



- Superior surface quality
- Faster results
- Cost-efficiency



Cut-off wheels specially developed for materialographic specimen preparation



The first step in the materialographic process

The first step in a process sets the pace and determines the quality of the finished result. In the materialographic process, the first step is most often sectioning. The purpose sectioning is to section a representative, yet manageable sample from a large or irregular piece of a given material or to obtain sections at specific angles, e.g. cross-sections. Sectioning makes high demands on a number of factors: Speed, planeness, amount of thermal damage and degree of deformation.

About abrasive wet cutting

The most commonly used method to section a material is abrasive wet cutting. The cut-off wheels consist of two main components: abrasives and bonding material. During sectioning, the cut-off wheel is flushed with a cooling liquid to avoid thermal damage and to remove debris, providing the highest possible material removal.

A complete product range

Struers cut-off wheels have been specially developed for materialographic specimen preparation: they produce specimens that are in perfect condition for the next preparation step. Our large range of different wheels assures that all materials can be cut without structural changes due to overheating or deformation, and guarantees maximum life time of the wheels.

The wheels are designed for Struers machines, taking into consideration the most recent developments in wet cutting techniques. Various abrasives are used for sectioning of different materials. However, Al_2O_3 or SiC in a resin bond is used for sectioning most metals.

The selection of bond hardness must be based on an evaluation of the hardness of the material. Soft materials should be sectioned with cut-off wheels having a hard bond as the grains retain their abrasive ability for a long time. Harder metals require a softer resin bond, which gives a fast replacement of abrasive grains.

**INTELLIGENT
CUT-OFF WHEELS**



For the sectioning of materials with hardness above HV 700, diamond or CBN (cubic boron nitride) are used as the abrasive. Because of the high cost of these abrasives only the outer rim of the wheel is covered with abrasive particles in a resin or a metal bond. Metal bonded wheels are used for sectioning of brittle materials, such as ceramics or minerals, while bakelite bonded wheels are used for more ductile materials, such as sintered carbides or composites containing predominantly hard phases.

Intelligent cut-off wheels

All Struers abrasive bakelite wheels have built-in compensation to wear.

As a conventional cut-off wheel with uniform abrasive density wears, the sectioning performance changes from the outside to the inside. The number of grains is reduced, the load of each grain increases and the wheel appears to get softer and softer. The drawback is higher wear and a less controllable cut. The abrasive density on a Struers wheel varies across the wheel radius – with increasing density towards the center of the wheel. This means that the sectioning performance remains constant even as the wheel wears to a smaller diameter (see illustration on page 5). That is converted into less wear and better control of the section.

3D cut-off wheels* for increased performance

Struers was the first to offer cut-off wheels with a hexagonal surface pattern. The cut-off wheels are designed so that each side has a 3 dimensional hexagonal surface pattern, also called the 3D surface.

With the 3D cut-off wheels cooling of the workpiece is much more efficient. As the aim in materialography is to obtain the true, undisturbed structure, less heat damage due to more efficient cooling is

an important step towards faster, more reliable preparation results.

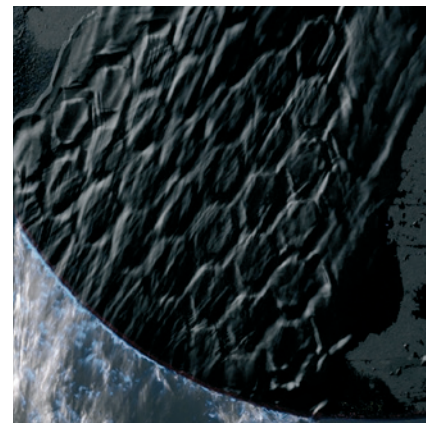
In addition, with the 3D design the problem that debris builds up during cutting is completely eliminated. The cutting table and the entire cutting chamber stay clean as the small particles easily are washed away. Cleaning of the equipment is far easier, and the risk of overflowing because of a blocked outlet is greatly reduced.

Premium cut-off wheels for increased yield or speed

The Struers Premium cut-off wheels were developed for high-volume serial sectioning, typically in the automotive industry. A unique combination of hard abrasives, thinness and a spiral-shaped surface pattern has resulted in excellent abrasive properties. This results in more sections per wheel or a higher turnaround time.

Cost efficiency

Selecting the right cut-off wheel is not just a matter of preparation quality, it is also the best way to save time and consumables.



With the 3D surface all the water sprayed into the channels between the hexagons is transported into the cut, thus cooling the workpiece much more efficiently.

bles. Choosing the correct wheel for an application will produce a surface which requires less subsequent preparation steps. Thus producing specimens in a shorter time and at a lower cost per sample.

Struers range of cut-off wheels are under constant improvement and gives you:

- Specimens that are in perfect condition for the next preparation step with no thermal damage
- A complete product programme covering all materials and materialographic applications
- High quality wheels with built-in compensation to wear. The result is controlled cutting and uniform results
- 3D wheels offering less heat damage due to more efficient cooling. In addition the 3D surface means improved handling of cut-off debris and easier cleaning of the equipment
- Specimens in a shorter time and at a lower cost per sample
- Premium wheels with ultra-hard, self-sharpening grains and spiral-shaped, thin wheels. The unique properties enable an increasing number of sections or sectioning speed

How to select the correct cut-off wheel:

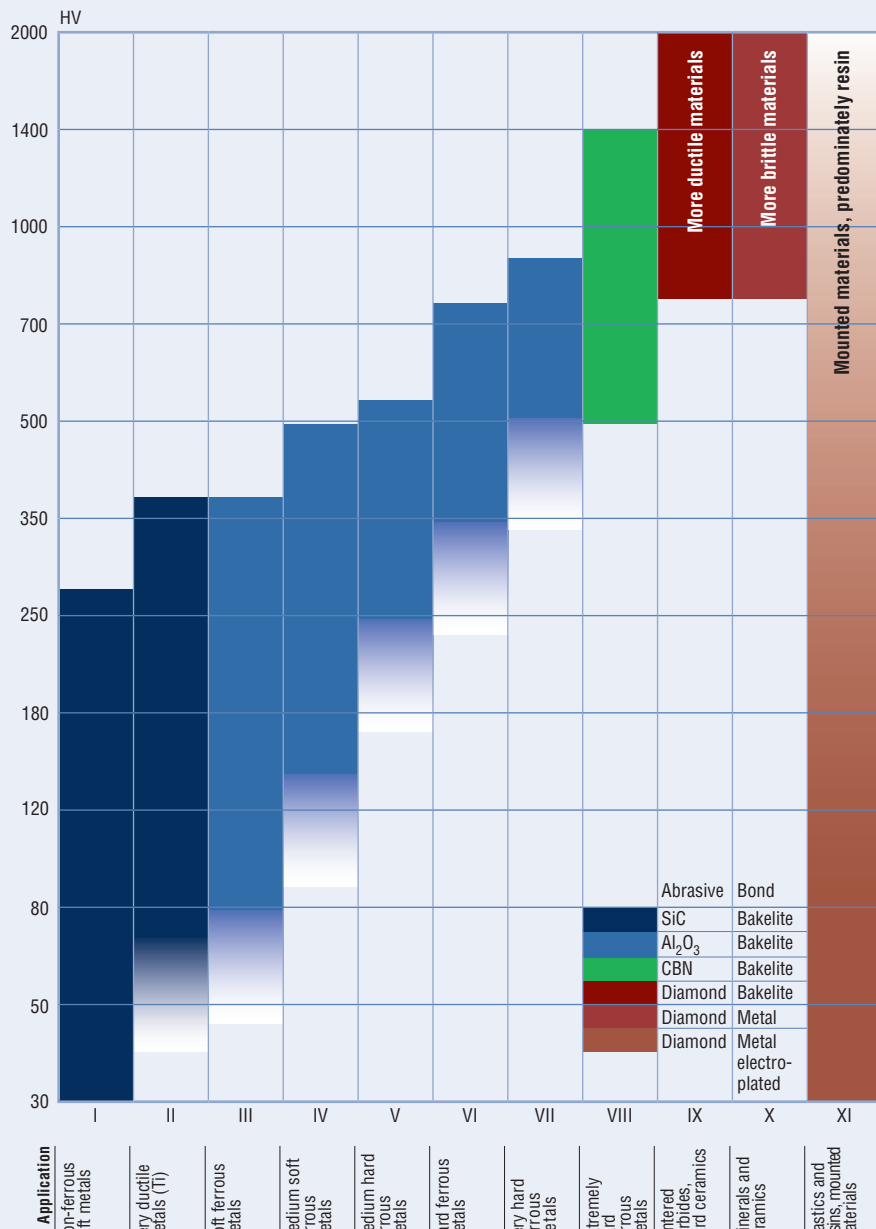
Struers offers a wide variety of wheels, which means that you can select the hardness that optimally balances durability with finish.

If the hardness of the material is known, use the table at the top of the page. In the table at the bottom, you will then find the cut-off wheel codes for the specific cut-off machines. If the hardness of the material is not known, find a suitable cut-off wheel according to material group in the table below.

1. Go upwards on the y-axis of the overview to the right until you find the hardness value of your material.

2. Move to the right, until you cross the material group that fits your application. If you only have one material to cut, find the wheel where your material's hardness is placed as close to the middle of the interval as possible. For two or more materials, see if you can find a wheel that covers the whole hardness range. For workpieces with smaller or larger diameters, it may improve the result to choose a material group one step to the left, respectively to the right of the initial selection.

3. Find the number (I-XI) of the material group, and see the table below for the code of the correct wheel for your cut-off machine.

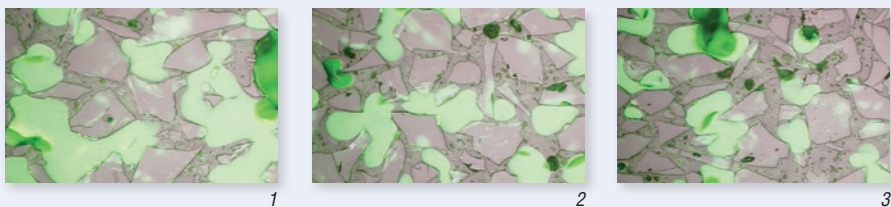


Cut-off machine	Std. wheel size* (mm)	Application	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Magnutom-500/-5000	508 x 3.5 x 32	Non-ferrous soft metals	10S51										
Exotom-100/-150 Magnutom-400 /-500/-5000	432 x 3.0 x 32	Very ductile metals (Ti)		20S43									
Axitom-5/400	400 x 3.0 x 32	Soft ferrous metals			20S35	X20A400C	X30A400C	X40A400C					
Axitom-5	350 x 2.5 x 32	Medium soft ferrous metals				20A35	20A35	30A35	40A35				
Labotom-15/-20		Medium hard ferrous metals											
Exotom/Unitom-2/-5/-50		Hard ferrous metals											
Unitom/Discotom-50/-60/-65/-100	300 x 2.0 x 32	Very hard ferrous metals											
Discotom-5/-6/-10/Labotom-3/-5	250 x 1.5 x 32	Extremely hard ferrous metals											
Discotom/Labotom	235 x 1.5 x 22	Sintered carbides, hard ceramics											
Discoplan-TS	200 x 1.0 x 22	Minerals and ceramics											

1) 406 x 1.8 x 32 2) 350 x 1.5 x 32 3) 356 x 1.5 x 32 4) 305 x 1.8 x 32 5) 305 x 1.5 x 32 6) 350 x 1.8 x 32 7) Width = 1.3 8) Width = 1.1 9) Width = 0.8 10) Fibreglass reinforced
11) For hard and ductile materials, Ni-base alloys 12) 3D cut-off wheels 13) Width = 0.6 14) Width = 0.4 15) For sintered carbides in steel 16) Width = 2.4 17) Width = 3.2 18) Premium Cut-off wheels 19) Fiber reinforced

Precision cut-off machine	Std. wheel size* (mm)	Application	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
Secotom-1/-10/-15/-50/-6/-20/-60**	200 x 0.8 x 22	Non-ferrous soft metals	10S20	10S20	30A20	30A20	50A20	50A20	50A20	50A20	BOC20	BOD20	MOD20 ¹³ M1D20 ¹³	E1D20
Accutom-10/-100/-5/-50	150 x 0.5 x 12.7	Very ductile metals (Ti)		10S15	40A15 30A15	40A15 30A15	50A15	50A15	50A15	50A15	BOC15	BOD15	MOD15 M1D15	EOD15
Accutom-2	125 x 0.5 x 12.7	Soft ferrous metals			30A13	30A13	50A13	50A13	50A13	50A13	BOC13	BOD13 ¹³	MOD13 ¹⁴ M1D13 ¹⁴	M1D13 ¹⁴
Minitom	125 x 0.5 x 12.7	Medium soft ferrous metals											MOD13 ¹⁴ M1D13 ¹⁴	M1D13 ¹⁴
Wheels with special sizes	100 x 0.3 x 12.7	Medium hard ferrous metals											MOD10 M1D10	M1D10
	75 x 0.15 x 12.7	Hard ferrous metals											MOD08 M1D08	M1D08

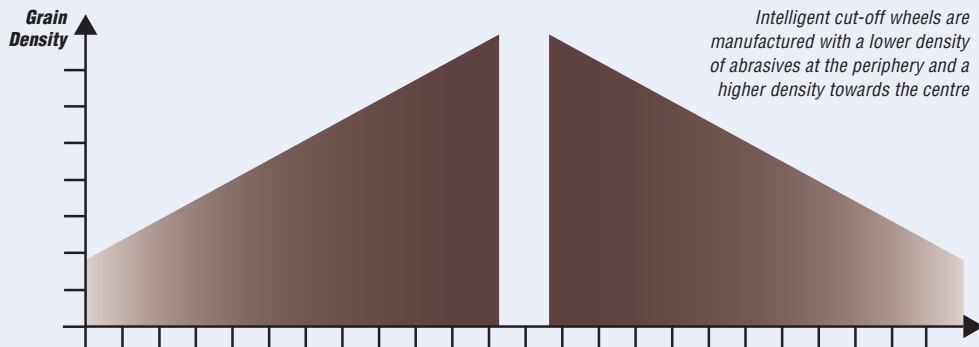
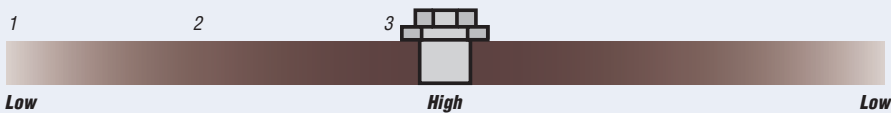
*) Diameter x Width x Bore in mm, **) On Secotom-1 only use MOD20 + BOD20 + M1D20



Constant improvement

Struers cut-off wheels offer the widest variety of abrasive types and bond properties, allowing you to find the optimal wheel for all materials and materialographic applications.

At Struers, we are constantly striving to develop new improved and environmentally friendly consumables. To you this means superior preparation quality, faster results and better cost-efficiency. Make your lab more efficient, more productive and successful with performance products from Struers.



The Struers cut-off wheels are boxed with cardboard flanges and detailed instructions

Struers' products are subject to constant product development. Therefore, we reserve the right to introduce changes in our products without notice

Ensuring certainty

Materialographic preparation and testing demands consistent, reproducible results. These come not only from your laboratory process, operators and equipment, but from your supply chain and your partner. As a Struers customer you benefit from high quality design and engineering of equipment and consumables, but just as much from our unique knowledge base, robust global supply chain, and expert service and applications support – where and when you need it. We call all this ensuring certainty

Struers remains dedicated to making the world a better place through the pursuit of deep scientific insights and ground-breaking technology. Today, we're your trusted partner in a fast-changing world, sharing our expertise and practical experience on a global scale. This gives you innovative solutions that help you face the future with confidence. We continue to lead the way in materialographic products and services, and to shape future developments towards a better society.