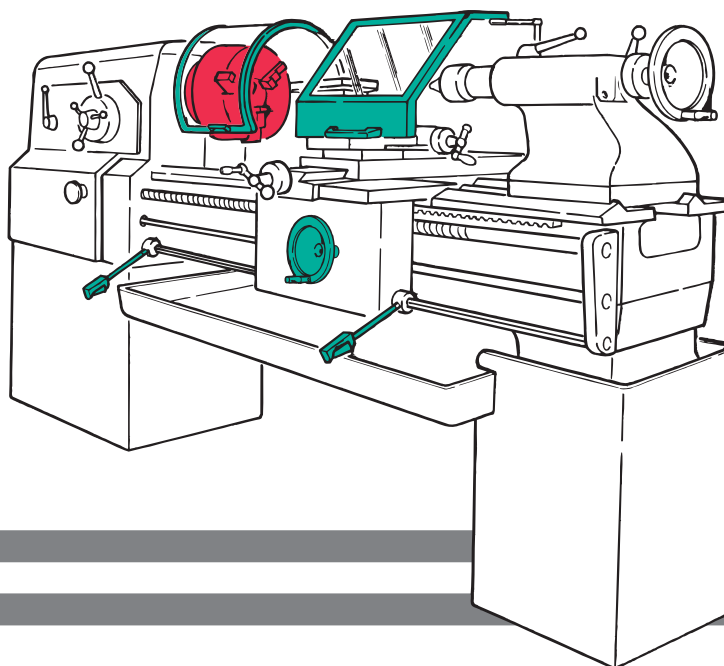


2.4 MAIN MACHINES

2.4.1 Manual lathe

Legislative Decree 81/08 App. V and VI, Presidential Decree 459/96 App. I, UNI EN 12840:2003

**HAZARD****PROTECTION**

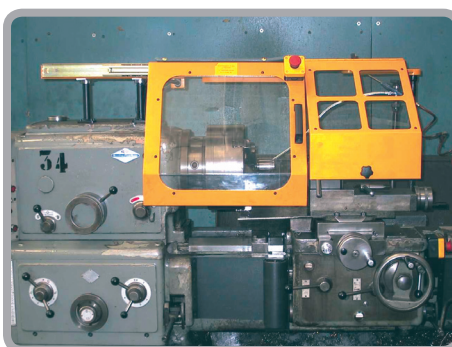
Machine tool, used to remove chips of material, where the main movement is the rotation of the workpiece around the tool axis. The workpiece is clamped in the spindle or self-centring chuck and rotated with it at a set speed.

2.4.1.1 HAZARDS

Entanglement and dragging with clamps, the spindle or the rotating workpiece

The spindle must be protected with a movable interlocked guard (see "Movable guards" in 2.2.3.2) that prevents direct access to the work area.

CAUTION! If the guard does not protect the hazardous area fully, all operations with the spindle rotating must be done by specially trained staff, who should not wear anything that could be caught and entangled in the rotating spindle (bracelets, necklaces, wide sleeves, long hair worn loose, gloves, etc.).



When machining bar stock, all the protruding part of the bar must be fully enclosed inside a fixed guard (see “Fixed guards” in 2.2.3.2) or a movable interlocked guard (see “Movable guards” in 2.2.3.2) capable of preventing contact with the rotating bar and containing any deformation of the bar itself.

2.4.1.1A ROTATING SPINDLE

To avoid contact with the spindle rotating due to its inertia after opening the guard, the lathe must be fitted with a braking system or interlock system with guard-locking (see 5.4 “Eye and face protection”).

Ejection of chips and other materials

There must be a movable interlocked guard on the toolholder carriage (see “Movable guards” in 2.2.3.2), as wide as the carriage, which protects the front of the operator against the ejection of chips or other material during machining. The guard must offer good visibility and be kept clean and transparent at all times.

At the rear of the machine there must be a chip guard to intercept any flying chips or other material that could damage people standing behind the lathe.

If the guards on the machine do not fully protect the area from which chips or fragments or cutting fluid could be ejected towards the operator, the operator must wear safety glasses (see 5.4 “Eye and face protection”).

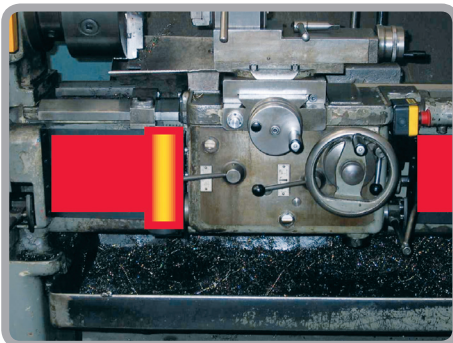
2.4.1.1B CHIP GUARD

This guard (see 2.2.3 “Guards”) must be fastened to the machine and cover the entire length of the machining area or, for machines with a stroke of more than 2,000 mm, be fastened to the carriage and be at least as wide as the carriage.

Contact with motion transmission equipment

Transmission bars that can entangle and drag while rotating must be fully protected with suitable fixed guards (see “Fixed guards” in 2.2.3.2) or movable interlocked guards (see “Movable guards” in 2.2.3.2).

Retractable guards can also be installed over the cross slide on one side and on the edge of the swarf tray, on the other side. Even if these guards do not cover everything, they are usually considered sufficient to prevent accidental contact with the motion transmission bars.



Crushing and impact from tailstock coming off

There must be a mechanical stop to prevent the tailstock from accidentally coming off the end of the bench while it is being manually adjusted.

2.4.1.2 CONTROL EQUIPMENT

Starting

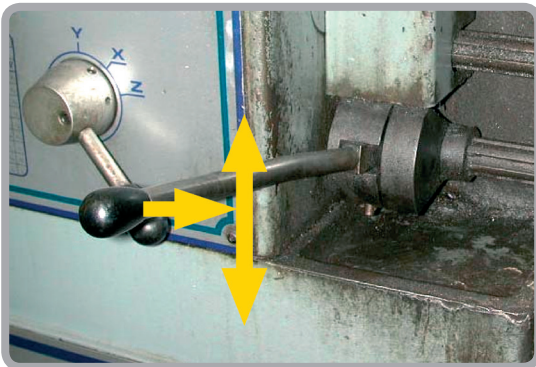
The only way to start the spindle rotating is to use specific control devices (see 2.2.6.1 “Starting”) that are easy to recognise and are protected against the risk of being accidentally activated (e.g. dual-action lever, pushbutton with guard ring, etc.).

2.4.1.2A CLAMPING THE WORKPIECE

It must not be possible to release the workpiece while the spindle is rotating.

For manual loading and unloading, means must be provided to prevent fingers getting trapped. For motorised self-centring chucks these means can include for example:

- 1) Adjustable jaw stroke not more than 4 mm or a guard that meets the safety distances (see 2.2.4 “Safety distances”);
- 2) Incremental movements not more than 4 mm;
- 3) Closing speed not more than 4 mm/s;
- 4) The workpiece clamping device must be controlled with the hands outside the work area, for example using a two-hand control together with a retractable workpiece support.



Unexpected restart

Unexpected restarts (see 2.3 “Machine electrical systems”) of the machine after power is restored must be prevented using a specific device.

Stopping

The stop control must stop the machine without causing hazards.

2.4.1.2B MAIN SPINDLE OPERATING STOP

When a machine operating stop is activated (see 2.2.6.3 “Stops”) the power to the motors controlling the various movements must not be shut off but, to ensure the hazardous parts stop, this must be monitored with very reliable devices with double switching.

Emergency stop

All machines must have at least one emergency stop device (see 2.2.6.4 “Emergency stop”) placed within easy reach of the operator. If necessary, there should be more than one emergency stop based on the size of the lathe and the number of different possible workstations.

Handwheels

The hazards of entanglement, entrapment and impact caused by the motorised rotation of handwheels must be prevented, for example by the automatic disengagement of the handwheels or by using flat, smooth and full-core handwheels.

2.4.1.3 ERGONOMICS

Positioning

The machine must be installed so that there is free access to the work area even when setting, loading and unloading devices, etc. are being used (for example, lifting devices).

Platform

The operator should stand on a wooden or plastic platform with a grating through which chips can fall and which is strong enough to walk on. Ergonomic aspects should be considered when choosing the platform height.

Changing the spindle

When changing the workpiece clamping device, the workpiece's weight must be considered. The operator must have appropriate tools to handle and position it correctly on the lathe.

2.4.1.4 OCCUPATIONAL HEALTH AND SAFETY

Emissions

The machine must be fitted with an appropriate local exhaust ventilation system ([see 3.6 "Local exhaust ventilation systems"](#)).

Noise

Find out the noise levels to which staff are exposed when using the machine and follow the employer's instructions.

2.4.1.5 PERSONAL PROTECTIVE EQUIPMENT

The machining work must be assessed carefully so that the use of PPE can be defined:



Safety glasses ([see 5.4 "Eye and face protection"](#)): glasses are not necessary during machining if the guards enclose the work area fully and prevent the ejection of chips in any direction.



Gloves ([see 5.6.4 "Gloves giving protection from mechanical risks"](#)) protecting against mechanical risks and which are waterproof when cutting fluid is used. Gloves can be an entanglement hazard when the spindle is rotating if the guards do not fully enclose the work area, meaning that no access is possible while it is rotating. In this case, gloves should be worn only when the spindle is not moving, to change and prepare the workpiece.



Safety shoes ([see 5.7 "Foot protection"](#)) with protective toe cap (S1). If the machining produces chips that could perforate the soles of shoes, these must have an anti-perforation sole (S1P).



Hearing protectors ([see 5.3 "Hearing protection"](#)).

2.4.1.6 OPERATING INSTRUCTIONS

The machine must come with a manual, in Italian, explaining correct use and maintenance, including a programme of periodic inspections.

2.4.1.7 OCCUPATIONAL HEALTH AND SAFETY ACTIONS

Before use

- Read the Operating Instructions and be trained on using the machine safely.
- Check that the guards ([see 2.2.3 "Guards"](#)) and safety devices ([see 2.2.5 "Safety devices"](#)) are present and positioned correctly.
- Check that the guard interlock systems work ([see 2.2.5.1 "Interlock systems"](#)).
- Check that the emergency stop button works ([see 2.2.6.4 "Emergency stop"](#)).
- Check that the system to protect levers and pushbuttons against accidental starts is working ([see 2.2.6.1 "Starting"](#)).
- Check that the workpiece is fitted and clamped correctly.
- Use the "rest" to support long workpieces and limit bending and/or vibrations.
- Choose the appropriate type of tool; check for wear and that it is fastened to the toolholder carriage.
- Choose the cutting speed and the rpm based on the material being machined and the tool type (see the tables and diagrams on the lathe).
- When the "clamp" is used, check that the guard around the spindle protects the rotating clamp disc and the clamp itself properly.
- Remove the chuck key (use keys that come out when released).
- Material that could become unstable and fall due to vibrations should not be placed on the machine headstock.
- Direct the cutting fluid nozzle correctly.
- Make sure that the right amount and pressure of cutting fluid needed for machining is used (to avoid overheating and fumes).
- Activate the exhaust system for cutting-fluid mist (if the work conditions require one to be installed).
- Wear clothes that cannot become entangled with the hazardous moving parts on the machine.
- Do not wear scarves, necklaces, bracelets, watches or rings and tie up long hair.
- Wear the personal protective equipment (PPE) shown in this data sheet.

2.4.1.7A EJECTION OF CHUCK KEY

It must be impossible to start the spindle if the key is still in the chuck. Having a correctly positioned movable interlocked guard or using a self-ejecting key is sufficient for this.

During use

- Keep the guards on the spindle and turret positioned correctly.
- Do not override or tamper with the safety devices. If they have to be deactivated for a specific job, other safety measures must be adopted immediately, such as very slow machining speed and hold-to-run controls.

- Replace the tool only when the machine is stopped.
- Do not carry out any operation with manual tools on the rotating workpiece, such as polishing with an abrasive cloth or deburring with files or scrapers. This type of machine is not safe enough for this type of use.
- For finishing operations where sandpaper or an abrasive cloth needs to be used, use appropriate supports (bridges) fitted on the machine structure.
- Chips should be removed only using special hooked tools with hand guard.
- Do not remove chips manually, even when using gloves.
- Report any malfunctions or faults promptly to the supervisor.
- Avoid getting cutting fluid on your hands or clothes (do not wear dirty overalls or canvas shoes, do not clean your hands on your overalls, do not keep dirty cloths in your pocket); wash your hands often (after finishing work and before eating, going to the bathroom and putting on gloves).
- Contain any cutting-fluid spills with special materials or substances provided by the employer.

After use

- Switch off the machine.
- Empty the chip tray with the machine stopped and using appropriate tools.
- Put measuring equipment and instruments back in their containers.
- Leave the area around the machine (especially the workstation) clean (free of chips, swarf and cutting fluid) and tidy.
- Reactivate any deactivated guards.