

Cut Off Wheels

Introduction

At present, in the professional metallographic laboratory, most of the cutting only uses one type of grinding wheel to cut metallographic samples of various materials and hardness. This unscientific method is not only inefficient, but also causes damage to the sample, or causes serious deformation of the sample layer, which is not easy to be completely eliminated in the subsequent grinding and polishing process, and affects the quality of metallographic sample preparation.

According to the difference in the material and hardness of the metallographic sample, the correct selection of the grinding wheel cutting blade can improve the cutting efficiency and minimize the damage to the sample.

According to the different materials of metallographic specimens, our company has developed a series of metallographic cutting blades which are specially adapted for metallographic cutting. Various specifications are complete, suitable for metallographic sample cutting machines of various models and specifications at home and abroad. It can fully replace similar products of professional foreign companies.

All cutting discs are made of high-strength resin and preferably special abrasives, which allow a large linear speed, more than 50 m/s, and are not brittle; Sharp cutting, minimal cutting heat, and shallow heat-affected layer of the sample minimize interference and provide the perfect prerequisite for the next step in metallographic sample preparation.



Technical parameter

Series	material	Scope of application	Linear velocity	Specification
A60	Alumina, resin-based	Extremely hard ferrous metal (HRC > 55)	30~36m/s	150*12.7*0.5
A50	Alumina, resin-based	hard ferrous metal (HRC44~55)	32~40m/s	200*22*0.8
A30	Alumina, resin-based	softer ferrous metal (HRC20~40)	35~45m/s	250*32*1.5
S20	Silicon carbide material, resin based	Very soft non-ferrous metals such as copper alloys, aluminum alloys (HV < 2000)	35~45m/s	300*32*2.0
				350*32*2.5
				400*32*3.0
				450*32*3.2
				508*50.8*4.0

Hardness	Linear velocity	Angular velocity				
		φ200	φ250	Φ300	Φ350	Φ400
HRC > 60	30~36m/s	2850~3400	2280~2740	1900~2250	1600~1950	1450~1700
HRC40~60	32~40m/s	3050~3800	2450~3000	2050~2500	1750~2170	1550~1900
HRC < 40	35~45m/s	3350~4280	2660~3400	2250~2850	1900~2450	1660~2100

Instructions

1. Installation

(1) Select the appropriate grinding wheel cutting disc according to the material, hardness, etc. of the material to be cut before use;

(2) Use a flanged with a diameter of not less than 1/4 of the wheel diameter to compress the cut-off wheel, Make sure there is a tight fit between the contact surfaces, screw in the screw, and tighten the screw with the ejector pin and wrench.

2. Unload

Use the ejector rod and wrench to loosen the screw, then unscrew the screw, remove the flange carefully remove the grinding wheel along the middle seam of the fixture, and store it properly.

3. Use

(1) At the beginning of cutting, use a small force to cut in slowly, and after the grinding wheel is cut in, feed it

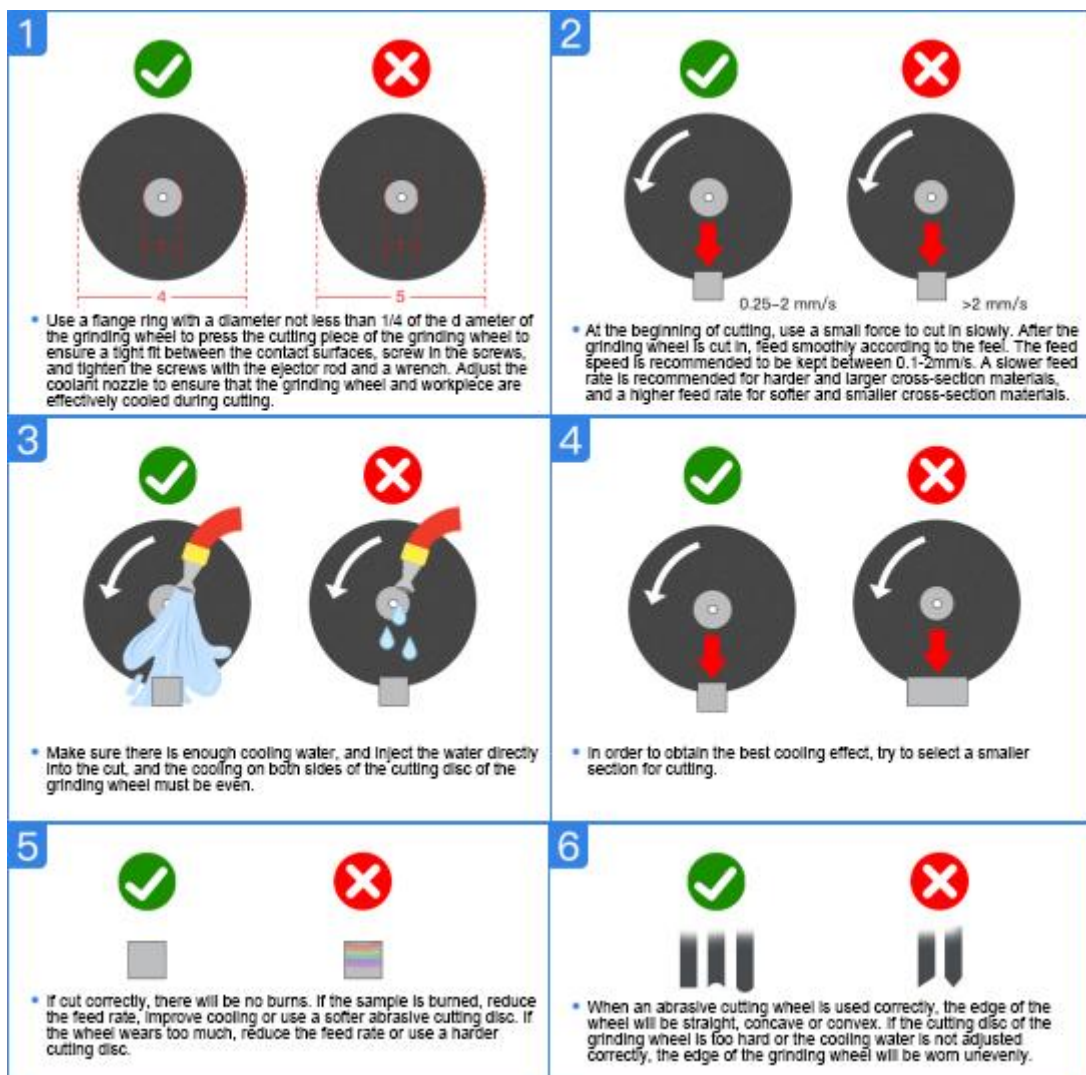
smoothly according to the feel, and the feed rate is recommended to be between 0.1~2mm/s. A slower feed rate is recommended for harder and larger cross-section materials, and a higher feed rate for softer and smaller cross-section materials.

(2) Make sure you have enough cooling water and inject the water directly into the cut. Cooling must be uniform on both sides of the wheel cutting disc.

(3) In order to obtain the best cooling effect, try to choose a smaller section for cutting.

(4) If cut correctly, there will be no burn. If the sample is burnt, reduce the feed rate, improve cooling or use a softer grinding wheel to cut the disc. If the wheel wears too much, reduce the feed rate or use a harder wheel cutting disc.

(5) When grinding wheel cutting discs are used correctly, the edge of the wheel will be straight, concave or convex. If the wheel cutting blade is too hard or the cooling water is not adjusted correctly, the wheel edge wears unevenly.



Precautions

1. Before working, you must wear labor protection equipment and check whether the equipment has a qualified grounding wire.
2. To check and confirm whether the grinding wheel cutting machine is intact and whether the grinding wheel piece has deformation, cracks, chipping and other defects, and prohibit the use of diseased equipment and unqualified grinding wheel pieces.
3. Grinding wheel is only allowed to be installed and used in one piece, and it is strictly forbidden to install and use two or more pieces at the same time.
4. When cutting materials, do not use excessive force or sudden impact, and turn off the power immediately when there is an abnormal situation.
5. It is not allowed to install the grinding wheel that has been worn on the cutting machine with a larger specification on a cutting machine with a smaller specification and continue to use it.
6. When replacing the grinding wheel, wait for the equipment to stop stably, and check the grinding wheel.
7. Note that the maximum speed of the grinding wheel installed should match the cutting machine, and it should not be used at excessive speed.
8. To choose a suitable cutting blade according to the cut sample, you can choose according to the products provided above.
9. Store resin cut sheets in a place out of direct sunlight and moisture, and in a horizontal position.
10. The cutting blade should be installed as required, and the test start operation should be smooth before starting to work.
11. The workpiece must be clamped to avoid loosening, otherwise it will cause the vibration of grinding wheel during cutting, and the partial instantaneous force of the grinding wheel will exceed its bearing limit and an explosion accident will occur.
12. It is strictly forbidden to sand objects on the cutting blade.
13. The clamping device should be safe and reliable to prevent accidents when the workpiece is loose.
14. When cutting, the operator should cut evenly and avoid the front of the cutting blade to prevent accidents due to improper operation of the cutting blade.

15. After the work is completed, wipe the dust on the surface of the grinding wheel cutting machine and clean the workplace, rain-proof measures should be taken for outdoor storage.

Common usage problems and solutions

Common Problem	Possible Reason	Corresponding Solution
The grinding wheel wears too fast and the life is short	1、 The selected grinding wheel is not hard enough to cut this material.	1、 Select the appropriate hardness grinding wheel according to the technical parameter table above.
	2、 The grinding wheel is too thin.	2、 Choose a relatively thick wheel.
	3、 The speed of the cutting machine is too low.	3、 Refer to the technical data table above to select a higher speed.
	4、 The cutting pressure is too high and the feed speed is too fast.	4、 Reduce cutting pressure, reduce feed speed.
Low cutting efficiency	1、 The hardness of the grinding wheel is not appropriate.	1、 Select the appropriate hardness grinding wheel according to the technical parameter table above.
	2、 The selected wheel diameter is too small relative to the diameter of the cutting surface.	2、 Choose a wheel with a larger diameter.
	3、 The power of the cutter is too low.	3、 Use a more powerful cutter.
Grinding wheel stuck	1、 Improper selection of grinding wheel.	1、 Select the corresponding grinding wheel according to the technical parameters in the table above.
Burns on the edges	1、 The grinding wheel is too hard.	1、 Choose a wheel with a lower hardness.
	2、 The cutting feed is too large and the cutting pressure is too high.	2、 Reduce the cutting feed and reduce the cutting pressure.
	3、 Improper cutting method (eg cutting in one place for a long time).	3、 Try to cut back and forth in a straight line as many times as possible, do not cut in one place for too long, exit the stroke properly, and then carry out the cutting operation.
	4、 Too little cutting coolant or incorrect spraying.	4、 Replenish the cutting coolant and adjust the coolant nozzle to the right position.
Lots of burrs after cutting	1、 Grinding wheel piece is too thick.	1、 Choose a thinner wheel.
	2、 The particle size of the wheel is too coarse	2、 Choose a grinding wheel with a finer particle size.
Uneven wear on the edge of the wheel	1、 Improper way of working (use the cutting discs as grinding discs).	1、 It is strictly forbidden to use the cutting disc as a grinding disc. Please use a special grinding disc or a multi-purpose grinding wheel.
	2、 The workpiece is not clamped firmly, resulting in vibration.	2、 The workpiece must be securely clamped in a suitable position for cutting or grinding.

Broken grinding wheel	1、 Wheel stuck during cutting.	1、 Vertical cutting must be ensured, otherwise there will be excessive lateral pressure on one side, resulting in the rupture of the cutting blade.
	2、 Incorrect cutting, such as cutting with too much force, grinding wheel piece being used at excessive speed, cutting too fast at the beginning, or cutting multiple pieces of material at the same time.	2、 Reduce the cutting force appropriately, use it according to the speed limit, put it slowly and gently at the beginning of cutting, and cut only one piece of material at a time.
	3、 The structure of the cutting blade is uneven, the flatness of the cutting blade is poor, the hardness of the cutting blade is high, and the resin of the cutting blade lacks toughness.	3、 Replace it with the qualified grinding wheel.
	4、 The diameter of the flange is less than 1/4 of the diameter of the grinding wheel.	4、 Replace the flange with a diameter larger than 1/4 of the diameter of the grinding wheel.
	5、 Poor lubrication, dry cut.	5、 Add or replace the cutting coolant.
Vibration of grinding wheel	1、 The balance of the grinding wheel is not good.	1、 Please replace the grinding wheel.
	2、 Improper maintenance of the cutter (e.g. excessive bearing wear)	2、 Replace the bearings.
	3、 Improper wheel clamping, resulting in the wheel not being installed in the center.	3、 Check the bearing of the cutting machine, and check the operation after the grinding wheel is clamped.
Bias Cutting of workpiece	1、 The flatness of the grinding wheel exceeds the standard, and there is deflection when rotating.	1、 Replace the grinding wheel with qualified flatness.
	2、 Uneven texture of the grinding wheel.	2、 Replace the cutting blade with a uniform texture.
	3、 Unequal grinding force on both sides of the grinding wheel.	3、 Use a grinding wheel with the same texture on both sides, and spray the cutting coolant evenly on both sides of the grinding wheel.

Storage method

Lay the grinding wheel flat or hang it in a ventilated and cool place, avoid direct sunlight and avoid humid environment. The stacking of grinding wheels should not be too high.