

The Instruction Manual For Safe Use


Diamond and CBN wheels


To ensure safety, be sure to carefully read before using the diamond and CBN wheels (below referred to as the 'wheel'), the instruction manual of the wheel, the inspection sheet describing the specifications of the wheel, the instruction manual of the used machine, and the instruction manual of the coolant (grinding oil) .

Be sure to keep the instruction manual and inspection sheet at a place always visible to the wheel operator.

Meaning of warning and caution

The Instruction Manual and Attention in the diamond tool security as follows according to the extent of risk and injury that could be caused by improper handling.

 **Warning** Improper handling may result in death or serious injury.

 **Caution** Improper handling may result in a minor injury or only material damage.

Prohibited action symbols



Prohibited



Do not touch

Instructed action symbols



Follow the instruction



Wear safety glasses



Wear safety shoes



Wear a safety hat



Wear a mask



Wear earplugs





Unplug the machine

Be sure to refer to the glossary in this manual for the terms underlined.

1. Work environment, Clothing, Protective outfit

Warning







 Be sure to properly install the safety cover specified by the manufacturer of the used machine. When a wheel or mached part breaks, the resulting dispersed fragments can hit nearby operators and cause serious injury.

 No person other than authorized personnel is allowed to enter working zone of the used machine. Especially keep away from the rotary tool, a table and other parts of the used machine, and travel range of the machine.




Be sure that operators wear dust goggles, safety shoes, hard hats and other protective outfits well as work clothing with tight sleeves and trousers furled at the bottom.

Caution








-  Provide sufficient ventilation to remove coolant (grinding oil) mist, dust and other particles from the air.
-  The operator must always wear a dust mask and earplugs as protective outfit.
-  Clean the floor around the used machine, and keep things around the machine tidy and in order.
-  Clearly mark on the floor the moving range of the table and other movable components.
-  Do not put things or stand still in the moving range.
-  Sparks may be generated by contact between the wheel and a material. Do not use the wheel in flammable or explosive environments.

2. Before use

Warning



-  Use the wheel at circumferential speeds below the maximum working circumferential speed. Make sure that the maximum rotation speed of the wheel is higher than the spindle rotation speed of the used machine.

Caution










-  Make sure that the dimensions of the wheel are compatible with the designated dimensions of the used machine (the outer diameter, thickness, and hole diameter of the wheel).
-  After cleaning the wheel, make a visual inspection to check for cracks, fissures, defects, scratches, lifting of the abrasive grain layer due to cracking, and other improper connection.
-  If the base metal of the wheel is an iron-based alloy, clean the corrosion inhibitor.
-  Clean the spindle wheel mounting part of the grinder.
-  Clean the flange and check for scratches, bends, warpage, or imbalance.
-  Check for bends and warps of the wheel.
-  Read the inspection sheet of the wheel and the descriptions given on the body, and make sure that the wheel is appropriate for the intended use.

3. Tool set up

Warning

-  Be sure to turn off the power off when mounting the wheel on the spindle of the grinder.
-  Install the safety cover specified by the used machine manufacturer appropriately.

Caution





-  Check for scratches and adhesion of foreign matter in the matching part of the wheel and flange (the inner face of the hole of the wheel, the side faces, the flange end face, and the inner face of the pilot).
-  Repair, with sandpaper or the like, minor scratches, burrs, and swells in the hole of the wheel.
-  Insert a label if the material of the wheel core is grindstone, and do not insert if the material is another type.
-  Press gently the wheel into the flange.
-  Do not press forcibly by hammering etc.
-  It is prohibited to machine the bore of the tool to change its dimensions. Please consult with us if necessary.
-  Tighten the flange screws in a criss-cross .
-  Balancing the wheel after set on balancer.
-  In the case of a shaft-mounted wheel, make sure that the overhang does not exceed the length suited for the rotation speed.

Precautions


The wheel may also be balanced after being mounted on the grinding machine. Another method is to loosen the matching part of the wheel and the flange and then tighten the wheel while checking the fluctuation of the reference plane that is set near the abrasive grain layer of the wheel.

4. Idling

Warning



-  Check whether the material is securely fastened and operates properly.
-  Check whether the wheel is securely fastened, and whether the feed mechanism operates properly.
-  Check whether the wheel is rotated in the proper direction.
-  Perform no-load test run for 1 - 3 min. before operating, check whether there occurs abnormal sound and vibration.

Caution

-  Make sure that the coolant is poured onto the point of grinding.

5. Grinding

Warning

-  Never touch the wheel when it is rotating.
-  If abnormal sound or vibration occurs, escape the wheel immediately, and fully stop the operation.

- ! After completing the grinding operation, stop the supply of the coolant, drain off the fluid, and then switch off the rotation of the wheel spindle.
- ! Wait until the wheel stops naturally, without touching it by hand or pressing it against any object.
- ! Be sure to turn off the power when removing the wheel from the grinder spindle.

Caution


- ! Conduct truing and dressing.
(Consult with us for the method and equipment for truing and dressing.)
- ! After the truing and dressing, recheck the balance. (Consult with us for the method and equipment for wheel balancing on the machine.)
- ! To prevent excessive cutting when the wheel gets in contact with the material, avoid the wheel from burning in, in particular during dry tool grinding.
- ! In a grinding test, make sure that feed, grinding depth, cycle time and other settings are implemented properly.
- ! Conduct dressing when the cutting performance of the wheel is degraded.
- ! Conduct truing when the wheel is deformed.
- ! Check for burns and chatter marks in the material.
- ! Make sure to avoid overloading.

Precautions

Please consult with us if there is any problem in the grinding condition or tool specifications in terms of dressing intervals, grinding performance, and the like.

6. Storage, Handling

Caution

- ! Observe the working face of the wheel and check for burn marks, loading, glazing, pull out, lifting of the abrasive grain layer, defects, cracks, and fissures.
- ! When unpacking and storing the wheel, keep it in a dry place protected from falls and impacts.
- ! If the base metal of the wheel is an iron-based alloy, apply preservative when storing the wheel.
-  Do not modify the shape of the wheel. Please consult with us if necessary.

◆Glossary◆

1. Inspection sheet

Items described in an inspection card include the geometry, dimensions, quality, serial number, and maximum working circumferential speed or maximum rotation speed of the wheel.

2. Safety cover

Guard to protect the operator from fragments that fly when the wheel breaks during its rotation. Also used for protecting the operator from injury caused by touching the wheel during its rotation.

3. Maximum working circumferential speed, maximum rotation speed

The maximum working circumferential speed or the maximum rotation speed must never be exceeded during the use of the wheel.

The maximum working circumferential speed or the maximum rotation speed is indicated on each tool or inspection card according to the standard maximum working circumferential speed specified by the manufacturer.

The conversion between the circumferential speed and rotation speed of a wheel is given by

$$V = \frac{3.14 \times D \times n}{60 \times 1000} \qquad n = \frac{60 \times 1000 \times V}{3.14 \times D}$$

V : Circumferential speed of the wheel (m/s)

π : Circular constant $\doteq 3.14$

D : Outer diameter of the wheel (mm)

n : Rotation speed of the grinder spindle (min^{-1})

Generally, the maximum working circumferential speed of the wheel depends on the material of the core, the method of bonding between the abrasive grain layer and the core, the type of binder of the abrasive grain layer, and the method of grinding.

4. Pilot (of flange)

Matching part of the flange that fits in the hole of the grinding machine. Plays an important role in centering when mounting the wheel.

5. Core

Central part of the wheel tightened when mounting the tool on the flange. It is made of metal, plastic, grindstone, etc. It is also called the main part or base metal if it is metallic.

6. Abnormal sound

High-pitched metallic chattering and vibrating noise, different from the constant sound of the wheel during normal grinding.

7. Abnormal vibration

Irregular vibration, different from the constant vibration of the wheel during normal grinding.

8. Escape the wheel

Act of disengaging the wheel from the material.

While the wheel is in contact with the material during grinding, disengagement can be achieved by lifting the wheel, lowering the material, or retracting the wheel by button or handle operation.

9. Truing

Act of shaping or reshaping when the work face of the wheel is deformed.

10. Dressing

Act of restoring the performance of the wheel by treatment when the work face of the wheel is in poor condition and the cutting and other performance is unsatisfactory.

11. Loading

State in which swarf is stuffed around the work face of the wheel, obstructing the grinding of the material.

12. Glazing

State in which abraded, flatten abrasive grains align on the work face of the wheel, obstructing the grinding of the material.

13. Pull out

Fall-off of abrasive grains from the work face of the wheel.