

In support of its Members BDA has analysed audit data and identified different members interpret the drilling machine guarding requirements in a variety of ways. This is affecting members audit results. The following information is from our lessons learnt which BDA is sharing to assist members going forward. The following information about guarding and other points below, originates from the BDA's interpretation of HSE Regulations that control the use and manufacture of rotary drilling machines. The BDA has also included information from the British Standards that apply to rotary drilling machines.

1. All guards/or protective devices must be soundly constructed, and well maintained.
2. Fixed guards must be fixed by systems that require tools to be used to remove them.
3. The current Provision and Use of Work Equipment Regulations require that rotating shafts (drilling strings) need guarding. BS EN 16228-2:2014 requires that a vertical drilling machine guard must start a *maximum* of 500mm from the ground or working platform. The BDA audit will accept this can be achieved by extending the lower guard level, by attaching additional guarding media, such as Polycarbonate sheet, conveyor belt rubber or other substantial media by fixing it on to the existing guarding to infill any gap to achieve the 500mm above ground level or working platform rule. The 500mm maximum open distance also ensures that the further requirement to guard tool handling systems (clamps) is also adhered to.
4. The guard must have a height of a *minimum* of 1600mm from ground level. It may need to be longer where persons still have operational access to a danger zone. This includes where the working platform is situated higher than ground level, this may mean the guard will need extending.
5. The guard or protective device must fully enclose the dangerous points between 500mm and 1600mm from the ground or working platform. Any gaps present must serve a specific purpose or form a fundamental requirement for the operation of the machine. Any gaps present must be small enough and/or positioned in such a way that no dangerous points can be reached at arm's length.
6. Rotation must stop on activation of any safety device such as an emergency stop. When opening a guard rotation must stop before it can be opened more than 100mm.
7. The guard must have a locking mechanism to keep it closed (N/A to sensor-based protective devices).
8. The guard must not be easy to bypass or disable.
9. The guard must have a working Restricted Operating Mode (ROM) system that governs the controls when open, or there must be no rotation with it open.
10. To re-engage full operational rotation there must be a deliberate action with the guard closed.
11. The drilling machine must fail to safe (if it does not work/or operate correctly the rotation must not start or must stop).
12. Where mesh is used as part of the guarding, it must be small enough to prevent a hand passing through it, whilst still allowing clear visibility through it.
13. For drilling at an inclination or horizontally the 500 mm rule is not absolute. In these cases, the auditor must consider the alternative measures in place to control access to the danger zone. If these are sufficient to protect and they are included in the method statement and risk assessment, then this is sufficient.
14. When vertically drilling the drilling machine may be raised for operating reasons and the rotating shaft can often become exposed below the guarding system. A static object such as outer nonrotating casing in the borehole can be used to cover the gap. Whilst this casing is initially positioned the guarding system must still cover the exposed rotating casing. This can be done by dumping down and up or with other methods.
15. BS EN 16228-2:2014 also mentions a 200 mm gap between the bottom of a guard to the drilling clamps and seems to contradict the 500 mm rule above. However, the British Standard caters for different types of drilling machine. The 200 mm reference is for Horizontal Directional Drilling machines.
16. Guarding designs differ. When using any guard for vertical drilling that is attached to that drilling machine the above guidance is applicable. When a guard type of different design is attached to the rotary drilling machine and it is not protecting the danger zone, for access reasons, then restricted operation mode is to be active, or the drilling machine should be static and unable to drill.

Examples of acceptable guarding



Examples of unacceptable guarding



Guard starts too high from floor, doesn't prevent access to dangerous parts.



Angle of machine increases gap to working platform to an unacceptable distance.



Large, unnecessary gap that permits access to dangerous parts.



Guard starts more than 500mm from the floor. Must be extended.



Due to machine setup, guard starts more than 500mm from floor. Either adjust setup or extend the guard.



Large, unnecessary gap that permits access to dangerous parts.