

Guidance notes for an environmental permit: Form WQX001 – Guidance on registering an exemption for ground source heating and cooling systems

Background information

We use a risk based approach to controlling activities that may impact the environment. Where an activity is likely to be a risk to the environment then an environmental permit is required for that activity. For lower risk activities we allow exemptions from permitting to be registered with conditions. We do this under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

You have to notify us of a registered exemption by completing and submitting your registration form. This can be done through our [web portal](#)

There are two main types of ground source heating and cooling systems (referred to as “GSHC systems”):

Closed loop systems. These schemes consist of a closed piping system buried in the ground and neither abstract nor discharge to groundwater. You do not need a registration, a permit or an abstraction licence for a closed loop GSHC system.

Open loop systems. Open-loop schemes abstract groundwater from a borehole and pump it through a heat exchanger before discharging it back to ground via another borehole. If the system operates within prescribed discharge and temperature limits (set out in Tables 1 and 2) then it can be registered as a low risk activity, exempt from requiring an Environmental Permit.

Important note:

1. The registration will only cover the discharge aspect of the open loop GSHC system.
2. A registration is needed for each point of discharge, so if the open loop GSHC system includes multiple points of discharge then separate registrations are required

For any open loop GSHC systems you will also need to apply for an [abstraction licence](#) if the volume of groundwater abstracted will be greater than 20 cubic metres per day (20,000 litres)

Fees

For the discharge aspect of the GSHC system there is no charge for registration and no yearly subsistence charges. For the abstraction licence aspect of the GSHC system, there are application fees and an annual charge.

How to contact us

If you would like help filling in this form or guidance on exemptions, you can find information on our website or please contact us: by phone on 0300 065 3000 (Monday to Friday, 8am to 6pm), or by email at enquiries@naturalresourceswales.gov.uk.

About your GSHC system

Discharge rate conditions

To register an exemption you must confirm you will comply with one of the conditions listed in Table 1 and all conditions in Table 2. If you cannot comply with these, then you need to modify your design or apply for a permit. It is important that throughout the life of the GSHC system you adhere to these conditions and we therefore recommend that you record flow and temperature during operation. This helps you ensure that the system is operating efficiently and to confirm that you are complying with the conditions.

Table 1. Explanation of discharge conditions

008	A cooled aquifer system with a volume of less than 1500 cubic metres per day	A cooled aquifer system is a system used for both heating and cooling and where in a 5-year period the ratio of the discharge water temperature to the abstracted water temperature is less than 0.8
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009	A balanced system with a volume of less than 430 cubic metres per day	A balanced system is a system used for both heating and cooling and where in a 5-year period the ratio of the discharge water temperature to the abstracted water temperature is within the range 0.8 to 1.2
010	A heated aquifer system with a volume of less than 215 cubic metres per day	A heated aquifer system is a system used for both heating and cooling and where in a 5-year period the ratio of the discharge water temperature to the abstracted water temperature exceeds 1.2

The ratios given in Table 1 are calculated as follows:

$$\text{Ratio} = \frac{\text{Discharge temperature}}{\text{Abstraction temperature}}$$

Note: For new applications registration should be based on your system design constraints and on-going monitoring of flow and temperature used to control the system to be within the conditions in Table 1.

Example calculation: Balanced system

Average temperature of water discharged = 13.5 degrees centigrade
Average temperature of water abstracted = 15.0 degrees centigrade

- The temperature ratio is 13.5 / 15.0 = 0.9
- This is within the ratio 0.8 to 1.2 and would be considered to be a balanced system.
- The volume of water used within a low risk GSHC system must be less than 430 cubic metres per day.

Table 2. Conditions for registration of GSHC systems

Condition		Further details
1	Water within the system must not be used for any other purpose	
2	Nothing will be added to the water within the system	If anything is added to the water within the system, for example any additives that could be used for de-scaling, then the activity will cease to be exempt.
3	The temperature of water discharged from the system will not exceed 25°C and will not vary by more than 10°C compared to the abstracted water	We recommend that you routinely record flow and temperature during system operation to help you to monitor this.
4	The system is not on a known contaminated site or where there has been previous contaminative use	If the site where the boreholes are located has had a historic use which may have caused contamination of the land. This could include old industrial sites, collieries etc. Please contact us or the Local Authority for further details.
5	Water from the system will not be discharged within 50 metres of a watercourse	A watercourse is every river, stream, ditch, drain, cut, dyke, sluice and passage through which water flows.
6	Water from the system will not be discharged within 50 metres of a groundwater-fed wetland	A groundwater-fed wetland is a terrestrial ecosystem directly depending on a body of groundwater and includes: <ul style="list-style-type: none"> • A European site / Special Area of Conservation (SAC) • A site of special scientific interest (SSSI)
7	Water from the system will not be discharged within 50 metres of a point of groundwater abstraction	It is important that you find out if there are any private or licensed abstractions within 50 metres of the discharge point(s). It does not include the abstraction borehole used as part of the GSHC system. We hold details of licensed abstractions. Check with your neighbours or the local authority for details of any private abstractions nearby.

8	Water from the system will not be discharged within a groundwater source protection zone 1 (SPZ1)	A SPZ1 is an area where abstracted groundwater is protected. The zones have a default radius of 50 metres but where they have been modelled on groundwater travel times the zone may be much larger. We hold details of these.
9	The abstraction and discharge will be within the same aquifer	<p>Different geological strata below your site may be separated and therefore different aquifers. You must not allow the flow from one aquifer to another without a permit. The borehole driller will be able to confirm that the abstraction and discharge are within the same aquifer.</p> <p>If you change the point of discharge you will need to notify us of a new registration or apply for an environmental permit.</p> <p>The same quantity of water abstracted must be discharged back to the same aquifer. You cannot abstract from or discharge to surface waters (such as rivers, streams, lakes, ponds and the sea) under this exemption.</p>