

PAS 1899:2022

Electric vehicles – Accessible charging – Specification



Office for
Zero Emission
Vehicles



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Contents

Foreword	iii
0 Introduction.....	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	3
4 General requirements.....	6
5 Physical chargepoint design.....	8
6 Chargepoint placement.....	18
7 Streetscape and public realm around the chargepoint.....	24
8 Digital platforms and information provision for chargepoints.....	28
Annexes	
Annex A (informative)	
Establishing an inclusive and safe environment around public chargepoints.....	31
Annex B (informative)	
Designated accessible parking bays – off-street chargepoints.....	34
Annex C (informative)	
Designated accessible parking bays – on-street chargepoints	41
Annex D (normative)	
Wireless/inductive chargepoints.....	47
Annex E (informative)	
Checklists for requirements and good practice guidance for accessible public chargepoints	48
Annex F (informative)	
Determining forces required for charging cable manoeuvrability	65
Bibliography	68

List of figures

Figure 1 – Roles and responsibilities for PAS 1899	viii
Figure 2 – Navigating the structure of PAS 1899	ix
Figure 3 – “Concentric” model for requirements within PAS 1899:2022	6
Figure 4 – Chargepoint component heights: Socket-outlet and holster heights	10
Figure 5 – Chargepoint component heights: Screen/visual interface and payment terminal heights	10
Figure 6 – Space around chargepoint and position of impact protection barriers.....	19
Figure 7 – Space around chargepoint and position of bollards	22
Figure B.1 – Additional space allowance surrounding off-street designated accessible parking bays with public chargepoints	36
Figure B.2 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – placement of wheel stops	37
Figure C.1 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints.....	43
Figure C.2 – Additional space allowance surrounding on-street kerbside designated accessible parking bays with public chargepoints with angled footway access area	44
Figure C.3 – Additional space allowance surrounding designated accessible parking bays with public chargepoints – angled parking bays (off- and on-street)	45
Figure F.1 – Linear forces required to operate a public chargepoint	66

List of tables

Table 1 – Chargepoint scenarios for PAS 1899	ix
Table 2 – Height range requirements for chargepoint components	9
Table E.1 – Checklist: Core standard for minimum requirements for accessibility for all public chargepoints	48
Table E.2 – Checklist: Supplementary good practice accessibility guidance for all public chargepoints.....	56
Table E.3 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to off-street designated accessible parking bays	58
Table E.4 – Checklist: Good practice accessibility guidance for chargepoints installed adjacent to on-street designated accessible parking bays	62

Foreword

This Publicly Available Specification (PAS) was sponsored by the charity Motability and the Office for Zero Emission Vehicles (OZEV). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 October 2022.

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- AccessAble
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- Easee
- Electric Vehicle Association (EVA) England
- Gemserv
- GHD
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- Motability
- National Highways
- NI Civil Service
- Office for Zero Emission Vehicles (OZEV)
- Pod-point
- R-E-A (Renewable Energy Association)
- Scope
- Transport Scotland
- Transport for Wales
- UK Charity, Designability
- UK Power Networks
- Zap-Map

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Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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Compliance with a PAS cannot confer immunity from legal obligations.

In particular, attention is drawn to the following specific regulations:

- Equality Act 2010 [1];
- Building Regulations 2010 and subsequent amendments [2];
- Building (Amendment) (Wales) Regulations 2014 [3];
- Building (Scotland) Regulations 2004 and subsequent amendments [4];
- Building Regulations (Northern Ireland) 2012 and subsequent amendments [5];
- Traffic Signs Regulations and General Directions 2002 [6].

NOTE Attention is also drawn to Article 9 in the UN Convention on the Rights of Persons with Disabilities [7], which states that appropriate measures should be taken to ensure that disabled people have access on an equal basis with others to the physical environment, transportation, information and communications, and to enable them to live independently and participate fully in all aspects of life.

0 Introduction

0.1 Context for PAS 1899

Government policy and intervention is leading to an increase in uptake of electric vehicles, which necessitates a significant network of commercially viable public electric vehicle chargepoints across the UK. With an estimated 14 million disabled people in the UK and 2.7 million predicted disabled drivers and/or passengers in ten years' time¹⁾ [8], with this figure expected to grow further, it is essential that chargepoint deployment aligns with government policy, strategy and guidance including "Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure"²⁾ [N1], "The Inclusive Transport Strategy: Achieving Equal Access for Disabled People", and "Taking charge: the electric vehicle infrastructure strategy"³⁾. Alignment with these policies and strategies will mean that all chargepoints are inclusive and accessible and can be used by all consumers, designed to relevant standards.

The policy direction for road transport has been set by UK Government with a phase out on sales of new petrol and diesel cars and vans set for 2030. UK Government is committed to making the UK's transition to zero emission road transport inclusive for all, and policy developments focused on improving the consumer experience of using public chargepoints⁴⁾ [9] and setting accessibility standards for public chargepoints⁵⁾ [10] are contributing to this vision.

There is a growing suite of research focused on ensuring accessibility of chargepoints for disabled people. Major market and industry players, charities, research institutions, public sector bodies and distribution network operators, amongst others, have undertaken research efforts that highlight the additional barriers faced by disabled people in their use of chargepoints. The resolution of these barriers can also contribute to accessibility and inclusivity for other groups of consumers, including older people, and ensure that the requirements of a diverse range of disabled people are considered⁶⁾.

NOTE 1 "Accessibility" is considered in relation to users, drivers and passengers, and others nearby, and in relation to disabled people, people of other protected characteristic groups, and including, older people and those with children, thereby making chargepoints inclusively designed for a general population as well as for disabled drivers.

¹⁾ Motability & Ricardo (2020), *Electric Vehicle charging infrastructure for people living with disabilities*. Available from <https://www.motability.org.uk/media/nghmmyu0/electric_vehicle_charging_infrastructure_for_people_living_with_disabilities_ricardo_energy_and_environment.pdf>.

²⁾ Department for Transport (2022), *Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*. Available from <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044542/inclusive-mobility-a-guide-to-best-practice-on-access-to-pedestrian-and-transport-infrastructure.pdf>.

³⁾ HM Government (2022), *Taking charge: the electric vehicle infrastructure strategy*. Available from <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf>.

⁴⁾ OZEV (2021), *Consumer Experience at Public Chargepoints: Government Response to the 2021 Consultation on the Consumer Experience at Public Chargepoints*. Available from <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1066972/government-response-to-the-2021-consultation-on-consumer-experience-at-public-chargepoints.pdf>.

⁵⁾ OZEV (2021), *Future of transport regulatory review: zero emission vehicles*. Available from <<https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-zero-emission-vehicles/future-of-transport-regulatory-review-zero-emission-vehicles>>.

⁶⁾ It is against the law to discriminate against anyone because of "protected characteristics", which are age, gender reassignment, being married or in a civil partnership, being pregnant or on maternity leave, disability, race including colour, nationality, ethnic or national origin, religion or belief, sex, and sexual orientation [1].

The UK Government's policy developments, combined with this suite of research, have highlighted strong industry appetite to understand and address accessibility of public chargepoints. Whilst a majority of current electric vehicle charging occurs in private locations such as households with off-street parking, research has shown that up to half of disabled people in the UK will be partially or wholly reliant on public charging by 2035⁷⁾. This highlights a clear need to define what accessible charging comprises, and how to implement accessibility in consideration of public chargepoints.

There is notable European and international interest in addressing accessibility of chargepoints. Prior research commissioned by Motability identified an absence of common standards that address disabled people's access when designing and installing chargepoints. Subsequently, there is growing appetite from European and international bodies to implement such standards and to ensure zero emission transport is inclusive for all.

Importantly, research undertaken in the fields of accessibility and electric vehicle charging has indicated an increased willingness of disabled people to transition to electric vehicles if charging was more accessible⁸⁾. There is an opportunity to ensure that accessibility is embedded in public chargepoints during design and installation, avoiding a need to reposition, reconfigure or remove chargepoints that are not accessible to all users, thereby contributing to improving the commercial case for public chargepoints by avoiding the cost of retrofitting.

The intention of this PAS is to provide requirements and recommendations to any party involved in procuring and providing public chargepoints, including installers and manufacturers of public chargepoints, local authority planners, highways authorities, chargepoint providers, chargepoint location landowners, chargepoint owners and others who will be responsible for the locally built environment for any publicly available chargepoint in the UK. The PAS delivers on the UK Government's commitment to develop new standards for accessible public chargepoints.

The PAS sets out the minimum specification for an accessible public chargepoint, providing a new standard to ensure this infrastructure is accessible to users. In addition, the PAS provides best practice guidance for the provision of accessible chargepoints specifically adjacent to designated accessible parking bays. This approach supports the objective that all electric vehicle chargepoints meet certain minimum requirements for accessibility, regardless of whether the parking bay to which it is attached is a standard or designated accessible parking bay, whilst also ensuring that for those who require designated accessible parking, chargepoints installed in those designated accessible parking bays also meet their needs.

The provision of clear standards on how to install more inclusively designed chargepoints is expected to improve the experiences of disabled people using public chargepoints, and can increase public engagement and confidence in the future of electric vehicle charging. The implementation of these standards in combination with the best practice guidance provided in the UK Government's "Inclusive Mobility" [N1] has the potential to have additional benefits for others in the public realm, such as pedestrians and cyclists, by maintaining accessibility in surrounding areas.

NOTE 2 *This PAS is applicable to all public chargepoints, with a definition for public chargepoints provided in 0.2.6; however, in consideration of key differences in types of public chargepoints, some clauses are only applicable to specific types of chargepoints, and annexes provide supplementary best practice guidance for accessibility for all public chargepoints, and best practice guidance for chargepoints installed specifically adjacent to designated accessible parking bays.*

NOTE 3 *UK Government has announced its intention to introduce consumer experience regulations in response to known issues experienced by users of electric vehicle chargepoints [9]. The regulations announced by UK Government address five key areas of market failure:*

- *Minimum payment method: consumers should be able to charge their vehicle and pay with ease, using a payment method that is not specific to a brand and does not require a payee's mobile or internet signal.*

⁷⁾ Motability & Ricardo (2020), *Electric Vehicle charging infrastructure for people living with disabilities*. Available from <https://www.motability.org.uk/media/ngmmyu0/electric_vehicle_charging_infrastructure_for_people_living_with_disabilities_ricardo_energy_and_environment.pdf>.

⁸⁾ <<https://www.ridc.org.uk/transport/inaccessible-charging-barrier-electric-disabled-and-older-drivers>>.

- *Payment roaming: consumers should be able to access and pay at all public chargepoints easily with membership cards or smartphone apps enabling payment roaming.*
- *Open data: all drivers should be able to locate available and working chargepoints that suit their needs easily when they need to charge their vehicle, with openly available static and dynamic (i.e. data types that are subject to change on a regular basis such as whether the chargepoint is in use or available) data.*
- *Pricing transparency: consumers should be able to understand and compare pricing offers across the UK charging network, using a pence per kWh metric which is clearly displayed in advance of charging.*
- *Reliability: consumers should feel confident that the UK charging network is reliable and easy to use, with a 99% reliable charging network and with a free 24/7 helpline when consumers experience issues.*
- *The requirements within this PAS align with the announced consumer experience regulations. The consumer experience regulations are referenced where relevant throughout this PAS.*

0.2 Instructions for using PAS 1899

0.2.1 General

The chargepoint landscape is inherently complex due to the range of different bodies involved in the provision and installation of public chargepoints, along with the different types and locations of public chargepoints. There is also an inherently complex range of existing guidance and standards related to the provision of public chargepoints. All requirements within this PAS have been developed using an inclusive design approach, the principles of which design for all people with different accessibility requirements including those with permanent and temporary impairments. Clause 4 provides instructions for interpreting and navigating PAS 1899; users of this PAS will also need to cross-refer to existing guidance, which has been noted in this PAS where relevant.

0.2.2 Roles and responsibilities

The provision, installation and operation of public chargepoints inherently involves many different bodies, including but not limited to:

- chargepoint designers, manufacturers and installers;
- local authority or city planners and infrastructure planners;
- chargepoint location landowners and others who are responsible for the local built environment;
- chargepoint owners;
- urban design professionals;
- distribution network operators;
- highways authorities;
- chargepoint operators; and
- end users, including both private and professional/commercial drivers.

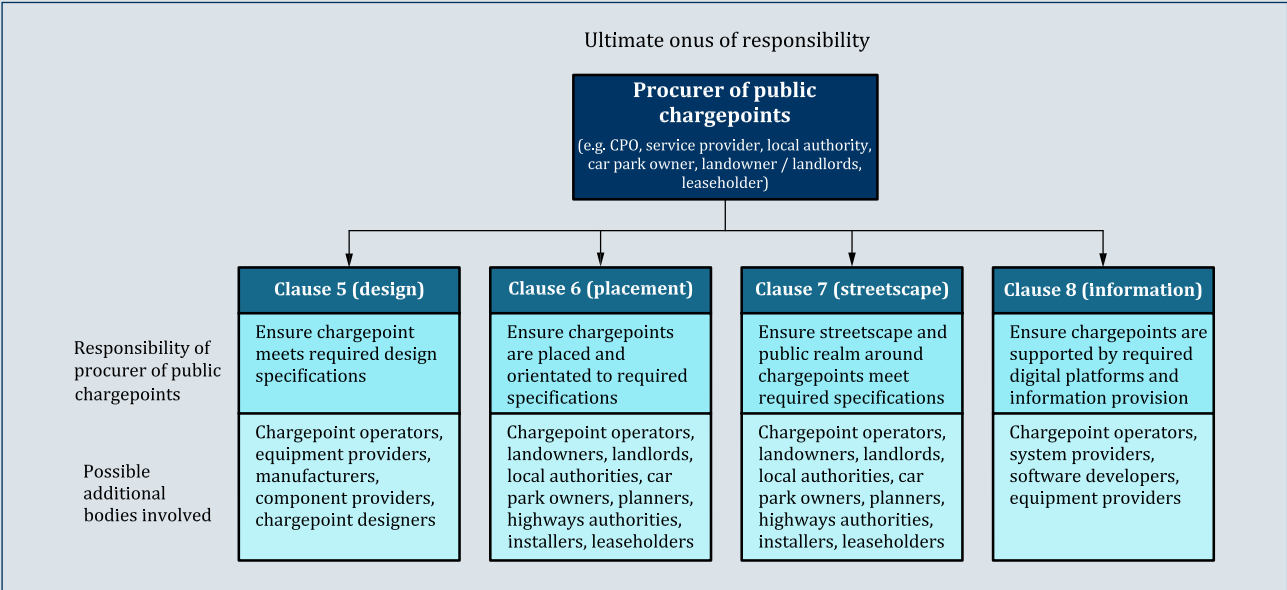
As such, there are roles and responsibilities for the different categories of bodies to be taken into account for accessibility of public chargepoints.

The ultimate onus of responsibility for conforming to the requirements within PAS 1899 is on the procurer of public chargepoints. The procurer can comprise a range of different bodies including the chargepoint operator, the service provider, a local authority, or other landowners or leaseholders such as a car park owner. In using this PAS, the procurer of public chargepoints is responsible for meeting the requirements within this standard, ensuring that chargepoints procured are designed to the specifications necessary for accessibility and that appropriate information provision and support is available; and for satisfying accessibility requirements related to the placement of the chargepoints and the surrounding built environment. The procurer is also responsible for complying with equality legislation and taking into account supplementary best practice accessibility guidance for all parking bays (Annex A), and for implementing best practice guidance for designated accessible parking bays (Annex B and Annex C), as outlined throughout this PAS.

Whilst the onus of responsibility for conforming to the requirements within PAS 1899 is on the procurer of public chargepoints, the requirements within PAS 1899 have impacts on other bodies involved in the provision, installation and operation of public chargepoints – for example, requirements for the physical design of a chargepoint have an impact on chargepoint designers and manufacturers. Some aspects, such as continued maintenance of public chargepoints, will require the procurer to ensure appropriate contractual agreements are in place.

Figure 1 explains the roles and responsibilities for implementing PAS 1899 broken down by clause, including the ultimate responsibility for the procurer of public chargepoints and the range of other bodies that may be involved. As shown in Figure 1, engagement and collaboration with other bodies is essential in the provision of accessible public chargepoints.

Figure 1 – Roles and responsibilities for PAS 1899



Additionally, the supplementary best practice guidance for accessibility of public chargepoints (Annex A) includes guidance for a range of other bodies involved in public chargepoint provision – whilst much of the guidance in Annex A is considered outside the direct control of the procurer of public chargepoints, the procurer of public chargepoints should nevertheless ensure that this guidance is implemented by engaging with other bodies involved in the installation process. Annex D covers requirements related to wireless/ inductive chargepoints.

In order to assist the procurer of public chargepoints in understanding the implementation of the requirements within this PAS, Annex E provides a checklist which covers each of the individual requirements included within this PAS.

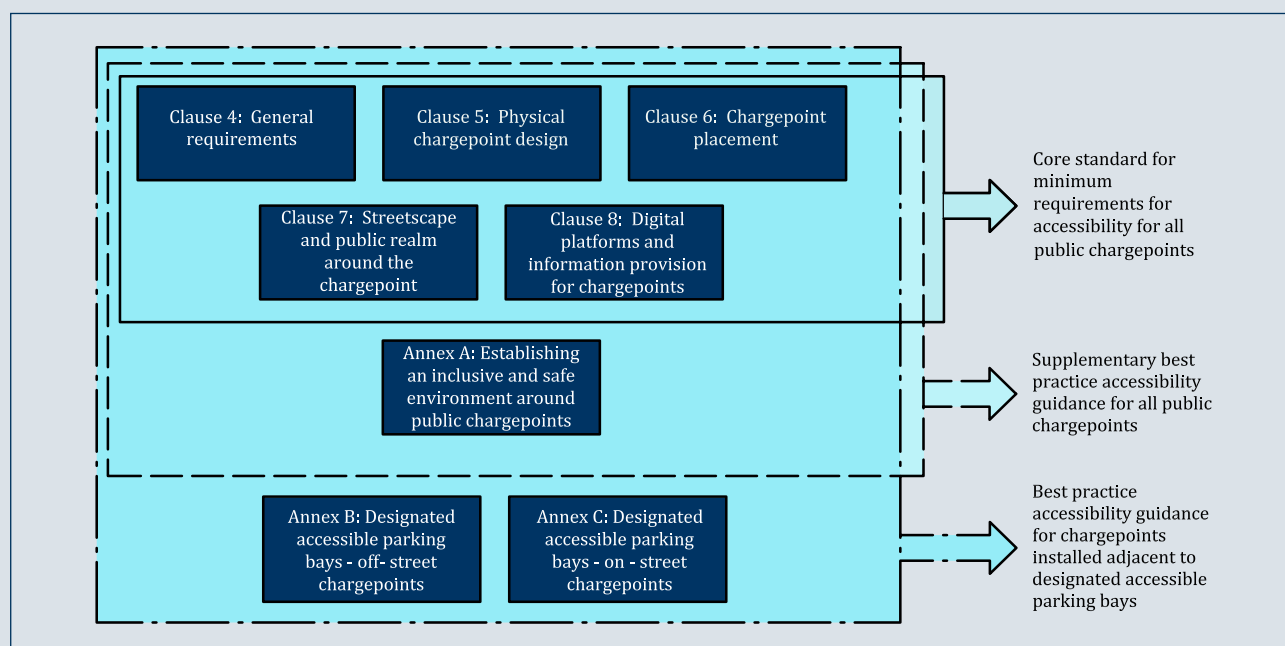
NOTE This PAS is applicable to all public chargepoints, with a definition for public chargepoints provided in 0.2.6; however, the PAS can also be used to improve the accessibility of chargepoints not covered by the definition provided in 0.2.6.

0.2.3 Provision of minimum requirements for accessibility for all public chargepoints and best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays

The aim of this PAS is to specify minimum requirements for accessibility for all public chargepoints whilst also providing supplementary best practice guidance for all public chargepoints as well as best practice guidance for chargepoints installed specifically adjacent to designated accessible parking bays. The PAS therefore has three main focus areas:

- core standard for minimum requirements for accessibility for all public chargepoints (Clauses 4–8);
- supplementary best practice accessibility guidance for all public chargepoints (Annex A); and
- best practice accessibility guidance for chargepoints installed adjacent to designated accessible parking bays (Annex B and Annex C).

In order to cater for these different focus areas, the PAS is necessarily divided into normative clauses to address minimum accessibility for all public chargepoints, and informative annexes to address the supplementary best practice guidance for all public chargepoints and the guidance for chargepoints installed specifically adjacent to designated accessible parking bays. Figure 2 provides an explanation of how to navigate the structure of this PAS – as shown, for designated accessible parking bays, all requirements in Clauses 4–8 need to be followed, along with implementing the best practice guidance in Annex B or Annex C.

Figure 2 – Navigating the structure of PAS 1899

Wireless and inductive charging is addressed in Clause 4 and Annex D – similar to the diagram above, the clauses and annexes described in Figure 2 need to be implemented for wireless and inductive charging in addition to conductive charging, following the same process dependent on where the wireless charging is located.

0.2.4 Types of public chargepoints

Due to the nature of the chargepoint market, there are different types, locations and configurations of chargepoints that have differing accessibility requirements. The requirements within this PAS are applicable to all public chargepoints, but some requirements are specifically for a certain “scenario” of chargepoints, such as requirements specifically for on- or off-street parking bays, or requirements for higher-powered or lower-powered chargepoints. For the purposes of this PAS, four chargepoint scenarios are defined, as outlined in Table 1.

Table 1 – Chargepoint scenarios for PAS 1899

Category	Description
Scenario A	Low-powered off-street
Scenario B	High-powered off-street
Scenario C	Low-powered on-street
Scenario D	High-powered on-street

For Table 1:

- “Low-powered” refers to chargepoints with a power rating of 22 kW and below.
- “High-powered” refers to chargepoints with a power rating above 22 kW.
- “Off-street” refers to any chargepoint location that is not on the public highway, such as car parks, charging hubs and service areas.
- “On-street” refers to any chargepoint location that is on the public highway, such as in residential areas and on high streets.

0.2.5 Chargepoint components

Public chargepoints have different chargepoint components dependent on their physical configuration. These components can include:

- cable management system;
- charging cable;
- charging connector;
- connector dock or holster;
- charging socket-outlet;
- feeder pillar;
- payment terminal; and
- screen/visual interface.

Requirements within this PAS related to individual chargepoint components are only applicable if the physical configuration of the chargepoint includes the component being addressed. This is also applicable to other components external to the chargepoint, for example protective bollards surrounding or adjacent to a chargepoint. For full definitions of each of the chargepoint components, see 3.9.

0.2.6 Definition of public chargepoints

This PAS specifies requirements for all public chargepoints. The definition of “public chargepoint” is as outlined in the Alternative Fuels Infrastructure Regulations 2017 (AFIR)⁹⁾ [11], as follows:

A recharging or refuelling point is accessible to the public if it is—

- (a) *intended for use by members of the general public (including those situated in public car parks, whether or not those car parks are available only to consumers of specific goods or services); and*
- (b) *not intended for—*
 - (i) *exclusive use in respect of a vehicle produced by a specific manufacturer;*
 - (ii) *use by persons engaged in specific occupations;*
 - (iii) *use by persons whilst at their place of employment (including visitors); or*
 - (iv) *exclusive use by occupiers of, or visitors to, residential premises.*

“Recharging point” means an interface which is accessible to the public and is capable of charging one electric vehicle at a time, or exchanging a battery of one electric vehicle at a time.

Whilst at a minimum the PAS applies to chargepoints in scope of the AFIR 2017 definition, including on-street chargepoints, destination chargepoints (e.g. in supermarkets), en-route chargepoints (e.g. at motorway service areas), and chargepoint hubs, the requirements as outlined in this PAS are also relevant and useful for other categories of chargepoints, including residential (e.g. car parks for residential buildings), workplace, and semi-public (i.e. chargepoints that might be private during some times of the day whilst public at other times, with limitations or conditions applied on usage) chargepoints. It is strongly recommended that this PAS is incorporated for categories of chargepoints that fall outside the AFIR 2017 definition to ensure accessibility at a wider range of chargepoints.

0.2.7 Compliance with PAS 1899

PAS 1899 is voluntary on implementation. The PAS represents the benchmark of what can be reasonably expected for the provision of accessible public chargepoints, thereby supporting demonstration that appropriate levels of accessibility have been taken into account.

The approach to PAS uptake is not covered in this document as it is a question of policy and regulation, not of standards definition.

PAS 1899 is intended to improve accessibility of all newly installed public chargepoints as defined in 0.2.6. The PAS can be used to assess the accessibility of existing public chargepoints, but as the question of PAS uptake is one of policy, this document does not address whether this PAS should apply to existing chargepoints that might need to be retrofitted. The PAS is applicable to public chargepoints in the UK, but the requirements may also be used to improve accessibility of public chargepoints internationally. In order to assist with complying with the requirements within this PAS, checklists of the requirements within each of the clauses in this PAS are provided in Annex E.

⁹⁾ UK Parliament (2017), *The Alternative Fuels Infrastructure Regulations 2017*. Available from <<https://www.legislation.gov.uk/uksi/2017/897/contents/made>>.

1 Scope

This PAS specifies requirements for the provision of accessible public chargepoints for electric vehicles to all potential users, including, for example, disabled people and older people. The PAS is applicable to all public chargepoints. The PAS primarily addresses requirements for conductive charging (i.e. plug-in vehicle charging), with wireless/inductive charging addressed where relevant.

The focus of this PAS is on chargepoints used to charge motor vehicles (e.g. cars and vans) due to their greater spatial needs and requirement for dedicated infrastructure, rather than charging for mobility aids such as mobility scooters that are charged off-street. Moped and motorcycle users can also benefit from the requirements within the PAS. Larger vehicle categories such as minibuses are addressed where relevant, as users of larger vehicle categories can also benefit from the requirements within the PAS.

The PAS covers:

- the physical aspects of the environment surrounding fixed chargepoints (e.g. kerb height, ground type);
- the location, placement and spacing of chargepoints within the streetscape/public realm and relative to other infrastructure and/or objects (e.g. placement of chargepoints relative to individual parking bays, adequate space surrounding the chargepoint and vehicle);
- factors to be taken account of in the design and specification of accessible chargepoints and their more immediate surrounding areas (e.g. height of chargepoint components, cables and cable management systems, bollard spacing, interface tilt, colours used, accessibility of language within communications, weight and associated forces required to use equipment in an accessible manner); and
- information (physical and digital), signals and indicators provided.

In addition to normative requirements for all public chargepoints to address minimum requirements for accessibility, informative best practice guidance is subsequently provided within this PAS, in terms of supplementary accessibility guidance for all public chargepoints, and best practice accessibility guidance for chargepoints specifically located adjacent to designated accessible parking bays where additional space considerations are required.

The PAS covers both tethered and non-tethered chargepoints, along with chargepoints that can be attached to existing street furniture such as lamp post chargepoints or bollard or pillar chargepoints, as well as wall-mounted chargepoints and dual-socket chargepoints (for example those used in car parks or in on-street locations).

The PAS does not cover:

- electric chargepoints and charging systems used within domestic/private environments;
- specific materials used within a chargepoint;
- charging rates, charging prices, and software for payment methods;

***NOTE 1** Payment methods and payment metrics are addressed in the UK Government's announced consumer experience regulations.*

- user personal safety and protection;
- NOTE 2** General principles for a more inclusive environment are within the scope of the PAS. Guidance on access standards to and within curtilages and associated infrastructure is available in BS 8300-1 and BS 8300-2.*
- grid connections for public chargepoints, other than equipment in the immediate vicinity of public chargepoint equipment such as feeder pillars;
 - parking policy related to restrictions on parking in parking bays adjacent to public chargepoints including designated accessible parking bays, and related to retrofitting or otherwise existing designated accessible parking bays with chargepoints; and
 - planning policy related to specifying a proportion of designated accessible parking spaces within a car park to be equipped with electric vehicle charging.

The PAS should be used in combination with guidance within BS 8300-1 and BS 8300-2, the UK Government's "Inclusive Mobility" [N1] guidance, and the UK Government's "Manual for Streets" guidance¹⁰. This PAS solely covers inclusivity and accessibility of public chargepoints, and should be used in combination with other standards addressing the installation and connection of public chargepoints in general, as referenced throughout this PAS.

***NOTE 3** Although the PAS is developed with the intended use in the UK, it might also be suitable for international use.*

¹⁰⁾ <www.gov.uk/government/publications/manual-for-streets>.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this PAS¹¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 7671:2018+A2:2022, *Requirements for Electrical Installations – IET Wiring Regulations*

BS 8300-1:2018, *Design of an accessible and inclusive built environment – Part 1: External environment – Code of practice*

BS 8300-2:2018, *Design of an accessible and inclusive built environment – Part 2: Buildings – Code of practice*

BS EN 17186:2019, *Identification of vehicles and infrastructure compatibility – Graphical expression for consumer information on EV power supply*

BS EN 17210:2021, *Accessibility and usability of the built environment – Functional requirements*

BS EN 62752, *In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)*

BS EN 301549:2021, *Accessibility requirements for ICT products and services*

BS EN IEC 61851-1:2019, *Electric vehicle conductive charging system – Part 1: General requirements*

BS EN IEC 61851-21-2, *Electric vehicle conductive charging system – Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply – EMC requirements for off board electric vehicle charging systems*

BS EN IEC 61851-23:2014, *Electric vehicle conductive charging system DC electric vehicle charging station*

BS EN IEC 61851-25, *Electric vehicle conductive charging system – Part 25: DC EV supply equipment where protection relies on electrical separation*

BS EN ISO 17409:2020, *Electrically propelled road vehicles – Conductive power transfer – Safety requirements*

Other publications

[N1] DEPARTMENT FOR TRANSPORT, *Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*. 2022

¹¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

3 Terms and definitions

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

3.1 accessibility

degree to which a product, device, service, or environment (virtual or real) can be independently accessed or used

3.2 accessible

capable of being independently accessed and used

3.3 accessible parking bay

parking bay, either on-street or in a car park, that is clearly identified as reserved for use by disabled people and for people holding a Blue Badge parking card (3.4), which is larger than standard parking bays to provide additional space requirements surrounding the vehicle, or in some cases to provide for larger vehicles such as larger wheelchair accessible vehicles (3.27)

3.4 Blue Badge

parking card displayed upon parking a vehicle in a designated accessible parking bay within the UK, part of the Blue Badge Scheme¹²⁾ which helps disabled people to park closer to their destination

3.5 bollard

post of minimum 1 000 mm height installed adjacent to a chargepoint to protect the chargepoint from vehicle collision

[SOURCE: BS 8300-1:2018, 8.2.1.2, modified]

3.6 built environment

human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighbourhoods and cities that can often include their supporting infrastructure

3.7 carriageway

way constituting or comprised in a highway, being a way (other than a cycle track) over which the public have a right of way for the passage of vehicles

3.8 chargepoint

equipment that supplies electrical power for charging electric vehicles

3.8.1 higher-powered chargepoint

chargepoint that has a power rating above 22 kW and has larger infrastructure requirements, such as heavier cables and a larger physical chargepoint

3.8.2 lamp post chargepoint

chargepoint that uses an existing lamp post both as the physical location of the chargepoint and as the source of power for an electric vehicle, where an electric vehicle plugs into the lamp post-mounted chargepoint

3.8.3 pillar chargepoint

chargepoint that is installed in the ground, requiring an individual physical piece of infrastructure to charge an electric vehicle

3.8.4 public chargepoint

chargepoint intended for use by members of the general public, including those situated on-street and in car parks provided for public use, whether or not those car parks are available only to consumers of specific goods or services

NOTE See 0.2.6 for full definition.

3.8.5 wall-mounted chargepoint

chargepoint where the chargepoint itself and associated infrastructure such as cabling and mounting plates are mounted on a wall rather than being installed in the ground

3.8.6 wireless/inductive chargepoint

wireless transfer of electrical power between a chargepoint and an electric vehicle, without the need for cables or plugging into an electric vehicle

¹²⁾ UK Government, 2022, 'Apply for or renew a Blue Badge', <<https://www.gov.uk/apply-blue-badge>>.

3.9 chargepoint component

various physical components that make up a chargepoint and allow the utilization of a chargepoint

3.9.1 cable management system

organization, support and routing of charging cables utilizing sufficient equipment to manage wiring to ensure an orderly, uncluttered and manageable cable storage, ranging from simple cable arms to support the charging cable to mechanical equipment to wind back the charging cable

3.9.2 charging cable

flexible cable or cord used to establish the connection between an electric vehicle and the supply network or a chargepoint, which can be tethered (3.9.11) or untethered (3.9.12)

[SOURCE: BS EN IEC 61851-1:2019, modified]

3.9.3 charging cable holster/dock

physical holder for chargepoint connector attached to chargepoint within which the chargepoint connector is stored when not in use

3.9.4 charging socket-outlet

electric accessory on a chargepoint having socket-contacts designed to engage with the contacts of a plug and having terminals for the connection or cables or cords, intended for inserting the connector of an untethered charging cable, to charge an electric vehicle

[SOURCE: BS EN IEC 61851-1:2019, 3.5.10, modified]

3.9.5 feeder pillar

physical electrical infrastructure cabinet that houses the electrical equipment used to power the chargepoint, installed in close proximity to the chargepoint

3.9.6 height mounting base

physical base on which a chargepoint can be mounted to increase the height of the chargepoint and associated chargepoint components

3.9.7 minimum payment method

minimum/simplest means of providing impromptu access to chargepoints by chargepoint operators and ensuring consumers can rely on a familiar payment method across chargepoint networks

3.9.8 payment terminal

device which interfaces with payment cards or radio-frequency identification cards to make electronic funds transfers

3.9.9 screen/visual interface

mechanical or digital flat panel or area of a chargepoint on which visual content is displayed, and through which in some cases operation of the chargepoint can be administered

3.9.10 screen/visual interface tilt

tilt angle from the vertical plane of a chargepoint screen or visual interface towards the user

3.9.11 tethered charging cable

charging cable that is attached to a chargepoint at one end, with a connector on the other end of the cable for connecting to the vehicle

3.9.12 untethered charging cable

charging cable with a connector on each end, for connecting the cable to the vehicle and to the chargepoint

3.10 chargepoint operator (CPO)

body that operates and maintains public chargepoints so drivers can charge their electric vehicles

3.11 disability

physical or mental impairment which has a substantial and long-term adverse effect on a person's ability to carry out normal daily activities

3.12 dropped kerb

area where a kerb is lowered to meet the level of the carriageway or parking bay to facilitate movement of people including disabled people

3.13 electric vehicle

vehicle with a rechargeable energy storage system that is used for electrical propulsion to drive their wheels some or all of the time, including battery electric vehicles and plug-in hybrid electric vehicles that plug in to an external source of electricity

3.14 footway

way comprised in a highway which also comprises a carriageway, being a way over which the public have a right of way on foot only, also including people using mobility aids such as wheelchairs and mobility scooters designed for use on the footway, and people with physical, sensory or cognitive impairments who are travelling on foot

3.15 impact protection barrier

low-level barriers of maximum 600 mm height placed immediately in front of or surrounding a chargepoint to protect against vehicle impact

3.16 inclusive

relating to the approach to the design of the environment, including infrastructure and the surrounding built environment, to ensure that they can be accessed and used by everyone

[SOURCE: BS 8300-2:2018, 3.8, modified]

3.17 level access point

provision of continuous access between a carriageway or parking bay and the surrounding pavement/footway by raising the level of the carriageway to that of the kerb over a short distance, or where the pavement/footway and kerb are dropped to carriageway or parking bay level

3.18 light reflectance value (LRV)

total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source

[SOURCE: BS 8300-1:2018, 3.10]

NOTE For information on light reflectance values, see BS 8300-1:2018, Annex B and UK Government's "Inclusive Mobility" [N1].

3.19 mobility aid

device designed to improve the mobility of people with a mobility impairment or to assist walking

3.20 orientation

relative physical position or direction of someone or something

3.21 plug-in vehicle

road vehicle that can be recharged from an external source of electricity using a plug-in technology and the electricity stored in the rechargeable battery packs drives or contributes to drive the vehicle

3.22 radio-frequency identification (RFID)

method for tracking goods and services by means of tags which store information readable via radio signal

3.23 service area service station services motorway service area (MSA)

places where drivers can leave a road to stop and take a break in the course of their journey including facilities such as refuelling/recharging, resting, eating and drinking, shopping or staying in an on-site overnight hotel, including for motorways, A-roads and trunk roads and other areas where chargepoint hubs are located

3.24 slope

inclined surface with a gradient steeper than 1:60 and shallower than in 1:20

[SOURCE: BS 8300-2:2018, 3.13.10]

3.25 street furniture

objects placed or fixed in the street for public use, such as post-boxes, traffic signs and benches

3.26 tactile paving

profiled paving surface which is part of a national system providing guidance or warning to people who are blind or partially sighted

[SOURCE: BS 8300-1:2018, 3.14]

3.27 wheelchair accessible vehicle (WAV)

vehicle constructed or converted specifically so that they can accommodate one or more people seated in their wheelchairs when entering the vehicle, and in some cases when travelling in their wheelchair inside the vehicle, or transferring from a wheelchair inside the vehicle to a passenger or driver seat (internal transfer WAV), or when driving from a wheelchair (drive from wheelchair WAV)

3.28 visual contrast

perception of a difference visually between one surface or element and another by reference to their light reflectance values (LRV)

4 General requirements

COMMENTARY ON CLAUSE 4

Differing types (e.g. power ratings) and locations of public chargepoints have varying requirements for provision of minimum accessibility – the level of accessibility that can be reasonably achieved will depend on a number of factors, for example, some chargepoints have tethered cables whilst others do not, some higher-powered chargepoints have heavier cables, and on-street chargepoints might face additional spacing constraints. Clause 4 specifies the requirements for navigating and interpreting this PAS based on the category of public chargepoints being installed, along with PAS navigation guidance for public chargepoints specifically installed adjacent to designated accessible parking bays. A diagram showing how to navigate this PAS is available in Figure 2.

4.1 Categories of public chargepoints for minimum accessibility for all public chargepoints

NOTE 1 Annex A provides further guidance and best practice on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented for all public chargepoints to improve the accessibility of public chargepoints for all users.

The provision of low-powered off-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario A.

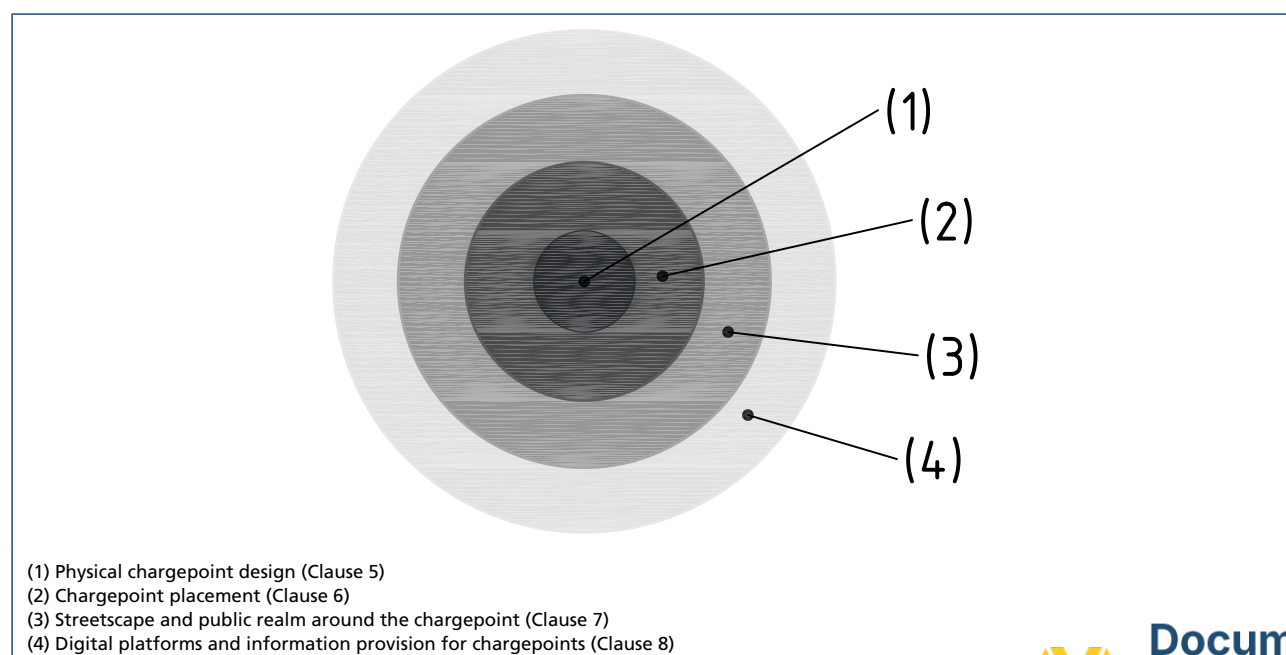
The provision of high-powered off-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario B.

The provision of low-powered on-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario C.

The provision of high-powered on-street public chargepoints shall follow all requirements within Clauses 5, 6, 7 and 8, including those specifically labelled for Scenario D.

NOTE 2 The requirements within this PAS have been designed using a “concentric” model, initially focusing on the physical design of the chargepoint, and then extending outwards to chargepoint placement, the streetscape and public realm around the chargepoint, and digital platforms and information provision for chargepoints. Figure 3 illustrates the “concentric” model for this PAS. The concentric model of the requirements within this PAS can assist with understanding how to implement the requirements within the PAS in a sequential manner.

Figure 3 – “Concentric” model for requirements within PAS 1899:2022



4.2 Chargepoints installed adjacent to designated accessible parking bays

NOTE 1 Annex A provides supplementary best practice guidance on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented to improve the accessibility of all public chargepoints.

The provision of off-street public chargepoints (Scenarios A and B) specifically adjacent to designated accessible parking bays shall follow all requirements within Clauses 5, 6, 7 and 8 at a minimum.

NOTE 2 Annex B provides best practice guidance on accessibility for public chargepoints specifically installed adjacent to off-street designated accessible parking bays – it is strongly recommended that this guidance is implemented to ensure additional accessibility is implemented for chargepoints installed adjacent to designated accessible off-street parking bays.

The provision of on-street public chargepoints (Scenarios C and D) specifically adjacent to designated accessible parking bays shall follow all requirements within Clauses 5, 6, 7 and 8 at a minimum.

NOTE 3 Annex C provides best practice guidance on accessibility for public chargepoints specifically installed adjacent to on-street designated accessible parking bays. It is strongly recommended that this guidance is implemented to ensure additional accessibility is implemented for chargepoints installed adjacent to designated accessible on-street parking bays.

4.3 Wireless/inductive charging requirements

The provision of wireless/inductive public chargepoints shall be in accordance with Annex D.

NOTE 1 Annex A provides supplementary best practice guidance on establishing an inclusive and safe environment around public chargepoints. It is strongly recommended that this guidance is implemented to improve the accessibility of public chargepoints for all users.

NOTE 2 For wireless/inductive chargepoints specifically installed within an off-street or on-street designated accessible parking bay, it is strongly recommended that the guidance in Annex B and Annex C, respectively, is implemented to improve accessibility for public chargepoints installed specifically within a designated accessible parking bay.

5 Physical chargepoint design

COMMENTARY ON CLAUSE 5

People can be faced with a range of issues and barriers with respect to the usability of chargepoints. Individuals with different (e.g. physical, sensory and/or cognitive) impairments and needs can experience different barriers to using chargepoints, including those related to dexterity/strength, access and comprehension. People can also experience a combination of these impairments. The physical design of a chargepoint and its components should therefore take into account the range of needs of users, including disabled people, in order to achieve inclusive design.

NOTE 1 For all public chargepoints mentioned within Clause 5, user testing with disabled people has shown that the points of access (i.e. the access areas immediately in front of chargepoint components) of chargepoint components are of utmost importance in terms of ensuring accessibility of public chargepoints. The reach, spacing and visibility requirements for public chargepoints (as outlined in Clause 6) help ensure that the needs of disabled users of chargepoints are met.

NOTE 2 Guidance on a “design for all” approach in products, goods and services is provided in BS EN 17161.

NOTE 3 The requirements within this PAS are for public chargepoints that require a cable for a vehicle to be plugged in. Many requirements are also relevant for wireless/inductive charging – refer to Annex D for requirements and guidance for wireless/inductive charging.

5.1 General

The design of public chargepoints shall conform, when applicable, with other standards focused on the design of chargepoints, in accordance with:

- BS EN IEC 61851-1:2019;
- BS EN IEC 61851-21-2;
- BS EN IEC 61851-23;
- BS EN IEC 61851-25; and/or
- BS EN 62752.

NOTE 1 The general design requirements for public chargepoints are summarized in the IET’s Code of Practice for Electric Vehicle Charging Equipment Installation¹³⁾ [12].

The design of public chargepoints shall take into account the guidance within BS 8300-1:2018.

NOTE 2 See also the guidance in the UK Government’s “Inclusive Mobility” [N1].

5.2 Chargepoint component height

COMMENTARY ON 5.2

The heights of the various components of public chargepoints (such as the height of the chargepoint socket-outlet, charging cable, screen and/or visual interface height and the height of a payment terminal) should be suitable for all users including disabled people, in particular users of wheelchairs, other mobility aids, those of short stature and those who have dexterity impairments. The heights of different chargepoint components should be accessible from both a fully standing and seated position.

NOTE 1 Some public chargepoints can be placed on the footway but accessed from carriageway level lower than the footway, which might affect the height of each of the chargepoint components mentioned in 5.2 and thereby the usability of the chargepoints for disabled people. Where this configuration is necessary, the effect of kerb height on chargepoint component height can be mitigated by considering the impact of kerb height (typically 100-125 mm) during the physical design process of a chargepoint, i.e. by factoring in the required height range of chargepoint components to accommodate the required installed height when mounted on a kerb. Such mitigation might need to include the use of different height mounting base/column components to accommodate variations in kerb height to vehicle bay level, to accommodate the required accessible heights for interaction by all potential users where the chargepoint is located at kerb height and operated by users at carriageway level. The preferred solution will generally be to have the chargepoint located at the same level as the vehicle parking bay with space required for user accessibility in front of the points of access of the chargepoint and associated chargepoint components, providing this can be accommodated and does not conflict with highway regulations.

¹³⁾ IET (2020), Code of Practice for Electric Vehicle Charging Equipment Installation, 4th Edition. Available from <<https://shop.theiet.org/code-of-practice-for-electric-vehicle-charging-equipment-installation-4th-edition>>.

NOTE 2 Reference is made in 5.2 to chargepoints placed at footway level along with level access points and dropped kerbs. Reach requirements for public chargepoints placed at footway level but accessed from carriageway level are further addressed in 6.4. Level access points and dropped kerbs are further addressed in 7.3.

For public chargepoint components, including the chargepoint socket-outlet, charging cable, screen and/or visual interface and payment terminal, the installed access heights of the chargepoint components shall be in accordance with Table 2 and as illustrated in Figure 4 and Figure 5.

Table 2 – Height range requirements for chargepoint components

Chargepoint component	Minimum height (mm)	Maximum height (mm)
Chargepoint socket-outlet (centreline)	800	950
Tethered charging cable connector handle when in holster (bottom of handle)	800	950
Screen/visual interface	Bottom of screen/visual interface at 800	Top of screen/visual interface at 1 300
	Bottom of interactive aspects (e.g. buttons, touchscreen) at 800	Top of interactive aspects (e.g. buttons, touchscreen) at 1 200
Payment terminal (bottom edge)	800	1 000

NOTE 3 The height ranges for chargepoint components in Table 2 are the heights relative to the user location, i.e. relative to where the chargepoint is accessed from for user interaction. As such, the heights should be interpreted as including any kerb height if mounted on a kerb, or including any height mounting base (see 3.9.6) or column component on which the chargepoint is mounted.

NOTE 4 The heights in Table 2 were developed from comprehensive user testing and vary due to the respective forces required to carry out the charging process, such as lifting a chargepoint connector from its holster. The user testing involved users who have different disabilities, including wheelchair users and ambulant users. The heights are reflective of the effort involved in manoeuvring chargepoint cables – 5.3.2 addresses cable weights and required forces.

NOTE 5 Not all public chargepoints have each of the components mentioned in Table 2 above – the height requirements are only applicable where a chargepoint has the component in its physical infrastructure.

NOTE 6 5.5.1 addresses the tilt angle of any screen or visual interface as part of the chargepoint. For untethered cables, a cable rest can assist accessibility, positioned between 800 mm and 950 mm height.

NOTE 7 Different users might have different height preferences for chargepoint components – for example, seated users might prefer a chargepoint socket-outlet at the lower end of the height range, whilst ambulant users might prefer a socket-outlet at the higher end of the height range. Provision of two socket-outlets should be considered to satisfy all user needs.

Figure 4 – Chargepoint component heights: Socket-outlet and holster heights

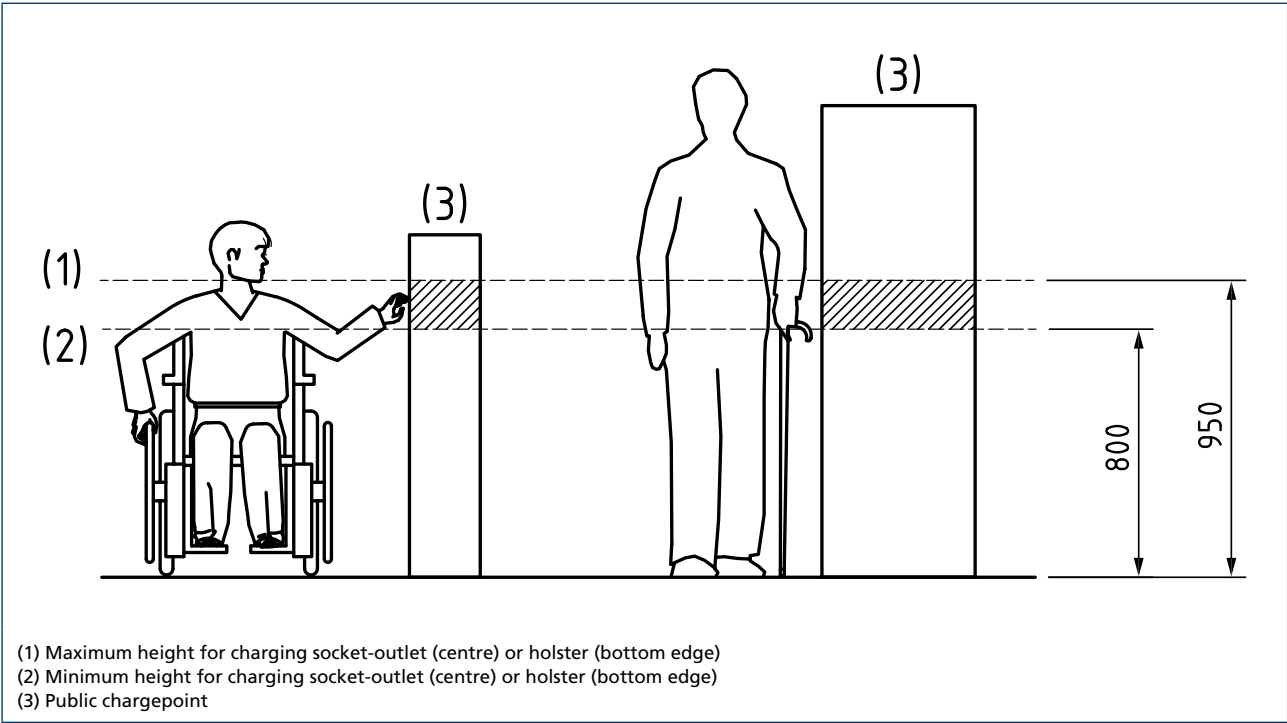
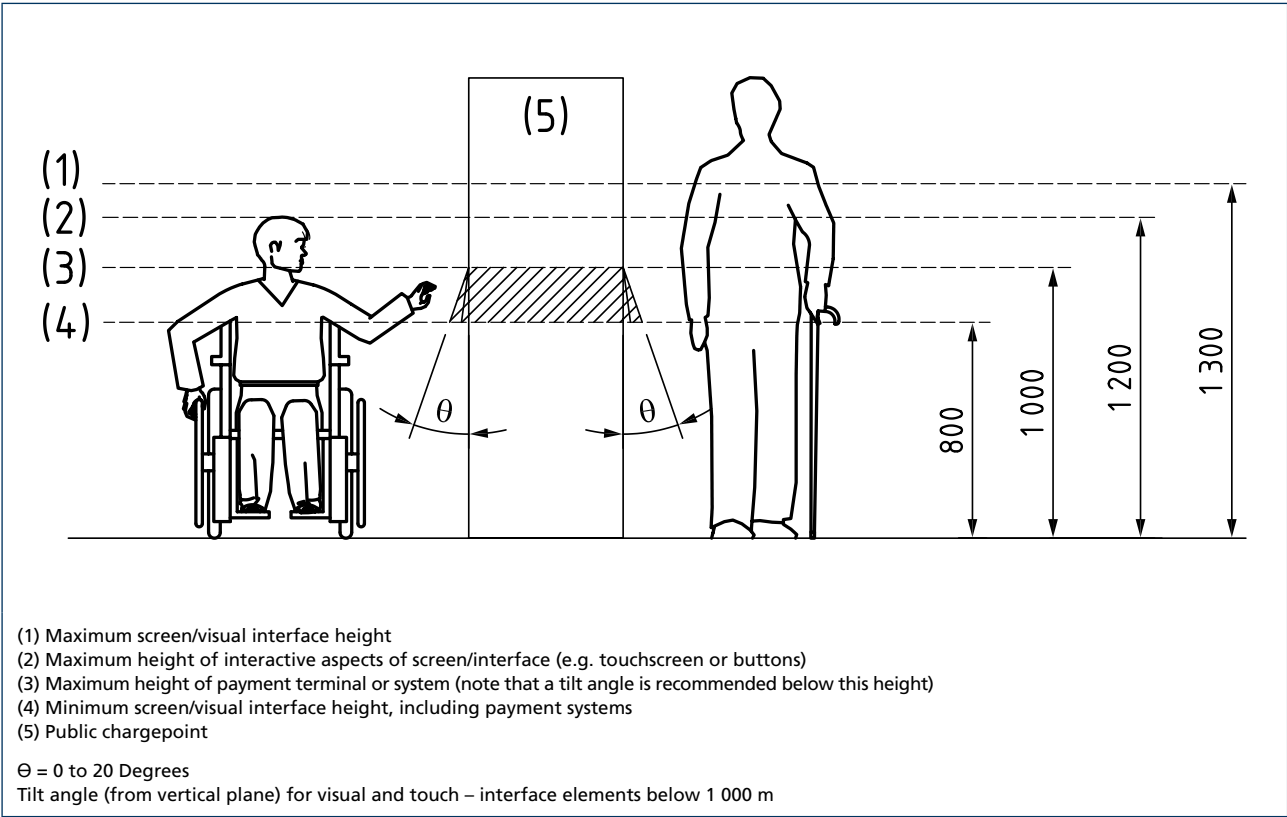


Figure 5 – Chargepoint component heights: Screen/visual interface and payment terminal heights



In the case of a public chargepoint installed at footway level, and where no level access point is provided to use the chargepoint (i.e. the chargepoint is accessed from carriageway level), the height of the charging components on any public chargepoint shall take into account the height of the kerb in its design, including the usage of any height mounting base or column component on which the chargepoint is mounted, such that access still falls within the required ranges in Table 2.

NOTE 8 As outlined in 7.3, in the first instance it is preferable that the installation of public chargepoints should establish whether level access can be provided at the parking bay to access and use the chargepoint, or whether the chargepoint can be accessed and used from carriageway level.

5.3 Chargepoint cables

COMMENTARY ON 5.3

The usability and manoeuvrability of chargepoint cables can be particularly problematic for some users, including older and disabled people. Wheelchair users and people reliant on other mobility aids can have issues holding, manoeuvring and positioning the cable; similarly, those with strength and dexterity impairments and those of short stature can experience difficulties with the weight of the cables and with plugging in the chargepoints. User testing has found that usability of chargepoint cables is amongst the biggest barriers facing disabled people; aspects to be addressed include the weight of the cable (particularly for higher-powered chargepoints) and the associated usage of cable management systems to support charging cables, the length of the cable (and associated distance from the chargepoint to the vehicle), and the ease of holding, manoeuvring and positioning a cable.

NOTE 1 5.3 is specifically focused on cables that are tethered to public chargepoints, rather than cables that an electric vehicle user carries around in their vehicle (i.e. untethered charging cables).

NOTE 2 The usage of wireless/inductive charging can have particular benefits for disabled people, as it avoids having to utilize and manoeuvre charging cables. Wireless/inductive charging is covered in Annex D.

5.3.1 Cable length

COMMENTARY ON 5.3.1

The length of a tethered chargepoint cable has been cited as an issue for disabled people in the usability of chargepoints. Public chargepoint cables should be long enough to accommodate a range of vehicle parking positions and vehicle socket-outlet locations, as there is no standardized position on electric vehicles where a socket-outlet is located. However, user testing with disabled people found issues with long cables, such that they can trail along the ground in an undesirable way both during and after charging, causing uncomfortable usability conditions for those in wheelchairs or those that use other mobility aids particularly during adverse weather conditions, and as such lengths should not significantly exceed what is reasonably required to accommodate the needs of anticipated users of the chargepoints. Cable lengths that are too short can also be difficult to manipulate into the required position for charging a vehicle.

NOTE 1 The lengths of charging cables are implicitly considered in the force measurements as described in 5.3.2; for example, having a cable length where a proportion of the charging cable can rest on the ground when the cable is being operated and manoeuvred can lessen the required forces-in-hand for utilization. Consideration should be given to positioning and routing of longer cables so that they do not become obstructive to users when the chargepoint handle is docked in its holster or when a vehicle is being charged.

For tethered public chargepoints, the length of the cable shall be sufficient to accommodate a range of vehicle parking positions, vehicle sizes and vehicle socket-outlet locations whilst ensuring the cable does not cause obstruction to the surrounding streetscape during the charging process, thereby causing accessibility issues for disabled people and others.

For tethered public chargepoints, when the chargepoint is not in use, the cable length shall be supported by appropriate cable routing at the chargepoint and/or an appropriate cable management system, so that the cable length does not present a trip hazard for users and pedestrians.

For tethered public chargepoints, when the chargepoint is in use and connected to a vehicle, the unused cable length shall be supported either on the ground adjacent to a vehicle or by an appropriate cable management system so it does not present a trip hazard for users and pedestrians. It shall be determined how best to route cables beside vehicles whilst they are charging, in accordance with force requirements detailed in 5.3.2.

The free cable length for standard parking bays (i.e. the length of cable not supported by a cable management system or other form of cable storage) shall not exceed 7.5 m when not in use, in accordance with accessibility requirements within BS EN IEC 61851-1:2019, 11.7.

NOTE 2 User testing has found that including a second handle on a chargepoint cable can assist with manoeuvrability of the charging cable.

5.3.2 Cable weight and cable management systems

COMMENTARY ON 5.3.2

Different chargepoints have different types of tethered charging cables – low-powered chargepoints with a power rating of 22 kW and below (Scenario A and Scenario C chargepoints) might have lighter cables, with less mass per meter and a smaller cable diameter, whilst higher-powered chargepoints with a power rating above 22 kW (Scenario B and Scenario D chargepoints) might have heavier cables, with a greater mass per meter and a larger cable diameter. Chargepoints with a power rating of 200 kW and above typically require liquid-cooled or air-cooled charging cables, adding weight to the cable. Charging cable weight and stiffness are directly affected by the power of the chargepoint, the thickness of charging cables, and the presence of insulation materials, as examples. The measurement of cable weight does not consider the impact on the user in terms of their capability of operation; rather the measurement and specification of forces required for cable operation provides a more user-centric measurement of the accessibility of a charging cable.

This PAS addresses issues related to cable weight and manoeuvrability by specifying requirements for maximum force-in-hand measurements for charging cables for linear chargepoint forces, which can be tested to assess whether charging cables can be considered accessible for all chargepoint users. A full explanation of the determination of forces required for charging cable manoeuvrability is available in Annex F.

NOTE 1 The requirements in 5.3.2 focus on linear forces required for charging cable manoeuvrability, i.e. upward forces and linear pull forces. It is strongly recommended that the design of public chargepoints takes into account other forces to operate a charging cable, including twisting, tilting, and rotational forces, as outlined in Annex F.

The upward force required to remove a chargepoint connector from the associated charging cable holster/dock shall not exceed 60 N.

NOTE 2 The force of 60 N was developed through user testing and chargepoint testing, as outlined in Annex F. The ergonomics and mechanical wear of charging cable holsters or docks should be assessed for ease of charging cable connector removal and for continued maintenance of the holster or dock.

In the first instance, charging cables shall be extended to a distance of 4 m from the chargepoint with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, to assess whether the linear force-in-hand measurement to hold and manoeuvre the charging cable exceeds 60 N.

NOTE 3 Where possible, charging cables should be operational using a linear force-in-hand measurement of far less than 60 N for both upward force and lateral pull force – different people have different impairments, and some users might still find 60 N forces to operate charging cables inaccessible to them. Additionally, the tilting, twisting and rotational forces required for operation might make manoeuvrability of charging cables more difficult – see Annex F for further details.

NOTE 4 Charging cables are recommended to be measured at a distance of 4 m as standard parking bays are 4.8 m in length; as such, a distance of 4 m will account for a majority of parking positions, noting that the location of charging ports on vehicles varies by vehicle. Additionally, the force when the charging cable is extended to this distance is greater than when it is extended to a lesser distance, allowing for contingency in the force measurement.

Where the linear force-in-hand measurement at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, exceeds 60 N, support to the cable shall be provided to reduce the force-in-hand required to hold and manoeuvre the charging cable to a maximum of 60 N but preferably lower. This shall be administered either by increasing the length of the charging cable to allow a proportion of the charging cable to rest safely on the ground adjacent to the vehicle, or through the inclusion and utilization of an appropriate cable management system that reduces the measured force required to operate the cable through provision of appropriate support.

Where it is not feasible to reduce the linear force-in-hand measurement to a maximum of 60 N at a distance of 4 m with the charging cable suspended in the air, or for the full extension length of the charging cable if this is less than 4 m, additional assistance shall be provided at these chargepoints in accordance with 7.5.

NOTE 5 When a charging cable is long enough such that a proportion of the cable can rest safely on the ground adjacent to a vehicle (i.e. adjacent to the vehicle and not presenting a trip hazard), this greatly reduces the required forces to operate and manoeuvre the charging cable. Care should be taken to ensure that long cables do not become obstructive to users and block the surrounding space adjacent to vehicles both when the chargepoint handle is docked in its holster and when a vehicle is plugged in to charge – see Annex F for further details. Trailing cables, in general, should be avoided for all public chargepoints as they have a negative impact for all people trying to make use of a footway, including disabled people.

NOTE 6 Cable management systems encompass the organization, protection and routing of wiring systems. In the context of public chargepoints, cable management systems can assist in alleviating barriers to tethered chargepoint cable usability experienced by disabled people by reducing the required weight of the cable to be carried (and associated operational forces), thereby mitigating barriers experienced by those with strength and dexterity impairments.

NOTE 7 It is acknowledged that installations of chargepoints with a power rating of 200 kW and above, where liquid-cooled or air-cooled cables are typically required, might experience difficulty in achieving the stated measured force of 60 N for operation and manoeuvrability of the charging cable due to the heavier cables. However, user testing has shown that disabled people will have difficulty in operating chargepoint cables in excess of this force-in-hand measurement. Chargepoints where a force-in-hand greater than 60 N is required as specified in 5.3.2 cannot be considered accessible for independent use for any chargepoints in accordance with this PAS. Provision of suitable cable management systems to support the unused length of the cable might assist in reducing the forces required for charging cable operation.

NOTE 8 There are various designs that can be incorporated into cable management systems for higher-powered chargepoints such as the cable being suspended from arms or the chargepoint having a pull-back mechanism that supports the weight of the unused portion of the cable. Consideration should be given to different proprietary solutions that are suitable for different types of chargepoints, in terms of ensuring the weight of the cable is less prohibitive for disabled people.

NOTE 9 Continuing need for assisted access for some disabled people is likely to remain where tethered chargepoints are provided, especially for higher-powered chargepoints. 7.5 provides further requirements for provision of additional assistance in locations such as service areas.

The design of cable management systems for all tethered public chargepoints shall be such that charging cable connectors and handles are simple to locate back onto their holster or dock after use through appropriate ergonomic design of holsters or docks.

NOTE 10 Requirements for cables for chargepoints in general are provided in BS EN 50620:2017+A1:2019, Clause 6. Prevention of overheating of cables or cable assemblies used in stored or partially stored position is covered in BS EN IEC 61851-1:2019, 11.7.

5.3.3 Cable connector grip

COMMENTARY ON 5.3.3

Disabled people with strength or dexterity impairments and older people can find it difficult to grip a chargepoint handle or connector without appropriate consideration to the design of the chargepoint handle. It is important to consider the ergonomic design of the connector grip or handle. Ergonomic design of a connector grip should consider single hand use, two handed use, and those who might grip without digits (amputation and reduced use of hands).

The design of a chargepoint cable connector grip or handle shall be of a suitable material and ergonomic design to be usable by people including disabled people with strength or dexterity impairments.

The diameter of the gripping portion of a chargepoint connector grip or handle shall be between 19 mm and 43 mm.

The design of a chargepoint cable connector or grip shall ensure the connector is robust, reliable, and easy to maintain.

NOTE The design of handrails is covered in BS 8300-1:2018, which can assist with the design of a cable connector grip. According to BS 8300-1:2018, handrails should be easy and comfortable to grip with no sharp edges, but able to provide adequate resistance to prevent hand slippage. In locations subject to extremely cold or hot temperatures, handrails should not become excessively cold or hot to touch, while being of a material that, if necessary, is sufficiently robust to resist vandalism or misuse.

5.3.4 Cable and connector visibility

NOTE 1 For untethered chargepoints, users bring their own cable to the chargepoint, and as such the chargepoint equipment manufacturer does not have control over cable visibility. However, whilst outside the scope of this PAS, it is strongly advised that any untethered cable supplied by vehicle and cable manufacturers and suppliers should also satisfy the relevant requirements within 5.3 of this PAS.

The design of a tethered chargepoint cable and connector shall be of suitable visibility so as to provide a visual contrast for chargepoint users including disabled people along with other footway users, in accordance with light reflectance value and visual contrast principles in BS 8300-1:2018, Annex B.

NOTE 2 BS 8300-1:2018, Clauses 11, 12 and Annex B provides guidance on utilization of light reflectance value requirements; 30 LRV is suggested for chargepoints, and 70 LRV is suggested for signage.

NOTE 3 Consideration should also be given to visibility during the night-time, using the principles outlined in BS 8300-1:2018, Clause 11.

5.4 Chargepoint connection

NOTE 1 Subclause 5.4 addresses the physical connection of a chargepoint. Positive forms of feedback to indicate when certain stages of the charging process have initiated or concluded, using tactile, audible or visual feedback, are addressed in Annex A.

Any chargepoint connector, and any associated chargepoint socket-outlet cover to protect from water or dust, shall be operable without excessive force for a wider range of user populations, including those with strength and dexterity impairments and for those with the use of only one hand. An assessment of the maximum operating force (i.e. when inserting or removing the connector or using the chargepoint socket cover) shall be undertaken to determine whether this force exceeds 60 N.

Where it is not feasible to reduce the force required to operate any chargepoint connector, and any associated chargepoint socket-outlet cover, to a maximum of 60 N, additional assistance shall be provided at these chargepoints in accordance with 7.5.

NOTE 2 IEC 62196-1:2022, 16.16 states a maximum insertion and extraction force of chargepoint connectors of 100 N. However, user trials have found difficulties experienced by many elderly and disabled people when inserting and removing a chargepoint cable, and connection forces exceeding 60 N cannot be considered accessible. Options should be considered by chargepoint designers to reduce the force as much as possible to enable ease of insertion and removal of cable connectors at chargepoints (and at electric vehicles), to ensure ease of user operation. Where possible, this connection force should be limited to a maximum of 15 N.

Chargepoint connectors or socket-outlets shall be clearly and unambiguously labelled to indicate the type of chargepoint connector, in accordance with BS EN 17186:2019.

NOTE 3 From a safety perspective, it is desirable to incorporate a safe connector release mechanism into the chargepoint connector, to ensure an electric vehicle user can drive away whilst a vehicle is charging if their safety is perceived to be at risk, or in the event of accidental drive-off whilst a vehicle is still connected. Further information on interlock functions for chargepoints is available in BS EN ISO 17409:2020, Clauses 8 and 9.

NOTE 4 Some users with restricted strength and/or dexterity can experience issues when trying to remove and/or replace rubber dust caps that cover the ends of untethered charging cables. Whilst outside the scope of this PAS, it is nevertheless recommended that the forces required to remove and/or replace rubber dust caps are kept to a minimum, with a maximum operating force of 30 N but preferably limited to 15 N.