BS4163:2021

14.4 Drilling machines

14.4.1 Hazards

Employees and learners should be made aware of the following hazards.

a) Long hair, loose clothing, etc., can become entangled in moving parts of the drilling machine.
b) Chuck keys, broken drills, swarf, work pieces, etc., can be violently ejected.
c) Unexpected spinning of hand held work pieces could cause injuries to hands.
d) The drill table can slip down or heavy objects fall from the table.
e) Drilling machines present an electric shock hazard.
f) Closing movements between parts can lead to trapping.
g) Sharp edges on drills, work pieces and swarf can cause cuts.
h) Contact with metalworking fluids, oil and grease can irritate the skin.
i) Inadvertent starting of the machine can present a hazard.
j) Lack of space around the machine can lead to the operator being pushed by passers-by.
k) Slippery floor surfaces or loose items around the machine can cause slips that result in contact with moving parts.

14.4.2 Risk control measures

The machine should be provided with:

a) a means of electrical isolation using a fused isolating switch on or adjacent to the machine, and that it is controlled by a starter incorporating overload protection and no-volt release;
b) a foot operated emergency stop device so that the machine can be quickly stopped in an emergency, without requiring the operator to let go of the spindle feed or work piece;
c) a guard that encloses the drill chuck and which extends to the bottom of the drill bit;
d) fixed guards (removable only with the use of a tool), or alternatively interlocked guards that enclose the drive pulleys and belts (guards should prevent access to dangerous in-running nips on the pulleys).

There should be sufficient clear space around the machine to prevent the operator from being accidentally pushed by passers-by. The floor surface should not be slippery and should be kept free of loose items.

PPE, including suitable eye protectors conforming to BS EN 166:2002 1B (medium energy impact), should be used while operating the machine. Substantial footwear should be worn.

Learners should be instructed that long hair and loose clothing are to be secured so as not to come into contact with moving parts, and that jewellery is to be removed.

Gloves or bandages should not be worn while operating the machine.

An assessment should be carried out and measures implemented to minimize risks associated with lifting heavy items (e.g. use of lifting aids, team lifts, correct lifting techniques).

NOTE 1 *Manual handling tasks associated with, for example changing/moving heavy drill tables and vices, can be beyond the physical capability of some persons.*

The machine should be electrically isolated before the position of the drive belt is changed. The chuck key, preferably spring-loaded, should be removed immediately after use and before starting the machine.

NOTE 2 *A high proportion of accidents at drilling machines occur when the work piece is being put into position, with the drill bit at its uppermost point.*

The drilling machine should be fitted with a suitable guard that extends to the bottom of the drill bit when it is in the uppermost position. The table should be adjusted so that, as the drill bit leaves the guard, it enters the work piece.

When using a specialist printed circuit board drilling machine, the need for a guard should be ascertained by a specific risk assessment.

Foot start control switches should not be used.

Where appropriate, the work piece should be prevented from spinning around by use of a vice or hand grips, or by clamping it to the table.

NOTE 3 *A vice or clamp might not be required if a small diameter drill is used. In this case it might be sufficient to hold the work piece by hand but carry out a risk assessment first.*

If no rack and pinion rise and fall mechanism is provided for table adjustment, the safety collar stop under the table should be used. If the head is adjustable, the safety collar stop underneath it should be secure.

Suitable implements should be used to remove swarf, so that hand contact is avoided.

Metalworking fluid nozzles should not be adjusted while the machine is in operation.

Metalworking fluids, if used, should be mixed and changed in accordance with the supplier's instructions. A system of fluid quality checks should be in place, with remedial action taken following poor results, which might include draining and cleaning the system.

NOTE 4 *See HSE COSHH Essentials MW5 Managing Fluid Quality for more information [59].*

Contact with the skin should be kept to a minimum.

NOTE 5 *See HSE COSHH Essentials MW2 Control of Skin Risks During Machining for more information [60].*

Hands should be washed thoroughly after using the machine.

The machine should be included in a planned maintenance programme that includes electrical safety inspections and tests.