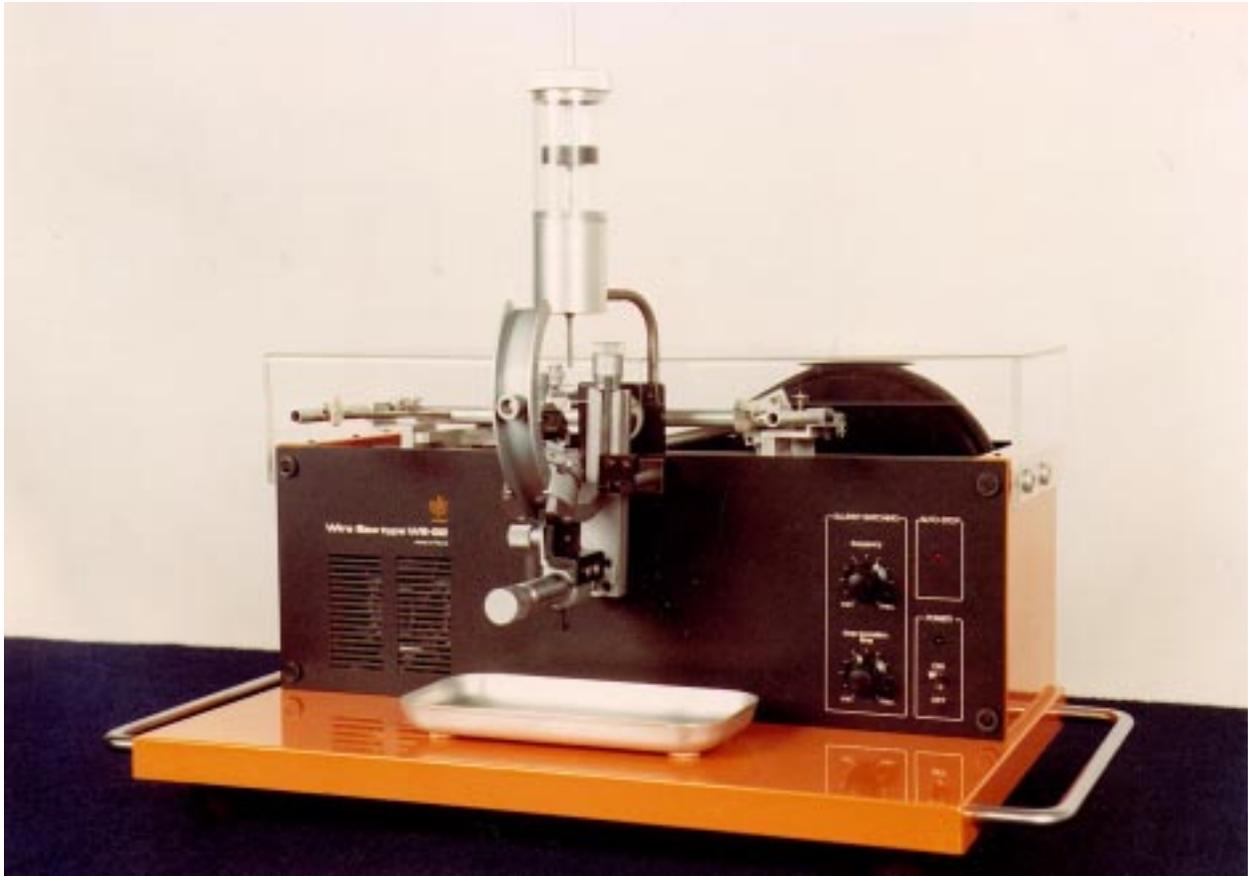


PRECISION WIRE SAW



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WS 22 High Precision Wire Saw

Application

The WS 22 wire saw has been developed to meet two important requirements: cutting should not introduce deformations or defects, and losses of the material should be minimized. These two requirements have been met by the development of an improved cutting technology which utilizes the precision guidance of a wire and uniform application of the abrasive slurry. The saw is semi-automatic and requires no supervision during its operation.

The saw can be used for precision cuts on semiconductors, ferrites, metals, glass, as well as many other solids, including very hard or brittle ones.

The wire saw enables cutting of very thin slices (down to thickness of 10 μm) with smooth cut surfaces (surface roughness does not exceed 1 μm). The WS 22 saw is particularly recommended for cutting materials where minimal material losses and high surface demands are important, When using the thinnest wire (20 μm diameter), and proper abrasive powder grid size, material losses do not exceed 30 μm on average.

The obtained slices are perfectly parallel, thus additional lapping is unnecessary. Cutting under any desired angle is possible due to the rotational capability of sample holder. Use of special accessories (goniometers, orientation devices) extends the WS 22 saw's application to precision cutting of crystallographically oriented crystals.

General Characteristics

A thin tungsten wire, moistened with an oil- or glycerin suspended abrasive slurry, is used during the cutting process. This slurry is applied continuously to the cutting area. The wire moves rapidly back and forth in an oscillatory motion. A high accuracy of cuts is guaranteed because of the following features:

1. The sample is in a oscillatory motion around the axis perpendicular to the cutting plane;
2. The saw wire slides on two guidebars which move in tandem with the swinging motion;
3. The wire load on the sample is precisely controlled;
4. To prevent wire wear, new wire is fed continuously to the cutting area.

The cutting speed depends mainly on wire load, sample hardness, sample shape, and for such materials as Ge, InSb, HgTe, GaAs, etc. is approximately between 1 to 3 cm^2/h . The WS 22 saw is equipped with a horizontal sample carriage mechanism of high precision. A displacement of the sample by $\pm 30\text{mm}$ (deviation less than 0.002mm) is possible. The sample holder can rotate around the vertical axis and be fixed in any desired position.

The saw is equipped with an automatic switch-off (AUTO-STOP) which turns the saw off when the cutting wire is torn, the cutting process is completed, or the desired cutting depth is achieved. The saw is also equipped with a magnetically driven mixing device, by means of which the cutting slurry is being batched. Mixing and batching procedures are automatically controlled by an electronic system, which enables the drip frequency and time to form a drop (dependent on the viscosity and density of the slurry) to be programmed.

Technical Data:

Sample max. dimensions:	approx. 40mm diameter
Power supply:	220-250 V/50 Hz or 110 V/60Hz
Wire diameter:	20-60µm
Wire oscillation frequency:	200, 400/min.
Weight:	107 lb.
Dimensions:	23.6" x 15.0" x 9.8"

Standard Accessories

1. Bottle of oil	1 pc
2. Container of carborundum powder	1 pc
4. Spool of wire, 50µm diameter	1 pc
5. Wire guide bars	2 pcs
6. Sample holder yoke	1 pc
7. Drip-pan	1 pc
8. Oil can	1 pc
9. Driving belt	1 pc
10. Swinging support driving belt	1 pc
11. Sample support V-block	1 pc
12. Specimen glue	1 pc
13. Pawl gear	1 pc
14. Pawl	1 pc
15. Pawl spring	1 pc
16. Spanner stick	1 pc
17. Felt cleaners	15 pcs
18. Instruction manual	1 pc

WS 22B High Precision Wire Saw

WS 22B High Precision Wire Saw is a version B of the WS 22 wire saw. It has a stronger horizontal support and thereby allows to cut samples of bigger dimensions and weight.

Application

The WS 22B wire saw can be used for the same processes as described for the WS 22 High Precision Wire Saw.

General Characteristics

These are also identical to the WS 22 High Precision Wire Saw.

Technical Data:

Sample max. dimensions:	approx. 70mm diameter
Power supply:	220-250 V/50 Hz or 110 V/60Hz
Wire diameter:	20-60µm
Wire oscillation frequency:	200, 400/min.
Weight:	107 lb.
Dimensions:	23.6" x 21.7" x 9.8"

Standard Accessories:

1. Bottle of oil	1 pc
2. Bottle of glycerin	1 pc
3. Container of carborundum powder	1 pc
4. Spool of wire, 50µm diameter	1 pc
5. Wire guidebars	2 pcs
6. Sample holder yoke	1 pc
7. Drip-pan	1 pc
8. Oil can	1 pc
9. Driving belt	1 pc
10. Swinging support driving belt	1 Pc
11. Sample support V-block	1 pc
12. Specimen glue	1 pc
13. Pawl gear	1 pc
14. Instruction manual	1 pc

WSXC 10 X-Ray Laue Camera

Application

The *WSXC 10* camera is designed for the orientation of single crystal samples where cutting along specific crystallographic planes is strictly required.

General characteristics

The *WSXC 10* camera is used for determining a crystallographic orientation using Laue back reflection. The diffracted beams are registered by the wet film photographic method. A crystal can be rotated 360° in one axis with 0.1° vernier and 120° in its second axis with 0.1° vernier.

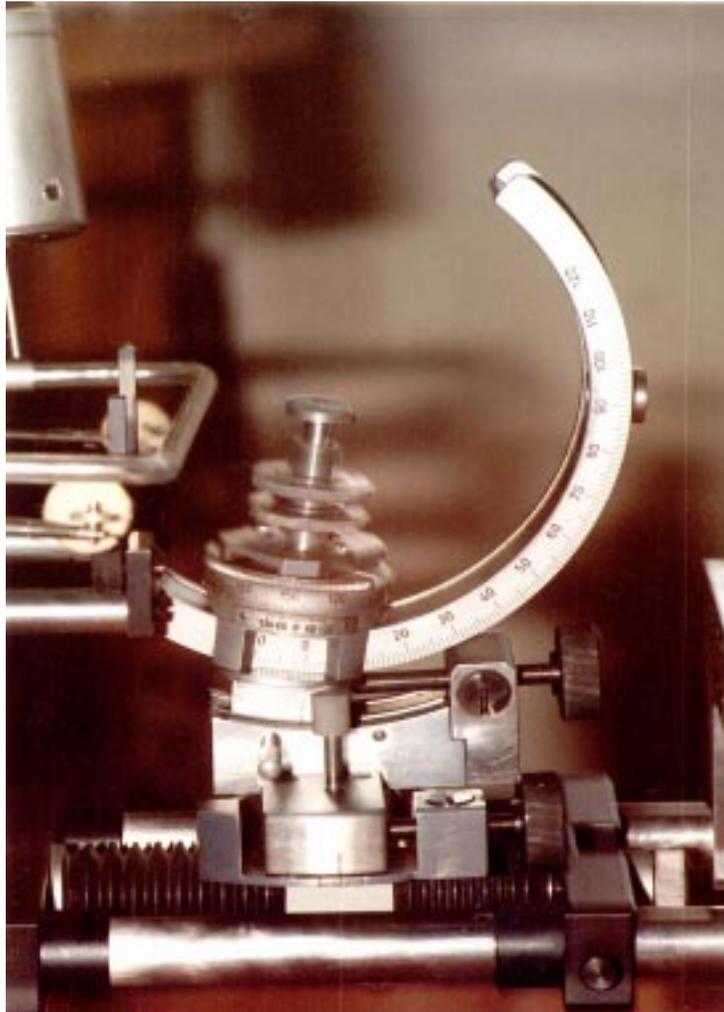
The goniometer can be attached to the *WS 22* or *WS 22B* Wire Saw.

The *WSXC 10* goniometer is constructed of hard stainless material. Its scales are deeply engraved and filled with a black ink. The crystal is cemented to a mounting table which is the central element of the goniometer. There are precision rises available, to increase the height of the goniometer, when working with crystals that are too small to reach the beam. If the face of the crystal is rotated to a position that is not in the path of the X-ray or optical beam, the table can be moved up to 10 millimeters to either side of center in order to re-align the crystal with the X-ray or optical beam.



Laue Camera and Goniometer mounted to common frame for taking Laue Pictures of crystals

WSXC 22 Goniometer



Application

A WSXC 22 goniometer is used for determining crystallographic orientations, using either X-ray or optical orientation techniques. A crystal can be rotated 360° in one axis and 120° in the second axis. The goniometer is equipped with a fine adjustment with vernier of 0.5' on either axis. After orientation, it can be mounted to the WS 22 wire saw for subsequent crystal processing.

The WSXC 22 goniometer is constructed of hard stainless material. It's scales are deeply engraved and filled with a black ink. The crystal is cemented to a mounting table which is the central element of the goniometer. There are precision rises available, to increase the height of the goniometer, when working with crystals that are too small to reach the beam. If the face of the crystal is rotated to a position that is not in the path of the x-ray or optical beam, the table can be moved up to 10mm to either side of center, in order to re-align the crystal with the x-ray or optical beam.

After the crystal is properly oriented, the whole goniometer is transferred to a saw for cutting oriented surfaces or slices.