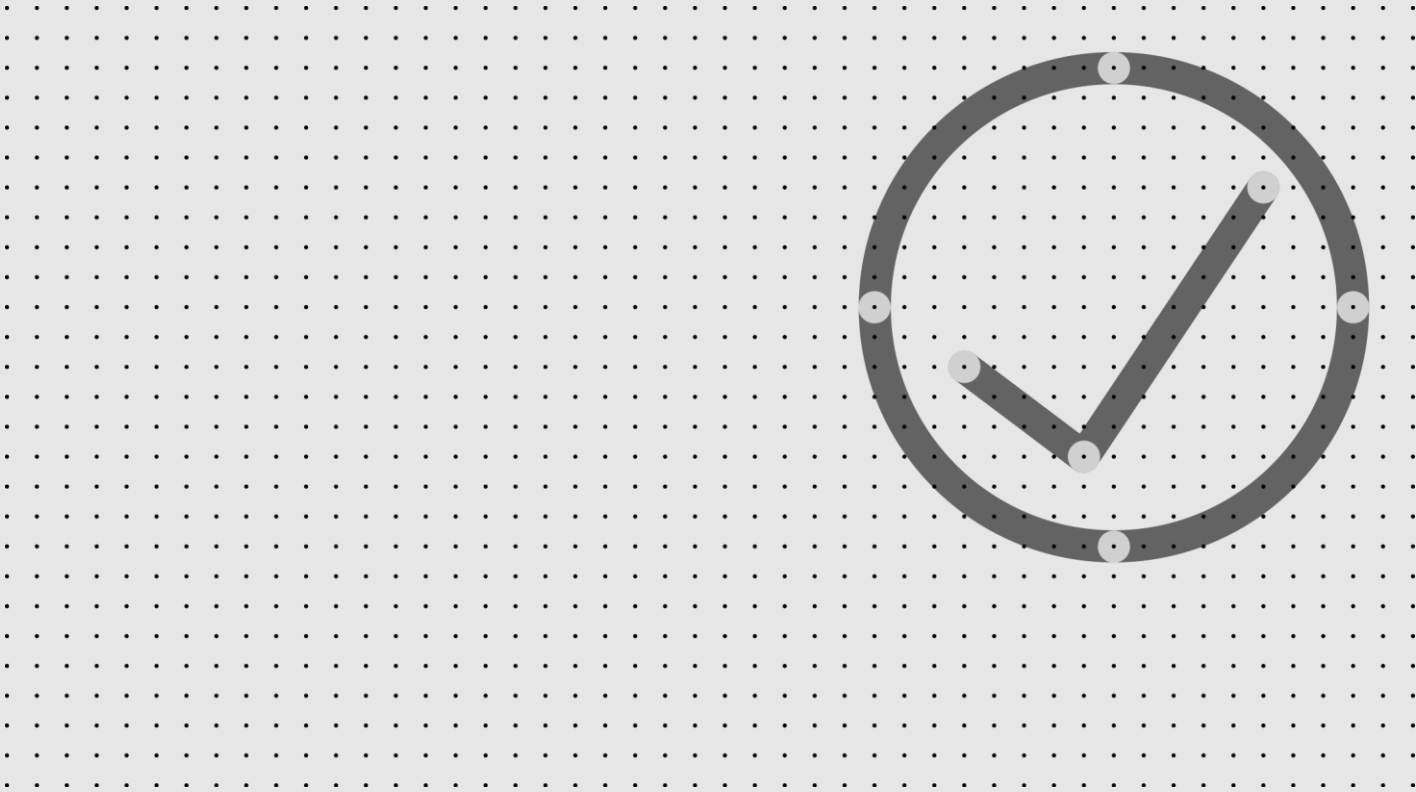




The MCS Specification for Ground Source Closed-loop Drilling

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This Specification was prepared by MCS and the Ground Source Heat Pump Association (GSHPA) facilitated Drillers Working Group.

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ABOUT MCS

Giving you confidence in home-grown energy

With energy costs constantly rising and climate change affecting us all, low-carbon technology has a bigger and bigger role to play in the future of UK energy.

We're here to ensure it's a positive one.

Working with industry we define, maintain and improve quality – certifying products and installers so people can have confidence in the low-carbon technology they invest in. From solar and wind, to heat pumps, biomass and battery storage, we want to inspire a new generation of home-grown energy, fit for the needs of every UK home and community.

About

The Microgeneration Certification Scheme Service Company Ltd (MCSSCo Ltd) trades as MCS and is wholly owned by the non-profit MCS Charitable Foundation. Since 2007, MCS has become the recognised Standard for UK products and their installation in the small-scale renewables sector.

We create and maintain standards that allow for the certification of products, installers and their installations. Associated with these standards is the certification scheme, run on behalf of MCS by Certification Bodies who hold UKAS accreditation to ISO 17065.

MCS certifies low-carbon products and installations used to produce electricity and heat from renewable sources. It is a mark of quality. Membership of MCS demonstrates adherence to these recognised industry standards; highlighting quality, competency and compliance.

Vision

To see MCS certified products and installations in every UK home and community.

Mission

To give people confidence in low-carbon energy technology by defining, maintaining and improving quality.

Values

1. We are expert – ensuring quality through robust technical knowledge
2. We are inspiring – helping to reshape energy in UK homes and communities
3. We are collaborative – working with industry and government to create positive change
4. We are principled – operating in a way that's clear, open and fair
5. We are determined – supporting the UK's drive towards a clean energy future

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CHANGES TO STANDARDS

When MCS Documents are revised, the issue number is also revised to indicate the nature of the changes. This can either be a whole new issue or an amendment to the current issue. Details will be posted on the website at www.mcscertified.com

Technical or other significant changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments.

The issue number is given on the left of the decimal point, and the amendment number on the right. For example, issue 3.2 indicates that it is the third significant version of the document which has had two sets of minor amendments.

Users of this Specification should ensure that they are using the latest issue.

Issue No.	Amendment Details	Date
1.0	First Publication	25/02/2022

FOREWORD

This Specification contains references to other documents which may be either normative or informative. At the time of publication any editions of those documents, where indicated, were valid. However, as all documents are subject to revision, any users of this document should apply the most recent editions of those referenced documents (unless a dated version is specified).

This document forms a Specification that describes the requirements for Ground Source Closed-loop Drilling and the installation of ground loops / probes.

NOTES: This MCS Specification for Ground Source Closed-loop Drilling makes use of the terms 'must', 'shall' and 'should' when prescribing certain requirements and procedures. In the context of this document:

- the term 'must' identifies a requirement by law at the time of publication;
- the term 'shall' prescribes a requirement or procedure that is intended to be complied with in full and without deviation;
- the term 'should' prescribes a requirement or procedure that is intended to be complied with unless reasonable justification can be given.

Compliance with this MCS Specification does not in itself confer immunity from legal obligations.

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1 PURPOSE & SCOPE

This Specification describes the requirements for Ground Source Closed-loop Drilling and the installation of ground loops / probes.

2 DEFINITIONS

Term	Definition
MCS Contractor	An organisation that is responsible for all of the following activities: supply, design, installation, set to work, commissioning and handover of microgeneration systems and technologies. An MCS Contractor will either employ, or engage as subcontractors, installers including Drillers.
Driller	The person(s) responsible for the drilling of boreholes for the installation of a Ground Source Heat Pump (GSHP).
Client	Being the Driller's client which is the MCS Contractor.

3 REQUIREMENTS OF THE DRILLING BUSINESS

3.1 CAPABILITY

3.1.1 Drillers shall have the competency (see Section 7) and capacity to undertake the drilling of Ground Source Closed-loop boreholes associated with the installation of Ground Source Heat Pumps.

3.1.2 Drillers shall be familiar with the concepts of Ground Source Closed-loop borehole design and shall be able to adequately assess that the design is fit for purpose, as far as possible.

3.2 ASSESSMENT

3.2.1 Drillers shall demonstrate their compliance with this Specification:

- Through membership of and compliance with, the membership criteria of the Ground Source Heat Pump Association (GSHPA), including the [GSHPA Code of Conduct](#).
- Compliance with the [GSHPA Vertical Borehole Standard](#).
- The successful completion of an audit conducted by the British Drilling Association (BDA) or equivalent.

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*Note: Information in relation to the BDA audit can be found via the website:
www.britishdrillingassociation.co.uk/competence/bda-audit/.*

3.3 INSURANCE

3.3.1 As a minimum, sufficient and valid Public Liability and Employers Liability (PL and EL) Insurance cover must be in place.

3.4 CONTRACT

3.4.1 There shall be a signed agreement, either in the form of a contract, scope of works or detailed purchase order, in place between the Driller and the MCS Contractor. Both parties shall sign this agreement prior to work commencing.

3.4.2 All contracts shall provide the following information as a minimum:

- Site contact details
- Site address
- Drilling requirements (number, loop depth(s), spacing, location (what3words reference), loop specification, grout specification)
- Site plan
- Agreed water supply
- Details of nearest A & E hospital
- Waste disposal arrangements

3.4.3 Variations to contracts and/or design may be required due to the following unforeseen reasons:

- Ground conditions
- Changes in the number of boreholes required
- Changes to the depth of boreholes
- Issues with site access
- Security
- Artesian water
- Any other problems that have not been envisaged

3.4.4 A diagram of the site shall be created, or original design annotated, marking any differences between the design and actual location, and number of boreholes drilled. This diagram or annotated design will confirm the number of boreholes, their depth and position, previously agreed with the designer.

3.5 DEPOSITS & WORKMANSHIP GUARANTEES

3.5.1 Deposits should be encouraged and if taken need to be protected. Any cash or cheque deposits shall be insured.

Note: insurance is not required where deposits are not taken, deposits are paid by

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credit card or placed in an escrow account.

4 PRE-DRILLING REQUIREMENTS

4.1 DESIGN VALIDATION

Contracts shall adequately include accurate information on parameters requiring consideration by the Driller in the performance of their part of the contract.

4.1.1 The Driller shall conduct a site survey, or ensure that one has been carried out, to adequately assess the delivery of the borehole design. The survey shall include an assessment of:

- a. Site Geology to at least the depth of the intended boreholes at the specific location of the boreholes and the surrounding ground. Assessment of ground/drilling conditions should include review of relevant nearby borehole records and other geological data, which can be accessed free on GeoIndex via the British Geological Survey (BGS) website: <https://mapapps2.bgs.ac.uk/geoindex/home.html>
- b. Geological hazards, such as, but not limited to groundwater hazards, potential for artesian flow, soluble rock and damage to adjacent foundations.
- c. Establish the location of underground / overhead services and utilities and if appropriate, confirm using a Cable Avoidance Tool (CAT Scan)
- d. Underground risks, including ground contamination, mines and mine shafts, natural caverns or voids, and buried artefacts, including unexploded ordnance (UXO).

4.1.2 The Driller shall make the MCS Contractor aware of permissions (for example Coal Authority and Environment Agency) approvals and restrictions applicable for the drilling activity.

Note: On some smaller domestic projects the site owner may not be capable of providing reliable and complete information.

4.1.3 The Driller shall not commence work until all necessary permits / permissions applicable for the Drilling activity have been obtained.

4.1.4 The Driller shall complete a Method Statement and Risk Assessment which details the process and tasks required to complete the drilling activity in a satisfactory manner. The Method Statement shall contain the following information as a minimum:

- Mobilisation
- Set up
- Preventative Measures
- Emergency Procedures

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- Drilling (method of drilling to be suitable to the anticipated ground conditions and control and protective measures to be based on the risk in difference between air and fluid flush techniques)
- Drilling Fluids
- Installation, grouting and testing of the Heat Transfer Loop (HTL)
- Rig movements and demobilisation
- Documentation including recording of borehole location, HTL installation and testing
- Waste Management and disposal (including control of COSHH materials)
- Handover of installation to client

4.1.5 The Driller shall communicate with the Designer, if following a site survey, conditions are other than predicted. This could include but is not limited to; the site strata, rest water levels, artesian conditions, location of trees and other obstacles, such as mine workings and explosive gases.

4.1.6 The Driller shall prepare a site dossier following site survey for guidance and reference for the drilling crew. The dossier can be a hard copy and/or in electronic form. It shall include:

- a. Method Statements that shall incorporate the disposal of waste and a list of the equipment necessary to deliver the boreholes specific to the site
- b. Site specific Risk Assessment and COSHH assessment
- c. Environmental risk assessment
- d. Health & Safety Policy
- e. Evidence that for equipment that requires certification that the certification is current, including that covered by the Lifting Operations and Lifting Equipment Regulations (LOLER) and Provision of Work Equipment Regulations (PUWER).
- f. Insurance certificates for PL & EL
- g. Evidence of the competency of the drilling crew e.g. NVQ (Level 2) in Land Drilling certification and appropriate CSCS operator cards
- h. Evidence of BDA Audit

Note: HSE Approved Codes of Practice (ACOPs) are available in support of compliance with LOLER and PUWER requirements.

5 DRILLING REQUIREMENTS

5.1 LEGISLATION

5.1.1 All applicable legislation and directives must be met in full.

Note: the legislation which applies may be different in England, Wales, Scotland and Northern Ireland.

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5.1.2 Drillers shall ensure, and be able to demonstrate, that they are aware of all current applicable legislation.

5.2 EQUIPMENT

5.2.1 All drilling rigs employed on the project shall conform to Provision and Use of Work Equipment Regulations 1998 (PUWER) Regulation 11, with fully enclosing interlocked guards to prevent access to rotating parts. Drilling rigs should also be Lifting Operations and Lifting Equipment Regulation 1998 (LOLER) certified within the last twelve months and all lifting accessories tested within the last six months.

5.2.2 All equipment must be compliant with current legislation.

Note: drilling rig compliance, safety and operation should be assessed via a BDA audit or equivalent.

5.3 MATERIALS

5.3.1 All work under this Specification shall be carried out:

- a) with adequate and proper materials which
 - i) are appropriate for the circumstances in which they are used,
 - ii) are adequately mixed or prepared, and
 - iii) are applied, used or fixed so as adequately to perform the functions for which they are designed; and should be supplied by acknowledged industry suppliers.
- b) in accordance with the final design.

5.4 SAFETY

5.4.1 Drillers shall operate a safe, clean and tidy site in accordance with their Method Statement.

5.5 WASTE DISPOSAL (IF IN THE SCOPE OF WORKS)

5.5.1 All waste must be managed in accordance with current legislation.

5.5.2 Evidence of disposal required shall be provided at the point of handover.

6 COMMISSIONING & HANDOVER

6.1 COMMISSIONING / SIGN OFF

6.1.1 The drilling activity shall be commissioned / signed off according to the design to ensure that the borehole is safe and has been drilled in accordance with the requirements of this Specification.

NOTE: See Appendix A for an example checklist.

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6.1.2 Individual loops, boreholes, and all elements of the system that the Driller is responsible for must be tested, including pressure testing the individual loops once installed, preferably with the Client / Engineer / Consultant in attendance. In the absence of third-party verification, a photographic or video record shall be made.

NOTE: A methodology for performing a pressure test for the ground loop is available in the GSHPA Vertical Borehole Standard.

6.1.3 Individual loops shall be flow tested in both directions following insertion into the borehole with clean water.

6.1.4 A drilling log shall be completed for each borehole which will confirm:

- Identification of the project
- Identification of the borehole
- Date
- Depth of the borehole including geological description, water strikes and at what depth below ground level
- Loop details (diameter, tremie pipe included, weight included)
- Depth of loop installation (with photographic or video record)
- Grout details: mixture of grout and volume of grout used to back fill each borehole
- Confirmation of results of pressure tests & flow tests
- Any certification / identification labels that came with HTL's

The log shall be signed off by the Lead Driller and preferably by client / client representative, and shall be uploaded, preferably in AGS format to the British Geological Survey (BGS) using the Data Deposit Portal: <http://transfer.bgs.ac.uk/ingestion>

6.2 DOCUMENTATION

6.2.1 Drillers shall collate a comprehensive document pack for each contract on completion which, as a minimum, includes:

- Customer Contact Details
- Customer requirements
- Deviations (Details of any changes to original quotation and/or sketch location of installed pipes and cables). See sections 3.4.4 and 6.1.5
- Drill logs
- Drilling Bill of Quantity
- Drilling Materials Bill of Quantity
- Copies of all forms and checklists used to sign off the drilling activity
- Any documentation or checklists required for any incentive schemes
- Any additional information

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6.3 HANDOVER AND REPORTING

6.3.1 At the point at which the drilling of the boreholes is completed, the documentation as detailed in 6.2.1 shall be provided and explained to the Client along with a document signed by the Driller detailing at least the following:

- A declaration, signed by the Driller’s representative, confirming that the drilling work meets the requirements of this Specification
- All permissions / permits
- Client name and address
- Site address (if different)
- Driller name, address, contact details etc.
- List of the key components installed
- MCS contact details (helpline telephone number and email address)

7 ROLES & COMPETENCY

7.1 All personnel involved in the drilling of boreholes, either employed by or subcontracted to the Driller, shall be competent, qualified, skilled and instructed for the activities they undertake.

7.2 Drillers need to have an effective method in place to identify hazards and to determine whether there are significant hazards that require further action. A hazard is an existing, new or potential situation or event that could result in injury or harm to health.

7.3 Complete records of training and/or qualifications demonstrating the required competencies shall be maintained by the Driller, in particular:

- Drilling personnel – Shall be able to demonstrate an adequate level of technical knowledge and drilling skills, in accordance with the requirements of this Specification, and Statutory Regulations.

7.4 All personnel using plant on site shall be certified to do so, such as CSCS operator licences or equivalent.

7.5 Competency of the Driller is determined by their completion of a vocational qualification in Land Drilling. A Driller’s qualification and its certification must include the relevant Pathway (i.e. Rotary, Cable Percussive) and Endorsement (i.e. Ground Investigation, Waterwell).

Note: As a minimum Drillers should have personnel with demonstrable training and / or experience of drilling boreholes. The BDA provides for a list of qualifications and certifications as part of their audit handbook, a copy of which can be found via the BDA website: www.britishdrillingassociation.co.uk

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8 PUBLICATIONS, REFERENCE AND FURTHER READING

- 8.1 The below lists are provided so that Drillers know which documents have been used as a basis for the development of the requirements of this MCS Drilling Specification and they are able to further research topics if they need to do so.
- 8.2 It is a scheme requirement for Drillers to own at least one copy of the following documents in each office or regional office undertaking drilling work:
- GSHPA Vertical Borehole Standard
 - IGSHPA/EPRI Grouting for Vertical Geothermal Heat Pump Systems (Engineering Design and Field Procedures Manual)
- 8.3 It is not a scheme requirement for Drillers to own, or have immediate access to, the following documents but access to these documents is considered desirable:
- Ground Source Heat Pump Association Best Practice Guide
 - BDA – Health & Safety Manual for Land Drilling 2015. A Code of Safe Drilling Practice
 - BDA – Guidance for Safe Intrusive Activities on Contaminated or Potentially Contaminated Land
 - BDA – Guidance on Managing the Risk of Hazardous Gases when Drilling or Piling near Coal
 - BS 5930:2015: Code of practice for ground investigation

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APPENDIX A – EXAMPLE COMMISSIONING / SIGN OFF CHECKLIST

Drilling Contractor:	
Site Reference:	
Borehole Reference:	
Date:	
Borehole Location (e.g. grid reference / accurate location plan):	
Borehole Diameter:	
Borehole Depth (meters below ground level):	
Loop Weight and specification:	
Depth of loop installation (meters below ground level):	
Grout specification and method of backfilling:	
Confirmation of loop purge:	
Results of Pressure Test:	
Results of Flow Test:	
Addition of Sanitiser:	
Sealing method of loop tails:	