

## Cutting

**The Accutom-50 is a technician operated instrument only. If you require the cutting of samples, please consult the technician to organise.**

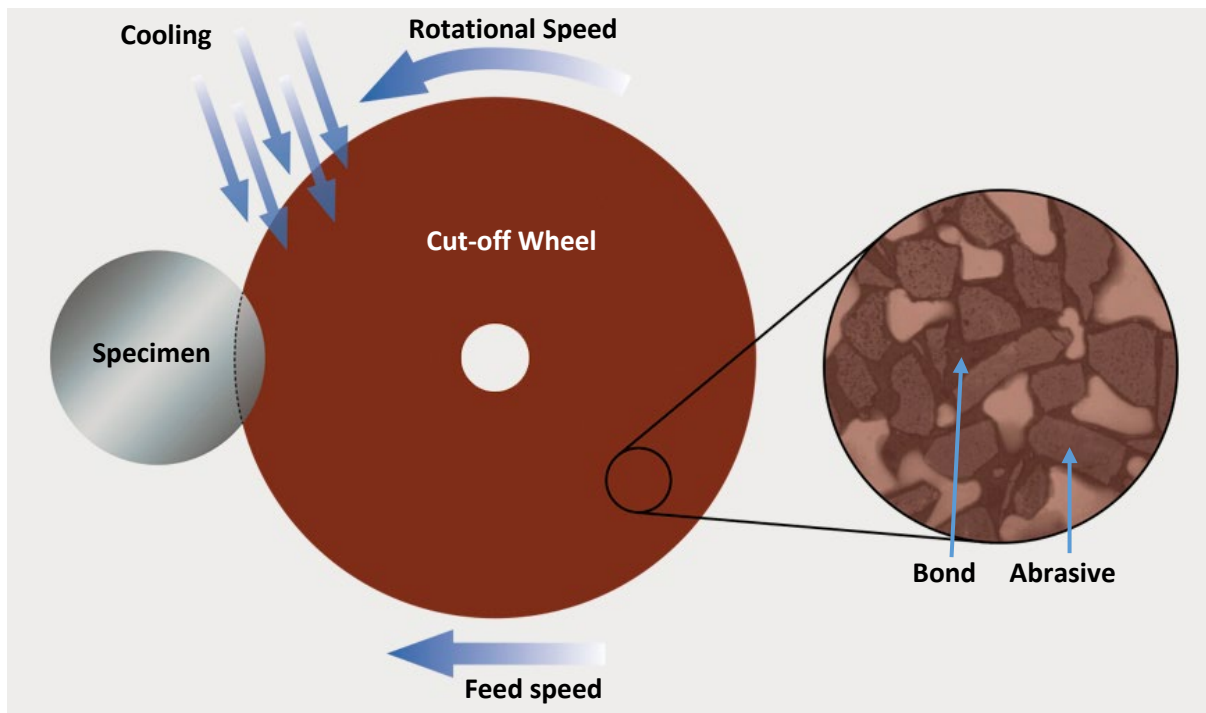
### Sample objectives:

- Representative sample – considering the variety of materials within it.
- Maximum planeness
- Minimum deformation and structural changes
- Minimise post-processing

### Problems that can occur:

1. Thermal damage/burning of the specimen surface, due to;
  - Feed speed too fast
  - Too much force
  - Wrong cutting wheel
  - Not enough cooling
2. Burring, due to;
  - Feed speed too fast

### Abrasive wet cutting on the Accutom-50



Abrasive wet cutting introduces the least amount of damage in relation to the time used for the process. A cooling liquid flushes the wheel to avoid damaging the sample with frictional heat, and also removes debris from the cutting area.

### Cut-off Wheel Selection Guide

The choice of cutting wheel is very important in order to minimise deformation and structural changes to the sample, and to minimise post-processing. Table 1 outlines the required material for the abrasive and bond of the cutting wheel based on sample material.

Table 1: Recommended abrasive and bond material of cutting wheel for different sample materials.

Sample Material	Abrasive	Bond
Ferrous metals	Aluminium Oxide	Bakelite
Non-ferrous metals	Silicon Carbide	
Very hard ferrous metals	Cubic Boron Nitride	
Hard ceramics	Diamond	Metal
Sintered carbides		
Minerals		
Very hard materials with low metal content eg: plastics, resins		
Composites		Electro-plated Metal

The lab has stocks of *aluminium oxide* and *silicon carbide* cutting wheels available for use. If you require a different cutting wheel you will need to organise its purchase with the [project budget form](#). The standard wheel size for the Accutom-50 is 150 x 0.5 x 12.7mm. [Cut-Off Wheel Selection guide](#).

### Cutting Parameters

#### 1. Feed speed

- Usually kept below 1 mm/s
- Adjusted for a given cut-off wheel and the sample to be cut.
- Too low prolongs the cutting process
- Too high increases the risk of thermal burns

#### 2. Rotational speed

Rotational speed is adjusted to change the properties of the cut-off wheel

- Hard wheel acts like a soft wheel at lower rotational speeds
- Soft wheel acts like a hard wheel at higher rotational speeds

#### 3. Cooling

- Important for reducing thermal burns and limiting the amount of heat generated in the sample
- Best added at a right angle
- The sample should be cold when removed



#### 4. Contact Area

Cut into the smallest surface area face to ensure a greater surface area of fresh abrasive is coming into contact with your specimen with each rotation.

### Features of a proper cut

- No blocking of the cut-off wheel.
- Minimum wear of the cut-off wheel.
- The cut surface is smooth.
- Minimum burrs.
- The cut piece is cold.

More information about [cutting](#).