

FARM BUILDINGS, THEIR DESIGN AND USE

It is important for sound economic reasons that all new farm buildings and other agricultural structures should be properly designed and constructed. A quality building, though perhaps of higher initial costs, will save ongoing maintenance and perhaps even future replacement costs, and should assist in achieving greater productivity.

BS 5502 covers the design of agricultural buildings. This British standard, which is published in separate parts to meet both general and specific interests and needs, covers those buildings, which are in general agricultural usage, including livestock, crop production and storage buildings. This standard, however, does not cover dwellings, those with access by the public such as farm shops and riding schools etc., and those which are subject to certain siting conditions and which would be subject to building regulation provisions. At present this standard also excludes the design and construction of temporary farm structures.

BS 5502 was drafted through a committee, which comprised a wide range of expertise, including that of farmers, landowners, designers, contractors, regulators and with farm animal welfare and other professional guidance. The standard is subject to regular review and reflects current good practices. Indeed, feed back from current practitioners and users of this series of standards on possible improvements and suggested additions is always welcomed, as this helps the standards to be kept at the forefront of the industry's needs.

In addition to the BS 5502 series, other standards are available which would also be of use in agricultural industry operations. Detailed summaries of all these standards are given and are supported by online searching facilities and full copies of any of the standards can be purchased directly or on line.

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Agricultural buildings

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For all the above listed standards, together with agricultural equipment and machinery specifications see BSI / Technical Indexes Online Module GMB 36, Agriculture.

ABSTRACTS

AGRICULTURAL BUILDINGS AND STRUCTURES

BS 5502 Buildings and structures for agriculture

The BS 5502 series provides information and gives recommendations on the principles involved in the design and construction of buildings and structures used in agriculture. The recommendations are primarily intended to be applicable to new buildings, conversions and extensions, though they are also relevant to renovation and repairs of existing buildings

BS 5502 – 0 Introduction

Describes the structure of the separate parts of this standard and includes a consolidated index for all the parts of this group of standards.

Reference information and legislation

BS 5502 - 11 Guide to regulations and sources of information.

Identifies and describes the main regulations that apply to buildings and structures used for agricultural operations in the UK. It includes planning, building regulations, environmental and pollution control, safety and animal welfare, pest and diseases and special production premises and services. Also list sources for further information. No interpretations of the regulations are given.

General design

BS 5502 - 20 Code of practice for the general design considerations

Covers general design considerations, but excludes those aspects specifically covered by other parts of the design series, namely materials (Part 21), structural design (Part 22), fire precautions (Part 23) and services (Part 25).

It outlines the general design objectives in relation to statutory requirements, and makes recommendations regarding siting of the building in the context of climatic exposure, atmospheric corrosion and its built and landscape surroundings. Specifically covers visual aspects of the building, including features and form and external colours. Gives recommendations on preferred building sizes.

This part also describes internal environmental requirements, including levels of natural and artificial lighting, heating, ventilation and infiltration, sound insulation, energy conservation and thermal insulation. The need for good workmanship, ease of maintenance and safety and hazard warning notices are also given.

BS 5502 – 21 Code of practice for the selection and use of construction materials

Covers the selection, performance and use of materials commonly used in agricultural situations according to the buildings design classification in relation to their durability, effects of corrosion, and specifically in relation to liquid fertilizers and farm effluents, and gives information on their preservative treatments.

Specifically covers timber, plywood, fibre building boards, fibre reinforced cement products, aluminium, steel, glazing, concrete and mixes, and masonry for use, as appropriate, for purlins and rails, cladding and ventilated cladding. Recommendations for their fixings are also given.

BS 5502 – 22 Code of practice for design, construction and loading

This part of BS 5502, uses design principles and the loading factors given in existing British standard structural design codes for buildings. It classifies agricultural buildings into four design groups based on minimum design life, maximum normal human habitation and distance to a classified highway or to human habitation.

Note. The existing structural design codes will remain current over the next few years as new Eurocodes, which will eventually replace the existing standards, are gradually phased in. The Eurocodes describe design principles common for all European building design practices. When the Eurocodes are complete it is envisage that a transition period of at least 5 years will be allowed before the existing national design codes are phased out. Although the design principles given in the Eurocodes are not dissimilar to those in current use in the UK, there are some differences and it is not normally possible to mix the design approaches

given in existing national design codes with those given in the new Eurocodes. The new European standard for greenhouses (BS EN 13031) is based on Eurocode principles.

The standard covers preparation of the site, service life, foundations and other works below ground and above foundations, protection of floors, walls, piers and columns, roofs and balustrades and safety rails.

Recommends characteristic loads, dead and imposed loads, and gives information about loads from stored materials, services, impact and dynamic loads. Also provides information on wind loads and other imposed roof loads, floor loads for livestock and for storage and for bedding materials, and vehicle loading, and loads for walls, suspended crops, balustrades and rails, and purlins.

Also recommends partial load factors for the structural use of timber, steelwork, concrete and masonry for frames, purlins and claddings by reference to the existing national structural design codes.

Special structures are also covered by other parts of BS 5502 and for greenhouses by BS EN 13031-1.

BS 5502 – 23 Code of practice for fire precautions

Describes fire hazard and covers access requirements for fire fighting, siting of buildings, emergency escape for livestock and the need for smoke venting. It also makes recommendations on design aspects for the passive fire protection by components and elements of construction and for internal surfaces of single storey agricultural buildings exempted under the Building Regulations. Specific requirements for livestock housing, hay and straw storage and workplaces are described. The use of active fire protection systems for fire detection, alarm and extinguishing systems are also covered.

This standard is not applicable to those buildings used for the storage of explosives or commercial quantities of chemicals.

BS 5502 – 25 Code of practice for the design and installation of services and facilities

This part of BS 5502 gives recommendations for the design and installation of services and facilities, including;

provisions for drainage of surface water, human waste and that arising from the agricultural and horticultural trade, including the importance of containing wastes to avoid pollution.

water supply systems for agricultural and fire fighting uses, as well as their storage systems and tanks.

the siting, construction of liquid fuel storage, gas and liquefied petroleum gases, and compressed air services.

the design and operating conditions for electrical services and their installation. Precautions to be taken during to meet special conditions, including use in oil tank chambers, the use of safety controls and their power distribution systems and emergency supplies. Advice includes information on electrical fence controllers.

the siting, design of chimney and flue systems for boiler and incinerator buildings and for specifically for heating appliances and particularly those used in livestock buildings.

Environmental aspects

BS 5502 – 30 Code of practice for control of infestation

Gives guidance on the precautions required to protect agricultural buildings from infestation and damage. It considers the type of damage that can be caused by birds, insects, rodents, and other mammals and outlines design considerations to minimize attack. Specific information is given for poultry buildings, fish farms, dairy units and slurry stores.

BS 5502 – 31 Guide to the storage and handling of waste.

Gives recommendations on structural aspects of agricultural and horticultural waste storage and its handling.

It specifically covers the prevention of air (odour) and water pollution that can be caused by liquid effluent such as livestock slurry, silage effluent, dirty water and milk. It describes the characteristics of different types of agricultural waste, by biochemical oxygen demand, dry matter content, acidity, fertilizer value and the disposal of different waste materials including solid manure and carcasses.

Design criteria for waste storage facilities, including lagoons, built dirty water and manure stores. Silos and silage storage, quantities of waste produced and of cleaning water required are given.

Regulatory, duty of care and health and safety advice is included.

Information on channels and reception pits is given in BS 5502 – 50.

BS 5502- 32 Guide to noise attenuation

Advice is given on ways in which noise pollution, which can arise as a part of normal agricultural processes can be reduced by introducing certain design aspects in the building. Advises on levels of noise that can arise, the effects of this noise on humans and livestock and describes ways of controlling it.

BS 5502- 33 Guide to the control of odour pollution

Gives guidance on those farming operations which occur during normal use of agricultural buildings and give rise to odour pollution, and which can be mitigated against by good design processes. Describes the possible causes of odour pollution, its control by siting, arising from land spreading, animal husbandry, animal feed production, and storage of waste and suggests ways of controlling odour pollution by siting and pre-treatment

Livestock buildings

BS 5502 – 40 Design and construction of cattle buildings

Describes the design of buildings used for the housing of cattle, specifically for cows, beef cattle, bulls, young stock and calves. It excludes provisions for milking premises, which are covered separately in Part 49.

It covers animal welfare considerations, occupancy levels and makes recommendations for solid, slated, perforated and wire mesh floors, walls and roofs. Environmental considerations are explained, including climate, gas concentrations and ventilation requirements, levels of lighting, together with the provision of electricity and drainage services and storage, feeding and drinking arrangements. The standard details dimensions and space allowances for cattle, including those for bedding, loafing, feeding areas and cubicles.

Recommendations are also given for suckler and ancillary accommodation for calving pens and yards, isolation pens, cattle handling, bull pens, and bull beef buildings. Also advises on chemical and medicine storage, safety signs and notices.

BS 5502-41 Design and construction of sheep buildings and pens

Gives recommendations for the design and construction of buildings and pens for the housing of sheep.

It covers animal welfare considerations, design and construction of floors, walls and roofs, suitable floor areas and provision of feeding and drinking arrangements, including recommended drinking trough lengths. Includes provision of services, electricity, water supply and drainage, carcass and membrane disposal. It also advises on handling, fences and gates, chemical and medicine storage and safety signs and notices.

BS 5502-42 Design and construction of pig buildings

Covers the design and construction of buildings for the housing of pigs and specifically the housing of sows and sows with litters and covers animal welfare considerations, design and construction of floors, walls and roofs, suitable floor areas, gas concentrations and ventilation and insulation requirements and lighting. Provision of feeding and drinking arrangements, services, electricity, water supply and drainage requirements are also covered.

Ancillary accommodation specifically covers, farrowing accommodation, boar and service pens, and isolation and quarantine pens, safety signs and notices.

BS 5502-43 Design and construction of poultry buildings

Gives recommendations for buildings used for poultry and specifically for rearing and housing turkeys, ducks, broiler and laying hens, and covers animal welfare considerations, design and construction of floors, walls and roofs, depopulation facilities, suitable floor areas, temperature and humidity levels, ventilation and lighting. Provision of feeding and drinking arrangements, services, electricity, water supply and drainage requirements are also covered.

Advice on ancillary accommodation, storage of chemicals and medicines, safety signs and notices are also included.

BS 5502-49 Design and construction of milking premises

Identifies regulatory and licensing requirements and animal welfare requirements for milking parlours and rooms. Detailed design and construction requirements are given for siting and

access, and for floors, walls, roofs and ceilings. Recommends dimensions and space, provision of services, fittings and equipment, ancillary and storage facilities.

Also advises on dimensions, paving and walls for collecting and dispersals yards associated with milking parlours, the exclusion of vermin and warning and safety signs.

BS 5502-50 Design, construction and use of storage tanks and reception pits for livestock slurry

Covers the siting, odour and pollution control and other factors, sizes, and slurry and wind loads, for storage tanks and reception pits. Also recommends on structural design aspects, specifically on slurry and loads, below ground pressures and surcharges. Advice is given for cylindrical steel plate tanks and concrete stave tanks, materials used for their construction, corrosion problems, and for joints, sealing and waterproofing.

Safety aspects, relative to guarding, access, safety and warning signs and details of supporting operational and maintenance information are given.

Note: Should be read in conjunction with BS 5502 Part 22, BS 8007 and ADAS Guides CGN 001 – 006, 10 and 11.

BS 5502-51 Design and construction of slatted, perforated and mesh floors for livestock

Details are given for the design and construction of slatted, perforated and mesh floors for the housing of cattle, pigs and sheep, so as to provide self cleaning by allowing animal waste to pass through the voids. The recommendations given on welfare, materials general design and installation are applicable to other types of livestock providing that additional consideration is given to the particular needs of the livestock being housed. These recommendations are not applicable to poultry.

Covers materials, such as reinforced and prestressed concrete, metals, plastics, timber and composite constructions, and recommends geometry and tolerances, design and other construction aspects.

Crop buildings

BS 5502-60 Design and construction of buildings for mushrooms.

Covers the design and construction of foundations, floors, walls and roofs of compost yards and production buildings used for the cultivation of mushrooms. The recommendations specifically include the use of film plastics clad structures, insulation, vapour checks, heating, refrigeration and ventilation requirements and supporting electrical, lighting, water and drainage services. Hygiene, welfare, safety aspects and control of infestation are also covered.

BS 5502-65 Design and construction of crop processing buildings.

Recommendations are given for the design and construction of buildings used for the processing and packaging of horticultural produce. Covers siting, space requirements, and the design of floors, walls, ceilings and roofs and doors, windows, access and walkways.

Provides advice on lighting, electrical installation, thermal insulation, temperature, ventilation, water and drainage and the control of infestation. Advice is also given on staff facilities.

BS 5502-66 Design and construction of chitting houses.

Recommendations are given for the design and construction of building used for chitting potatoes and covers naturally lit stores, stores with artificial lights and refrigerated stores. Provides information on the design of floors, wall and roof cladding, insulation, layout and dimensions, as well as on lighting, temperature and ventilation, and supporting electrical services. Includes information on safety and welfare.

BS 5502-70 Design and construction of ventilated on-floor stores for combinable crops.

NOTE: See BS 5502-74 for bin and silo storage.

Describes general requirements, siting and design recommendations and materials for different types of floors, walls, roofs and upper wall cladding, doors, ventilation ducts and exhaust vents, elevator pits grain conveyors, air ducts, fan housings access and walkways used in floor stores.

Also covers store geometry and layout, and gives information on bulk densities and angle of repose for different crops and angles for crop flows. Describes typical storage periods, maximum temperatures for drying grain and storage grass seed and wheat.

Advises on methods of drying, storage and conditioning and gives recommendations on electrical services, lighting, water supply and drainage and the control of infestation health and storage in of bulk and hygiene.

BS 5502-71 Design and construction of ventilated stores for potatoes and onions.

Covers the design of buildings used for bulk storage and storage in boxes of potatoes and onions using forced ventilation and/or refrigeration.

Makes recommendations for design and materials of floors, walls, roofs and upper wall cladding, doors, air ducts, fan housings, access and walkways. Gives specific guidance on thermal insulation requirements. Covers store geometry bulk densities for potatoes and onions, store environment, ventilation air speeds, relative humidity, and heat output from the crops. Electrical, water supply and drainage services are also covered and well as health and safety aspects.

BS 5502-72 Design and construction of controlled environment stores for vegetables, fruit and flowers.

Covers storage conditions, including temperature, humidity and atmospheric conditions. Advises on floor, wall, ceilings, doors and their thermal insulation requirements. Sealing requirements for controlled atmosphere stores, store geometry, typical storage volumes for various crops for box pallets and bulk storage. Describes environment, temperature, heat production and respiration in air, gives recommends storage conditions and cooling times for crops. Indicates humidity and atmospheric requirements, and guidance on types of equipment that can be used. Provides information on electrical, lighting, water supply and drainage services as well as safety and welfare aspects.

BS 5502-74 Design and construction of bins and silos for combinable crops.

NOTE: BS 5061 covers tower silos used for the conservation of grasses as silage.

Describes design aspects for floors, walls, roof and wall cladding and doors. Covers reception pits, elevator pits, grain conveying, ventilation ducts, fan housing, access and walkways. Advises on store geometry, layout, bulk densities and moisture content for stored crops, angle of repose, and slopes for crop flows. Recommended storage periods are given for grain, wheat and barley together with maximum drying temperatures and ventilation rates for grass seed and wheat. Advises on methods of drying, storage, conditioning and chilled storage of grain.

Information is given on electrical, lighting, water supply and drainage as well as safety and welfare aspects.

Also see BS 7885 (Code of practice for the safe entry into silos), which gives recommendations on operations prior to entry into a silo, bunker, bin or hopper, safety and access equipment for use therein, means of access and safety precautions when working in and affecting rescue from a silo bunker, bin or hopper.

BS 5502-75 Design and construction of forage stores.

NOTE: Excludes forage tower silos which are covered by BS 5061.

Gives design recommendations for different of storage, giving provisions siting and sizing, general design aspects, materials, floors, wall, roofs. Information is given on electrical, lighting, water supply and drainage as well as safety and welfare aspects.

Ancillary buildings

BS 5502-80 Design and construction of workshops, maintenance and inspection facilities.

Makes recommendations for the siting, access and geometry of working areas used for the purposes of repair, maintenance and inspection of machinery. Recommends minimum sizes and heights of floors, walls and roofs, and covers ventilation, heating, lighting and installation of other services.

Also advises on inspection pits, working platforms, stairways, ladders and catwalks, doorways and balustrades, protection for pits tanks and machinery for health and safety aspects. Gives anthropometric dimensional data.

BS 5502-81 Design and construction of chemical stores

Gives recommendations on the siting, construction, ventilation, insulation, heating, lighting aspects of chemical stores for agricultural and horticultural purposes. Also covers access routes, associated wash rooms, shelving small stores, associated services, fire precautions and security, and other safety aspects.

BS 5502- 82 Design of amenity buildings

Draws attention to statutory requirements, siting, sanitary facilities, associated services, environmental aspects and warning and safety signs.

Greenhouses and related structures

BS EN 13031-1 Greenhouses. Design and construction. Commercial production buildings

NOTE: The recommendations given in this code of practice are aligned with the Eurocodes (new structural European design codes). Additional parts of this design standard are under consideration.

This code describes rules for the structural design and construction of greenhouse structures for the professional production of plants or crops and where human occupancy is restricted to low levels of authorized personnel. It covers general design aspects, structural actions on greenhouses, displacements and deflections, serviceability limit states, ultimate limit state, tolerances, durability, maintenance and repair.

BS EN 13206 Covering thermoplastic films for use in agriculture and horticulture

Specifies the requirements for transparent and diffusing plastics films based on polyethylene and/ or ethylene copolymers which are used as covers for permanent and temporary greenhouses for forcing and semi-forcing vegetables, fruit and flower crops.

BS EN 13207 Silage - plastics films

Specifies the basic requirements for polyethylene and /or ethylene copolymer films used during the generation of silage and designed to last at least one year for protecting fodder. The films are usually black, white or bicoloured (double faced, black and white).

Tower silos

BS 5061 Specification for cylindrical forage tower silos and recommendations for their use.

Basic data for the design of cylindrical tower silos of all sizes with over 3m effective depth of storage, and used for the conservation of grasses as silage under UK farming conditions. Additional considerations need to be given when grasses contain additives, admixtures or other herbage.

Describes dimensions foundations, anchorage and siting, loading, design and materials construction and access equipment.

See also BS 7885 'Code of practice for the safe entry into silos'.

Water retaining structures

BS 8007 Design of concrete structures form retaining aqueous liquids

Covers the design of normal reinforced and pre-stressed concrete structures for the containment or exclusion of non aggressive aqueous liquids. The types of structure covered include tanks, reservoirs, and other vessels, but excludes dams, pipes, pipelines and lined structures. Describes the design objectives and detailing based on limit state principles, in line with the design recommendations given in BS 8100, materials, workmanship, inspection and testing of the structure.

BS EN 13251 Geotextiles and geotextile-related products. Characteristics required for use in earthworks, foundations and retaining structures

Specifies the relevant characteristics of geotextiles and related products for use in earthworks, foundations and retaining structures to fulfil filtration, reinforcement and/or protection uses. The standard allows manufacturers to describe products on the basis of declared values for specific characteristics, and for designers and end-users to define which functions and conditions of use are relevant according to the intended use.

This standard is not applicable to geomembranes.

BS EN 13265 Geotextiles and geotextile-related products. Characteristics required for use in liquid waste containment projects

Specifies the relevant characteristics of geotextiles and related products for use in liquid waste containment projects to fulfil filtration, reinforcement and/or protection uses. The standard allows manufacturers to describe products on the basis of declared values for characteristics, and for designers and end-users to define which functions and conditions of use are relevant according to the intended use.

This standard does not specify geomembranes which will be covered by BS EN 13492 and which is in preparation.

CATTLE GRIDS

BS 4008 Specification for cattle grids

Covers the requirements for cattle grids suitable for the containment of stock whilst permitting the passage of pneumatic tyred vehicles. Covers grids suitable for the containment of cattle, sheep, deer, goats and pigs and in certain circumstances horses. Also gives advice on animal welfare and small animal escape ramps, and gives recommendations on the use, location, design, construction and maintenance of cattle grids.

See also provisional draft pr EN 12737

FENCES AND GATES

BS 1722 Fences

This series of standards cover fences of different types and constructed of different materials, together with their installation fittings and fixtures, methods of construction and construction;

- BS 1722-1 Chain link fences
- BS 1722-2 Strained wire and wire mesh netting fences
- BS 1722-4 Cleft chestnut pale fences
- BS 1722-5 Close-boarded and wooden palisade fences
- BS 1722-7 Wooden post and rail fences
- BS 1722-8 Mild steel (low carbon steel) continuous bar fences and hurdles
- BS 1722 –9 Mild steel (low carbon steel) fences with round or square verticals and flat horizontals

BS 1722-10 Anti-intruder fences in chain link and welded mesh
BS 1722-11 Prefabricated wood panel fences
BS 1722-12 Steel palisade fences
BS 1922-13 Chain link fences for tennis court surrounds
BS 1722-14 Open mesh steel panel fences

BS 3470 Field gates and posts

Specifies requirements for timber field gates, their construction and sizes, and for timber and concrete posts and their fittings. Also specifies requirements for steel field gates, cattle yard gates and posts including their fittings. However due to the different designs of steel gates available, it is not practicable to specify the position of fixing holes in their posts for hinges and their keeps.

BS 5709 Gaps, gates and stiles.

Describes field measurable performance requirements for gaps, gates and stiles for footpaths and bridle-ways. Takes account of the needs of the less able bodied and persons with disabilities to access the countryside in the context the actual agricultural needs of the landowners, for example to be adequately stock proof.

BS EN 61011 Electrical fence energizers

BS EN 61011 Safety requirements for mains-operated electric fence energizers.

BS EN 61011-1 Safety requirements for battery-operated electric fence energizers suitable for connection to the mains supply.

BS EN 61011-2 Safety requirements for battery-operated electric fence energizers not for connection to the mains supply.

FIELD DRAINAGE

BS 1196 Specification for field drain pipes and junctions

BS 4962 Specification for plastics pipes and fittings for use as subsoil field drains

BS EN 13252 Geotextiles and geotextile related products. Characteristics required for use in drainage systems

WATER TROUGHS

BS 3445-1 Agricultural water troughs and water fittings- Specification for water trough bodies, service boxes and water supply system

Describes the requirements for the bodies of agricultural water troughs for holding drinking water for livestock and for the associated water pipes and fittings and surface boxes. Covers, trough bodies of any suitable shape and of capacity between 60 L and 3000 L made from concrete, galvanized steel, spray moulded glass reinforced and polyethylene.

BS 3445-2 Agricultural water troughs and water fittings- Code of practice for installation and operation

Makes recommendations for the siting, installation of water trough bodies, service boxes and water supply systems used for drinking water for livestock. Particular attention is given to protection of water supply and giving recommendations for the installer and operator in relation to water byelaw requirements.

OTHER STANDARDS RELATED TO AGRICULTURE

Livestock

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| PAS 44 | Official identification ear tags for cattle, specification |
| BS EN 60335-2-71 | Specification for safety of household and similar electrical appliances. Particular requirements. Electrical heating appliances for the breeding and rearing animals |

Management

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| BS 6736 | Code of practice for hand signalling used in the agricultural operations |
| BS 7885 | Code of practice for the safe entry into silos |
| BS 10175 | Investigation of potentially contaminated sites, code of practice |
| PAS 85 | A quality management system to ensure the integrity and traceability of primary products in the agricultural food chain. |
| PD ISO/TR 1406 | Information to assist forestry organizations in the use of environmental management systems standards BS 1488 BS ISO 14001 and BS ISO 14004 |

Milking equipment

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| BS 5226 | Code of practice for equipment and procedures for the cleaning and disinfecting of milking machine installations |
| BS 5305 | Code of practice for cleaning and disinfecting of plant and equipment used in the dairying industry |
| BS ISO 3918 | Milking machine installations. Vocabulary |
| BS ISO 5707 | Milking machine installations. Construction and performance |

Nursery stock

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| BS 3936-1 | Nursery stock - Specification for trees and shrubs |
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BS 3936-2	Nursery stock - Specification for roses
BS 3936-3	Nursery stock - Specification for fruit plants
BS 3936-4	Nursery stock - Specification for forest trees
BS 3936-5	Nursery stock - Specification for poplars and willows
BS 3936-7	Nursery stock - Specification for bedding plants
BS 3936-9	Nursery stock - Specification for bulbs, corms and tubers
BS 3936-10	Nursery stock - Specification for ground cover plants
BS 3936-11	Nursery stock - Specification for container-grown culinary herbs

Sludges

PD CR 13097	Characterization of sludges, good practice for the utilization in agriculture
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Soil improvers

PD CR 13455	Soil improvers and growing media, guidelines for the safety of users, the environment and plants.
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Tree work

BS 3998	Recommendations for tree work
BS5837	Guide for trees in relation to construction.

Turf

BS 3969	Recommendations for turf for general purposes
BS EN 12484-1	Irrigation techniques. Automatic turf irrigation systems- Definition of the programme of equipment by the owner
BS EN 12484-2	Irrigation techniques. Automatic turf irrigation systems- Design and definition of typical technical templates
BS EN 12484-3	Irrigation techniques. Automatic turf irrigation systems- Automatic control and system management
BS EN 12734	Irrigation techniques. Quick coupling pipes for moveable irrigation supply. Technical characteristics and testing