storage of waste should conform to any applicable UN, European and British Standards. (See BS 792, BS 4998, BS EN 840 (all parts), BS EN 12574 (all parts), BS EN 13071 and *Recommendations on the transport of dangerous goods* [19].) Non-standard containers that are handled mechanically should retain the standard interface details to ensure safe operation with lifting equipment.

4.10.2 *Household hazardous waste*

Household hazardous waste (HHW) is defined as any material discarded by a household, which is difficult to dispose of, or which puts human health or the environment at risk because of its chemical or biological nature. (Source: National Household Hazardous Waste Forum's *Good practice guide* [20]).

The following five main types of HHW products have been identified:

— decorative paints, coatings and related products;

— garden chemicals and petcare products;

— motoring products, including fluids;

— household chemicals; and

— batteries.

In the future, with amendments to EU legislation, in particular to the Hazardous Waste Directive (which may require local authorities to set up separate collection systems for HHW), the container type required for such collection systems will need to be considered in any design and be safe from fire (see **4.9**).

4.11 Commercial waste

4.11.1 *General*

This category of waste is as diverse in nature as the developments and processes that produce it. The data in Table 4 comes from the National Waste Production Survey 1999 [21], which was carried out by the Environment Agency and should be regarded as indicative only.

Table 4 — Non-residential waste arisings per annum

Standard Industry Code (SIC) and description	No. of companies surveyed	Mass per company t	Mass per employee t	Estimated total t
52 Retail excluding motor vehicles	1 195	200.46	2.54	7 557 236
55 Hotels and restaurants	639	126.64	3.21	3 551 661
65 Financial intermediation	272	207.45	0.62	773 846
66 Insurance, banking, etc.	120	203.64	0.50	122 462
67 Activities auxiliary to 65	139	139.68	0.57	237 563
70 Real estate, etc.	227	31.66	0.73	176 191
74 Other business activities	1 408	88.66	0.96	2 226 786
75 Public administration, etc.	458	212.10	0.50	762 953

4.11.2 *Waste electrical and electronic equipment*

Waste electrical and electronic equipment (WEEE) has been identified as a "priority waste stream" by the European Commission, i.e. part of our waste on which additional legislation should be imposed and action taken to control its disposal.

WEEE includes such items as:

- large and small household appliances;
  - fridges, freezers, washing machines, electric heaters, vacuum cleaners, irons, toasters, fryers, clocks, watches, etc.;
- information technology and telecommunication equipment;
  - computers, calculators, phones, answerphones, etc.;
- consumer equipment;
  - radios, televisions, videocameras, video players, hi-fis, etc.;
- lighting equipment;
- electrical and electronic tools;
  - drills, saws, mowing and gardening tools, etc.;
- toys;
  - video games consoles, sports equipment, etc.;
- medical equipment systems (with the exception of all implanted and infected products);
- monitoring and control instruments;
  - smoke detectors, heating regulators, thermostats, etc.; and
- automatic dispensers.

4.12 Healthcare waste

This code of practice does not deal with healthcare waste generated in hospitals. However, healthcare waste is generated from a wide variety of sources in the community.

Commercial premises producing healthcare risk waste (including clinical waste) should ensure that separate and adequate storage and collection systems for healthcare wastes are planned, provided and operated.

NOTE For healthcare waste generated in the home, see **7.4**.

5 Older persons and persons with disabilities

It is important that external and internal facilities for buildings are designed for older persons and persons with disabilities. BS 8300:2001 provides advice related to these design issues. The bibliography of this code of practice also identifies legislation on access and facilities for disabled people. In particular, Part III of the Disability Discrimination Act 1995 [8] places duties on building owners and service providers not to discriminate against disabled people in the provision of goods, facilities, services and premises.

NOTE Building Regulations [22] Part M and Approved Document M address these issues.

BS 8300:2001 details a range of architectural provisions that, integrated into the design of new buildings and their approaches, will make them safe, healthy and convenient for disabled people to use. It covers space allowance that should be made for wheel chair access; slip resistance requirements on flooring and reach ranges for use with facilities such as disposal or recycling units.

BS 8300:2001, Annexes B to E (informative) provide data that should be used in designing access from dwellings to external waste disposal units and the provision for depositing waste or recyclables in these units. Considerations should be given to both physical and sensory requirements for people using wheelchairs, a stick or crutches or those who are blind or partially sighted. Access to the waste disposal or recycling unit should be direct, free from obstructions and have a firm, slip resistant surface to allow for easy manoeuvre of a wheelchair. Guidance on illumination and use of contrasting colours should be used to enable safe use of facilities by visually impaired people.

Issues that should be considered in either an external or internal facility include lighting, the ability to reach and the force required to open the container, the ease of opening and holding open the container while depositing waste using one hand (preferably with either hand) as well as access to and the operating requirements of doors and locks (e.g. waste storage chambers).

Attention should be given to ramp and/or step requirements at all level changes, and to the positioning of balustrades and handrails. Provisions of signs, information and other way-finding details should be included in the layout of the waste disposal or recycling facility to allow for the needs of visually impaired people and those who have cognitive impairment, e.g. persons with learning difficulties or intellectual deterioration affecting some older people.

6 Systems of waste storage, handling, on-site treatment and collection

6.1 General

Waste may be stored in a variety of container types to await direct collection, or subjected to some form of on-site treatment designed to reduce the volume of stored material and hence the frequency of collection required. Systems for the handling of waste may be classified as in **6.2**.

6.2 Classification of the systems for the handling of waste

6.2.1 *Simple storage and direct collection*

The following are examples of systems for the simple storage and direct collection of waste:

a) individual waste containers for segregated waste;

b) communal waste containers for segregated waste;

c) underground waste containers;

d) communal waste containers with chutes;

e) bulk waste containers; and

f) bulky waste containment.

6.2.2 *On-site treatment of waste before collection*

The following are examples of systems for the on-site treatment of waste before collection.

a) Volume reduction systems (details can be found in Annex A) including:

— compaction;
— shredding;
— glass crushing; and
— baling.

b) Discharge of food waste via waste disposers into sewer.

c) Incineration (refer to Integrated Pollution Prevention and Control (England Wales) Regulations 2000 [5] for further details).

6.2.3 *Composting systems*

The following are examples of composting systems:

a) dedicated containers for compostable waste awaiting collection;

b) wormeries;

c) home composting containers; and

d) food waste digesters.

7 Choice of method of storage and collection of waste in various types of building

7.1 General

Individual/communal storage and bulk container systems are currently the most common systems for waste containment. However, the use of compaction should be considered for larger developments, e.g. more than 100 domestic units. Other on-site treatment systems are listed in **6.2.2**.

In certain circumstances, the provision of on site storage for smaller residential and non-residential buildings, e.g. individual shops and flats above shops can be difficult. However, it should be noted that the design for placement of waste containers and the presentation of bagged waste on the highway for collection is likely to be strongly resisted by planning authorities. In all such cases, the prior approval of planning and highways authorities is required.

Communal storage and bulk containers can be shared by domestic users, but not between domestic, commercial and industrial users. In circumstances where a development will generate household, commercial and/or industrial waste, the different containers should be clearly identifiable. Unless there will be one controlling agent for the commercial/industrial waste producers, provision should be made to allow each producer to store their waste in separate containers as each should make their own collection arrangements, which might be with different waste collectors. These containers should ideally be in separate storage areas.

Collection of containers and specific requirements for manual handling are covered in Clause **11**.

Other methods of storage and collection are necessary for bulky waste (see Clause **9**).

The storage of recyclable material should be considered in all types of development. Methods for the management and storage of recyclable material are covered in **4.5**, **7.2** and **7.3**.

7.2 Residential buildings

7.2.1 *Houses, bungalows and maisonettes*

The storage and collection of segregated household waste for these dwellings are best effected by the provision of individual storage containers for each dwelling. Containers should be located in an open-air position, preferably shaded, away from windows and ventilators and, if possible, within a suitably designed structure or area. Consideration should be given to providing communal waste storage containers, as in **7.2.2**, for high density, low-rise developments.

External storage areas should, where appropriate (after consultation with the local authority), be provided to accommodate composting containers, the exception being for wormeries, which can be stored internally.

All containers for waste, including recyclable material, should be easily accessible to both the occupier and waste collector. The preferred storage/collection point for containers would be as near to the curtilage of the property as possible, to minimize the cost of collection. The location for storage of waste containers should be sited so that, unless it is completely unavoidable, the occupier can take the containers to the collection point, without them being taken through a building. Containers should be placed on hard, impervious, free draining surfaces. Storage containers should be used to protect paper or plastic sacks against attacks from animals and birds. The plastic and paper sacks should have sufficient strength to contain the waste without breakage between collections. Plastic sacks should conform to BS 6642.

Shelters constructed as an integral part of the building or out-building should be open to the air and be of a sufficient size to accommodate containers as specified by the local authority (see **4.2** on consultation), e.g. up to a capacity of two 240 l wheeled bin containers. They should be of adequate height to permit the container lids to be removed or fully opened, without the withdrawal of the container. In cases where, for aesthetic reasons, containers are stored in screened compounds, gates or doors and where appropriate door or gate stops, frames, hinges, latches and striking plates etc., should be of sufficient strength and construction to withstand any impact from containers, etc. during the waste collection operation. Doors or gates, when provided, should not open out onto a footway.

It is essential that adequate provision be made for the separate storage of recyclable waste, as it is likely that collection authorities might, in order to meet current and anticipated legislative recycling targets, provide a separate collection service. The recommended storage area to be allocated for recyclable waste should ideally be 30 % of the total waste output by weight, or 50 % by volume.

7.2.2 *Multi-occupancy dwellings*

Ground floor communal storage facilities, i.e. a residents' bring facility, or management arrangements for transporting waste and recyclable material to a ground floor storage facility are preferred options. If internal management arrangements make provision for collecting waste from each floor, similar provision should be made for recyclable materials, including storage. A concierge system of collecting and taking waste and recyclables down to the storage area is good practice for buildings with three floors and above. In buildings with more than four storeys, communal chutes (see BS 1703) are a recognized option but they do not lend themselves to the segregation of recyclable material, and their maintenance, e.g. repair, cleaning and unblocking, can be problematic. Chutes, if installed, should be spaced at not more than 60 m intervals, on the assumption that an occupier should not be required to carry waste a distance of more than 30 m. The main considerations for all types of facilities should be to maximize the source separation of recyclables and the ease with which people can access the containers, and to minimize the distances travelled to those containers. The local authority should be consulted.

Waste storage chambers, detached or as part of the building, should be sited within 30 m (excluding any vertical distance) from each dwelling. They should provide convenient access for the collection of the containers by the collection agent (see Clause **11** dealing with the collection of containers).

Considerable fire risks are involved when large quantities of waste or recycled materials are stored. Therefore, waste storage chambers should be situated in readily accessible positions and, where practicable, suitable precautions provided, e.g. sprinklers, fire extinguishers and smoke detection equipment (see **4.9**).

Underground waste containers used for communal buildings and public open spaces are another option that could be considered. All that is visible to the user is the container top that has a "litter bin" or other appropriate type of chute for users to place recyclables into the containers. The upper surface of the container top should be of a non-slip material. The container is fitted with bottom discharge doors and a specially equipped vehicle is often required to handle the containers.

7.3 Commercial buildings

7.3.1 *General*

A wide range of waste management systems are available to cope with the waste output from the many types and sizes of non-residential buildings and the different activities that take place within them. However, system and equipment selection will depend upon the types and quantities of the waste to be handled and the frequency of collection. Therefore, knowledge of the anticipated nature of the activities associated with a particular development is required. In such cases, guidance and advice should be sought from the body responsible for the collection of waste, which may be the local authority or a private contractor, and with the managing agent, etc. of existing buildings undertaking similar activities.

In general, those principles that apply to the selection of systems for residential buildings apply to those for non-residential buildings, but the greater quantities of waste which have to be dealt with frequently justify bulk storage, on-site processing and the utilization of one of the methods of volume reduction described in Annex A.

Waste from shops and office buildings frequently contain up to 80 % paper, and a high proportion of this can be reclaimed. Handling methods will obviously depend upon quantities to be dealt with. Waste paper contractors and some local authorities will collect small quantities loosely packed in sacks, but for large quantities, the possibility of on-site compaction or baling should be considered. Storage space for recyclable paper should be dry and vermin-proof and paper should not be stored for longer than three weeks.

The size of on-site plant for dealing with large quantities of waste can give rise to problems in confined spaces. Waste collection vehicles used for handling bulk waste storage containers require considerable headroom to allow for loading and off-loading of the containers. Where headroom is not available it might be possible to mount containers on a trolley which can be manhandled or hauled by a small electric truck to a suitable collection point.

Containers of all types should preferably be stored under cover in specially designed waste storage chambers (see Clause **8**), or stores, which should be built to the same general standard as those for domestic premises. Adequate passive ventilation is particularly important in areas where quantities of biodegradable waste accumulate; mechanical ventilation may be necessary to prevent a build up of odours (see **8.5**). Considerable fire risks are involved when large quantities of waste or recycled materials are stored. These risks can be reduced to a certain extent by baling and compaction. Stores should be situated in readily accessible positions and suitable precautions provided, e.g. sprinklers, fire extinguishers and

smoke detection equipment (see **4.9**). The smoke detector should be sited away from a heat source as vehicle exhausts could set the system off each time waste is collected or deliveries are made to the building.

Developments of the enclosed precinct type may contain a number of buildings housing many activities and the combined volume of waste generated will be high. As vehicle access to such developments is frequently limited, it is essential that suitable access for waste collection is incorporated into the design and consideration should be given to minimizing the number of visits of such collection vehicles. To this end, consideration should be given to incorporating methods of volume reduction as described in Annex A, and to restricting the number of vehicles responsible for waste collection.

7.3.2 *Hospitality businesses*

The advice given above also applies to waste from hospitality businesses, e.g. restaurants, fast food outlets, public houses, etc. However, due to the nature of this waste, being particularly high in biodegradable content, extra attention should be paid to the on-site treatment, storage and collection arrangements.

For instance, it is important to ensure that the storage area is suitably protected from vermin and animal scavenging, including birds, and that it does not cause offence to neighbours by being detrimental to their visual amenity, or through emission of offensive odours.

Most restaurants produce large amounts of recyclable waste (primarily glass bottles, 42 %, and cardboard, 11 %) and suitable provision should be made for its segregation and storage.

Waste placed out on the public highway presents a hazard when awaiting collection. Whilst existing hospitality businesses may operate in this way, this is not acceptable for new or converted developments because of storage problems. Waste should be stored in leak-proof containers, e.g. wheeled bins, and these containers should be stored within the curtilage of the premises. If the collection point is not to be the same as the storage area then the collection point should also be within the curtilage of the premises.

Although this code of practice is primarily concerned with the management of solid waste, special arrangements for the storage, collection and potential recycling of waste cooking oil should be made if needed.

7.4 Healthcare establishments and other sources of healthcare waste

Healthcare waste is generated in the community in a wide range of premises including:

— nursing homes;
— residential care homes;
— households;
— doctors' surgeries;
— dental practices;
— medical centres;
— veterinary practices;
— child-care premises;
— pharmacies;
— laboratories;
— research centres;
— first aid rooms in non-residential and industrial premises;
— tattoo parlours;
— body piercing;
— funeral parlours; and
— substance misuse clinics.

Where healthcare waste is generated in a household, the source population is considered to be generally healthy and the waste is not considered to be infectious healthcare waste. The householder can put this waste, provided it is adequately wrapped and free of excess fluid, in the domestic waste container.

NOTE Examples of this type of waste (Group E in Table 5) includes human hygiene waste such as sanitary towels, nappies, stoma bags, incontinence pads as well pregnancy test kits and condoms.

Similar types of waste are also generated from areas such as childcare centres, nurseries, schools, offices, shopping malls. Such waste should be contained in UN approved containers ready for transport off site and the local authority should be consulted to determine how separate collection of such waste is operated.

Under duty of care (see Note 1 under **4.1**), waste generated from healthcare administered in the home (see Groups B and D in Table 5) is the responsibility of the producer and the community nurse should remove that waste in an appropriate container (e.g. sharps box, see BS 7320) and dispose of it through their own waste management system.

Waste from residential and nursing homes cannot be assumed to be from a healthy population. If the waste is an infection risk then it should be treated as clinical waste and segregated and disposed of via the appropriate disposal route. Where it is not considered an infection risk then it can be treated as household waste. Large volumes of such waste should be segregated from the rest of the waste stream and the local authority consulted to determine how separate collection of such waste is operated.

The following classification in Table 5 was developed by the Health and Safety Advisory Committee (HSAC).

Table 5 — HSAC categories of clinical waste

Waste group	Type of clinical waste
Group A	Identifiable human tissue, blood, animal carcasses and tissue from veterinary centres, hospitals or laboratories. Soiled surgical dressings, swabs and other similar soiled waste. Other waste materials, for example from infectious disease cases, excluding Groups B to E.
Group B	Discarded syringe needles, cartridges, broken glass and any other contaminated disposable sharp instruments or items
Group C	Microbiological cultures and potentially infected waste from pathology departments and other clinical or research laboratories
Group D	Drugs or other pharmaceutical products
Group E	Items used to dispose of urine, faeces and other bodily secretions or excretions, which do not fall within Group A. This includes used disposable bedpans or bedpan liners, incontinence pads, stoma bags and urine containers.
Source: *Safe disposal of clinical waste* [24].	

8 Waste storage chambers

8.1 Location

Waste storage chambers should be located at vehicle access level (essential in the case of bulk containers). Basement-level waste storage should have adequate provision to move waste to the ground floor for collection, e.g. by use of a dedicated lift and a temporary designated collection point. Waste storage chambers should preferably be away from the main entrance to the building, and should be constructed such that containers can be removed directly to the outside, without passing through any part of the building served by the chamber except by way of passage. The location should be decided in conjunction with the recommendations of BS 1703, where applicable, and those of Clause **10**. Provision should be made to ensure that the location of the containers in relation to the chutes and independent hoppers is correct.

8.2 Dimensions of chamber

The overall dimensions of waste storage chambers will generally be determined by the number, size, type and use of containers to be housed and their height above floor level; the clearance necessary to permit convenient positioning, removal and replacement of the containers; and if applicable, the type of chute shutter used (all of which should conform to BS 1703). When an on-site treatment plant is installed in the chamber, sufficient space should be allowed to accommodate the plant, any associated containers and, if required, storage for filled containers awaiting collection. The number size, type and use of containers to be housed within a chamber depends upon the circumstances of each case.

A minimum clear space of 150 mm between individual containers and between containers and surrounding walls will ensure satisfactory positioning. A greater distance might be necessary for maintenance of mechanical equipment. Sufficient space for the use and servicing of containers without moving other containers should be provided. When bulk waste storage containers or compacted waste containers are

used, sufficient space for access and handling should be allowed. The shape of the chamber and the space necessary for convenient removal and replacement of containers will depend upon the manoeuvrability of the containers and the vehicles handling them.

To provide sufficient working headroom when communal containers that conform to BS EN 840 (all parts) are used, the minimum height of the chamber should be two metres. Where bulk containers are used the minimum working headroom necessary should be determined at the design stage.

8.3 Construction

The walls and roofs of the chambers should be formed of non-combustible, robust, secure and impervious material, and have a fire resistance of one hour when tested in accordance with BS 476-21. The door of the chamber should be made of steel, or have a fire resistance of 30 min when tested in accordance with BS 476-22; the door frame may be made of metal, hardwood or metal-clad softwood (for robustness), situated in the external wall and, except where the doors of the chamber communicate directly with outside air, they should be self-closing. The doorframes should be rebated into the reveals of the opening, and the doors should be provided with a lock to a pattern approved by the local authority (see **8.4**). The chamber doors should be hung in such a way that their hinges are not subject to damage by leverage if the door is allowed to swing wide. A self-closing latch would also reduce this risk. The door should be capable of being opened from the inside as well as the outside, for reasons of safety.

The walls should be constructed of, or lined with, hard impervious material with a smooth finish suitable for washing down (see **8.7**). The floor should be not less than 100 mm thick, and formed of hard impervious material with a smooth finish, and there should not be steps and projections at the entrance (see **8.7**). The junctions of the walls with the floors should be coved, and the coving so formed to prevent damage to walls by containers (see BS 1703).

8.4 Security

8.4.1 *General*

Security is becoming an increasingly high priority consideration for occupiers of residential and non-residential properties and this often extends to the facilities provided for waste storage and collection.

To address security issues, the waste storage chamber should be either external to the building that produces the waste or it should be capable of being isolated from the main building. This will ensure that access into the main building cannot be achieved through the waste storage chamber. Where the waste storage chamber forms part of a building it should preferably have two access points, i.e. an internal access point with a security lock for the waste producer and a second external point for the waste collecting agent and only one egress point (to outside not into the building).

8.4.2 *Non-electronic locking mechanisms*

There are numerous locking mechanisms on the market; however, collection agents would seek to avoid the necessity for their staff to be required to carry many different keys. The option preferred by the collection agent would be the use of a universal lock and key system, i.e. standard Fire Brigade (FB) mortise lock and key. These should be fitted to all gates, doors, etc. where access to waste storage containers for collection, is to be controlled. However, these keys are widely available and security could not therefore be regarded as watertight, but one key would fit all and this would ensure access by waste collectors at all times. It should be noted that deviating from the use of FB locks can cause operational difficulties and prior approval should be sought from the collection authority in matters relating to the collection of household waste.

8.4.3 *Electronic entry systems*

There has been a tendency to move towards electronic entry systems. If electronic security systems are incorporated into the design, they should be capable of being programmed to allow collection at a time period specified by the collection agent, or operating devices should be made available. Such systems can be problematical and, where there are site security concerns, the preferred option, as mentioned above, is that two independently secured access points to the waste storage area should be provided.

8.5 Ventilation

To vent any odorous or dense flammable gases (portable gas or aerosol containers) that may escape from the waste, permanent ventilators should be provided giving a total ventilation area of not less than 0.2 m^2. The passive ventilators, which should not be louvered doors and which may need to be fire resistant, should be fly and vermin proof and located as near the ceiling and the floor of the chamber as possible, but away from windows of dwellings.

8.6 Lighting

Electrical lighting should be provided within the chamber by means of sealed bulkhead fittings (housings rated to IP65 in BS EN 60529:1992) for the purpose of cleaning down with hoses and inevitable splashing. Luminaires should be low energy light fittings or low energy lamp bulbs should be used. Switching should be either proximity detection or on a time delay button to prevent lights being left on.

8.7 Cleansing

Arrangements should be made for cleansing of the chamber with water, providing a hose union tap, in agreement with the local water authority and the Environment Agency. Drainage should be by means of a trapped gully connected to the foul sewer. The floor of the chamber should have a suitable fall towards the drainage point. Gullies should be so positioned as not to be in the track of container trolley wheels. Rainfall or other surface water should not be allowed to flow into the chamber (see **8.3**).

9 Storage for bulky articles

Where communal waste storage chutes and waste storage chambers are installed, separate enclosed accommodation at ground level in an accessible position should be provided for the storage of large and bulky waste (furniture, fridges, etc.) or recyclable materials or both, so that the collection agent can make special collection arrangements.

10 Roads and approaches to buildings

Roads providing access to buildings should have foundations and a hardwearing surface capable of withstanding the gross vehicle weight of the waste collection vehicle. The maximum gross vehicle weight used currently is 26 tonnes; the longest vehicle type is around 11 600 mm, widest vehicle is 2 500 mm and the maximum operating height is 5 638 mm. Turning circles are important for operating collection vehicles and consideration should be given to manoeuvring requirements; the maximum turning circle currently for a collection vehicle is 20.3 m.

The local authority should be consulted with regard to the maximum vehicle dimensions and weights currently in use as these may vary from the average dimensions stated above. The layout of roads should be such as to ensure reasonable convenience for the collecting vehicle and the collectors. Roads should have a minimum width of 5 m and be arranged so that collecting vehicles can continue mainly in a forward direction. If reversing is unavoidable (e.g. cannot accommodate a 20.3 m turning circle) then the distance should not exceed 12 m. Vehicles operating in service areas should enter and leave in a forward direction. Turning places, if required, should provide for the largest vehicle likely to be used now and in the future and attention is drawn to Road Vehicles (Construction and Use) Regulations 1986 [6] that implemented Directive 97/27/EEC relating to masses and dimensions of certain categories of motor vehicles and their trailers. See Figure 3 for examples.

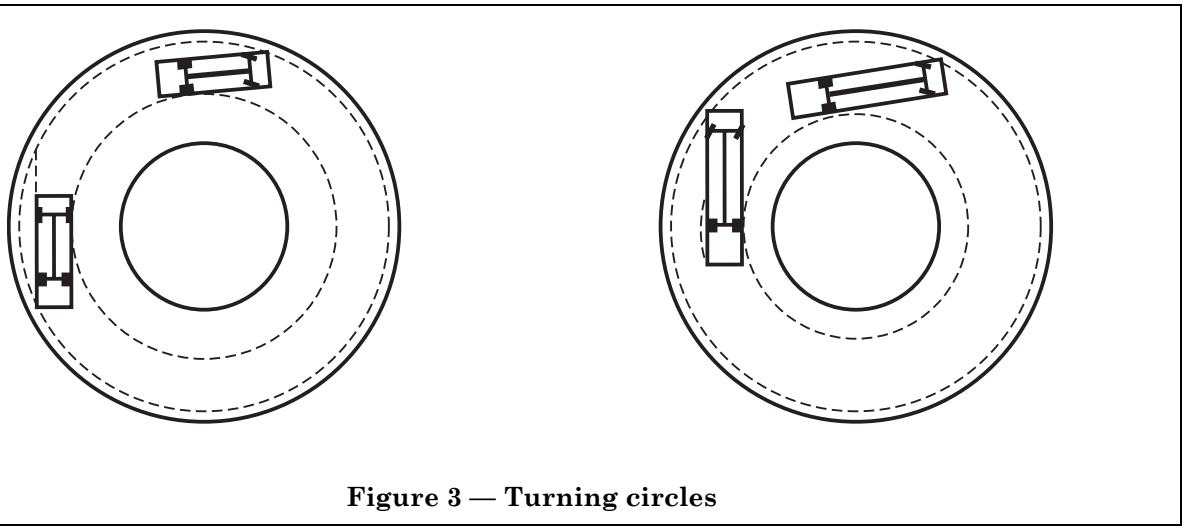

Figure 3 — Turning circles

Adequate clearance should be provided above the vehicle when it passes under canopies, building overhangs or when collection is undertaken within a building. Loading bays should have headroom appropriate to the method of waste collection, i.e. a minimum of 5 m clear headroom is required to safely load a compaction skip onto a skip vehicle.

Paths between the container chambers and collecting vehicles should be free from kerbs or steps or inclines with a gradient of more than 1:12, be non-slip and a minimum of 2 m wide. They should have foundations and a hardwearing surface that will withstand the loading imposed by wheeled containers.

All access roads should be clearly marked, signed and controlled to prevent unauthorized parking.

11 Collection of containers

The distance collectors should have to cover in respect of transporting waste containers to and from the collection vehicle should be minimized to achieve an economical service. Contents of kerbside recycling boxes should not exceed 15 kg and should comply with the Manual Handling Regulations 1992 [4] (see Figure 2). The collector should not normally be required to carry individual waste containers (Manual Handling Regulations 1992 [4] and Getting to *Grips with Manual Handling* [12]), or move two-wheeled containers, for a distance of more than 15 m, nor to manoeuvre four-wheeled waste storage containers from the storage points to collecting vehicles for a distance of more than 10 m. Where bulk containers are used, direct vehicular access to the containers is necessary. The collectors should not be required to move wheeled waste storage containers over surfaces that may hinder the smooth passage of the container. An adjacent storage area designed to not block the pavement should be provided where a large number of households use the same collection point.

12 Hygiene

12.1 General

The composition of waste is such that decomposition takes place under most climatic conditions experienced in the United Kingdom. Good housekeeping should ensure that all containers used for handling waste and chambers in which waste is stored and processed are adequately cleaned. The points considered in **12.4** are particularly important.

12.2 Chute cleaning

For information on the cleaning of chutes, refer to BS 1703.

12.3 Maintenance of hoppers

For information on the maintenance of hoppers, refer to BS 1703.

12.4 Waste containers

It is common for sludge to adhere to the inside of waste containers used for communal and non-residential purposes and frequent cleansing is essential. In all new schemes, the local authority should be consulted at the planning stage about arrangements for the frequent cleansing of waste containers. Not all authorities have the necessary plant for this work, and if the property owner is responsible for it, one or more spare containers should be installed under cover so that the work can be carried out on a rotation basis.

Annex A (informative)
On site treatment systems

A.1 Volume reduction methods

A.1.1 *Introduction*

A wide range of machines is available for on site baling, compacting, crushing and shredding of stored waste. There are also a number of options for kitchen food waste disposers.

The type and volume of wastes produced on any one site are carefully assessed in order to identify the need for volume reduction machinery and, following that, the selection of the appropriate system.

A.1.2 *Baling*

Baling is normally employed for the volume reduction and containment of segregated materials such as paper, cardboard, cans, plastics, and textiles.

Material fed into the baler is compressed at high pressure into a chamber to form bales. When the chamber is full, the bale is secured by strapping and, when removed, retains its compressed shape and volume.

Methods for handling bales are selected depending on their size and weight.

A.1.3 *Compacting*

A.1.3.1 Compactors are employed for the volume reduction of mixed dry wastes. The type and size of compactor used will depend on the amount and nature of waste arising and the available site facilities such as electrical power, installation and operating space, feed systems and container handling, storage and retrieval.

A.1.3.2 Sack/carton packers are used for the volume reduction of mixed or segregated wastes where the volume of uncompacted waste arising is of the order of 1 m^3 per day. Volume reduction is in the range 1.5:1 to 15:1 depending on the type and nature of the waste.

The compacting operation is normally along the vertical axis and feed systems may comprise a hand fed hopper or chute. The weight of the filled sacks should not be more than 25 kg to enable manual handling. Filled cartons may weigh up to 50 kg and will require mechanically assisted handling.

A.1.3.3 Portable compactors are used for the volume reduction of mixed or segregated wastes where the volume of uncompacted waste arising is of the order of 10 m^3 per day. Volume reduction is in the range 3:1 to 8:1 depending on the type and nature of the waste.

The compactor unit is permanently housed within a closed steel container equipped with lifting and tipping devices for transportation and emptying by a skip loader vehicle. The volume of the container is in the range 10 m^3 to 15 m^3. The compactor is normally fed by a chute system but hopper feeding is an option.

A portable compactor requires an electrical supply and adequate site space for placement and retrieval.

A.1.3.4 Static compactors are used for the volume reduction of mixed or segregated wastes where the volume of uncompacted waste arising is in excess of approximately 10 m^3 per day. Volume reduction is in the range 3:1 to 6:1 depending on the type and nature of the waste.

A static compactor is normally installed in a permanent or semi-permanent position and the installation will include hopper feeding or mechanical feeding by means of a bin lift or mechanical loader.

The compacting operation is normally along the horizontal axis with waste from the receiving chamber being transferred by a hydraulic ram and blade into a closed steel container attached to the compactor. The volume of the container will be in the range 10 m^3 to 30 m^3 and is equipped with a lifting device for loading, transportation and emptying by a roll-on/roll-off container-handling vehicle.

A static compactor requires a permanently connected power supply and adequate site space for installation and placement and retrieval of containers.

A.1.4 *Crusher*

Used for the volume reduction of specific wastes which shatter on impact with rotating flails or reciprocating jaws. In domestic and hospitality applications a flail crusher may be used to break glass bottles.

A crusher for domestic, pub, club and hotel use requires an electrical power source and suitable siting to enable waste to be fed via a chute.

Crushed waste is collected in a container situated underneath the crusher. Containers should be of the wheeled type and suitable for handling by a bin lift system for collection by special purpose vehicles.

A.1.5 *Food waste disposer*

Food waste disposers are easily installed and eliminate the need to store biodegradable kitchen waste on the premises; they can deal with 15 % to 20 % (by weight) of the total average output of household waste. They are a complimentary tool to methods of waste storage and collection (see BS EN 60335-2-16).

The units are designed to grind biodegradable kitchen waste in a safe, clean and efficient manner to tiny particles by the food disposer's shredding blades. When a small amount of water is run into the disposer, the remaining particles of material are easily flushed down the drain into the sewerage system or septic tank.

Food waste disposers enable segregation of waste types at source, without which recycling of different types of waste is not possible. The potential for hygienic collection and recycling of various dry recyclables such as paper, glass and metals is increased with the reduction of contamination of food waste.

A.1.6 *Shredder*

Used for volume reduction of specific wastes that are capable of being slit by rotating knife blades. Typical wastes that can be shredded are cans, plastic bottles, steel barrels, tyres, etc. In addition, confidential papers may also be shredded but not for the purpose of volume reduction.

Shredding of steel barrels, tyres and other large objects is normally carried out at purpose-built facilities, which fall outside the scope of this code of practice.

A shredder requires an electrical power source and should be sited to provide convenient and safe feeding of the waste. The shredded waste will be collected in suitably sized containers situated under the shredder, which can be removed manually.

Bibliography

Standards publications

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[24] GREAT BRITAIN. *Safe Disposal of Clinical Waste* London: Health and Safety Executive.

Further reading

Container Handling Equipment Manufacturers (CHEM) Standards[1)]:

TS1 Static compactor rating criteria

TS2 10 cubic metre compacted waste container

TS3 Container lifting lug criteria

TS4 Safety aspects relating to static compactors

TS5 15 cubic metre compacted waste container

TS6 Compaction containers for hook type units

TS7 Open top container to suit hook type units

TS8 Subframe specification for hook type units

TS9 Pinning bars and tubes for compaction containers

TS10 General arrangement of 11.5 cubic metre rear end loader container

TS11 Lifting pocket criteria for front end loader containers

TS12 Access criteria for high-sided open top containers

TS13 Subframe for small hook type units (3 to 10 tonnes gross vehicle weight)

TS14 Standard specification for skip containers

[1)] CHEM can be contacted by tel: 01452 814812, or fax: 01452 814812.

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