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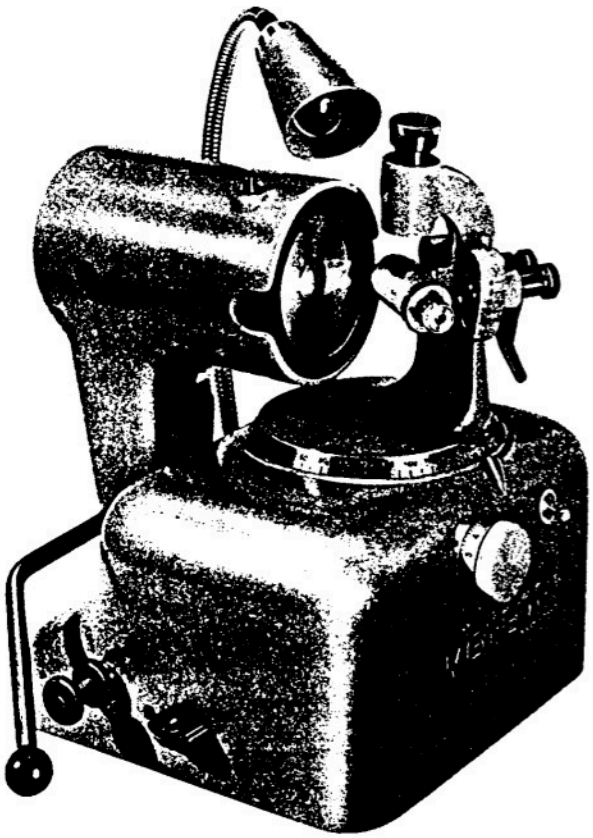
SMALL TWIST DRILL GRINDING MACHINE

INSTRUCTION-MANUAL



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1 Microscope

2 Microscope bracket (inspection position)

3 Workholder bracket (with rotating sleeve and universal chuck)

4 Clampscrew

5 Clampscrew for clearance angle adjustment

6 Web thinning ring

7 Clearance angle scale

8 Tilt lever for workholder bracket (end stops define inspection and grinding position)

9 Rotating table with point angle scale

10 Lock lever for rotating table

11 Motor switch

12 Feed knob with scale (1 division .0008")

13 Spring biasing lever

14 Tilt lever for grinding head

15 Stop screw for grinding wheel tilt motion

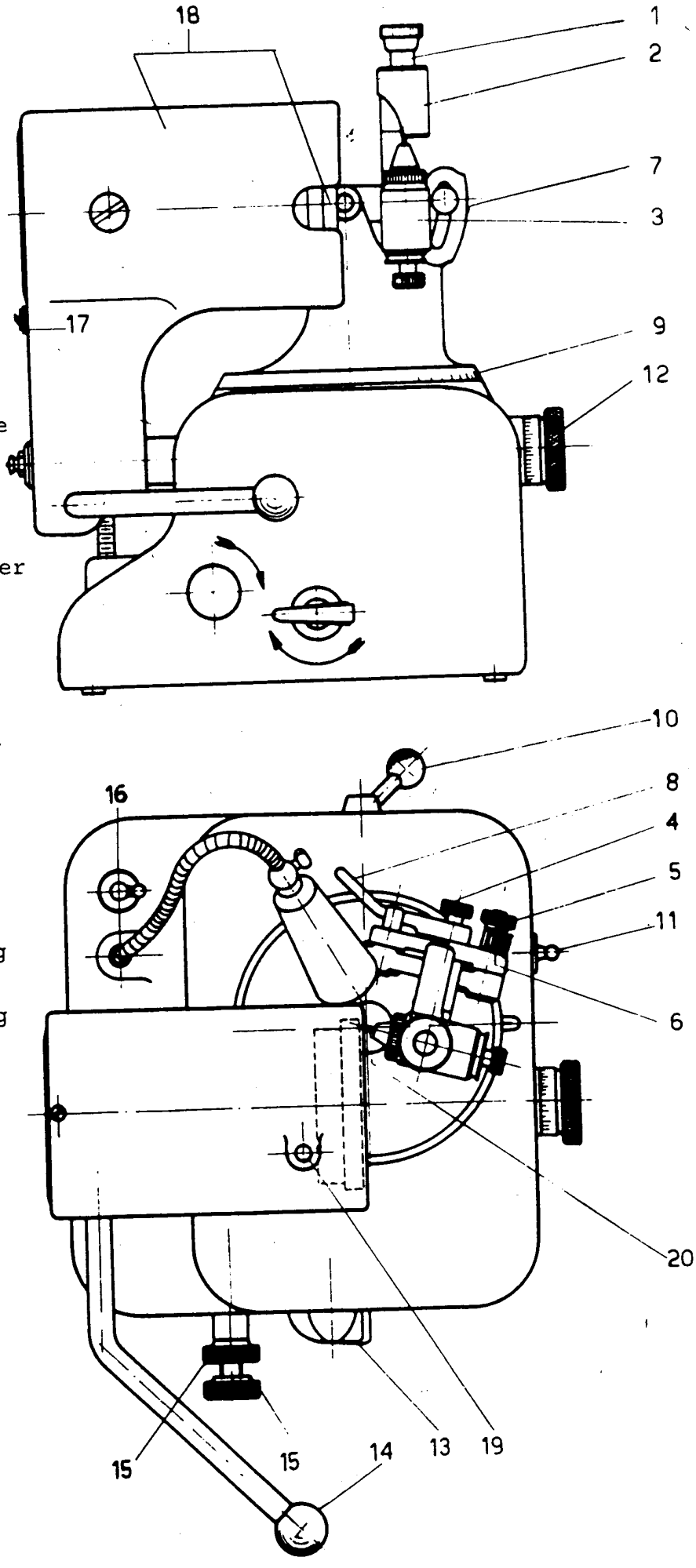
16 Lamp switch

17 Motor reverse switch

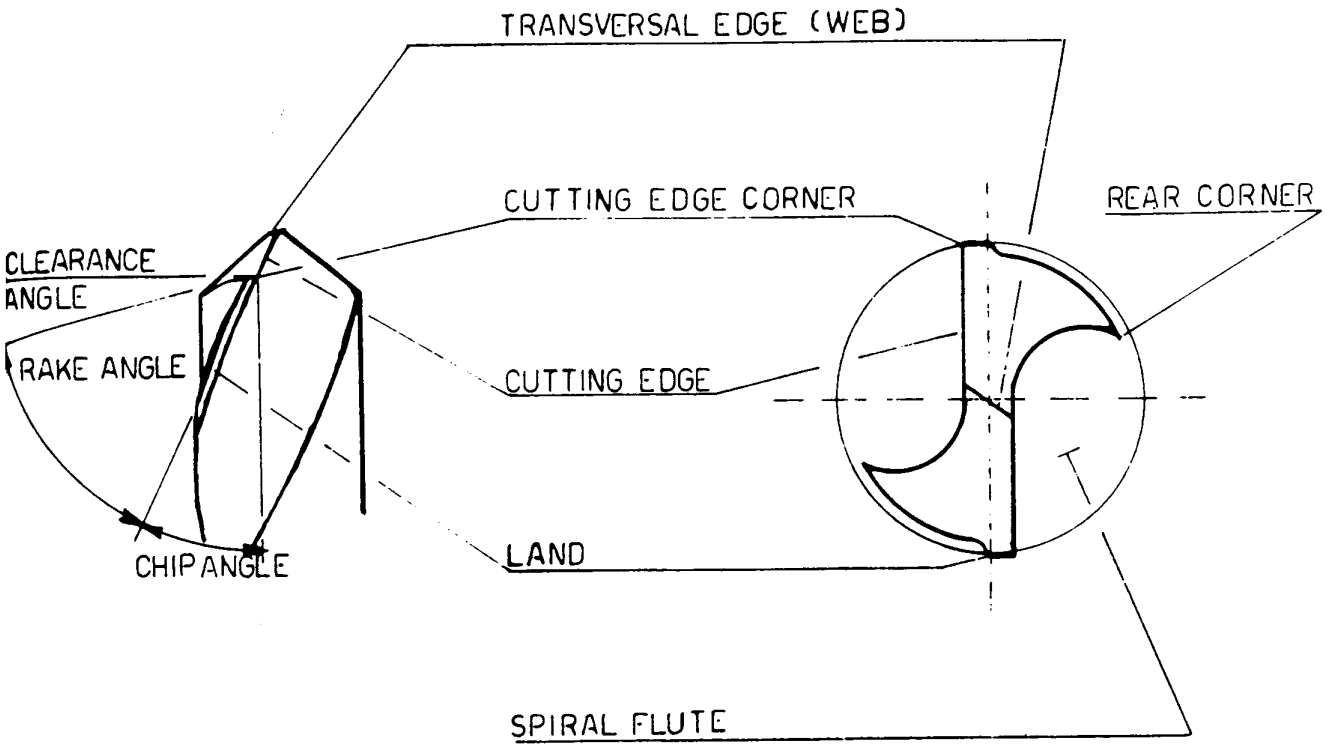
18 Grinding wheel and motor unit

19 Brake

20 Lamp



DEFINATION of DRILL ELEMENTS



I N S T R U C T I O N

for

Drill Pointing (Four-Plane-Grinding)

(Right hand drills (a); Left hand drills (b)).

1. Chucking the Drill (a + b)

   Hold drill firmly in the universal chuck (3). Let drill point project .100" beyond the jaws.

2. Insert Chuck and Snap into Position (a + b)

   Place the chuck with the left hand into the rotating sleeve of the workholding bracket (3). Push down and rotate until the two ball locaters of the locating sleeve have engaged the notches of the chuck.

3. Position Drill (a)

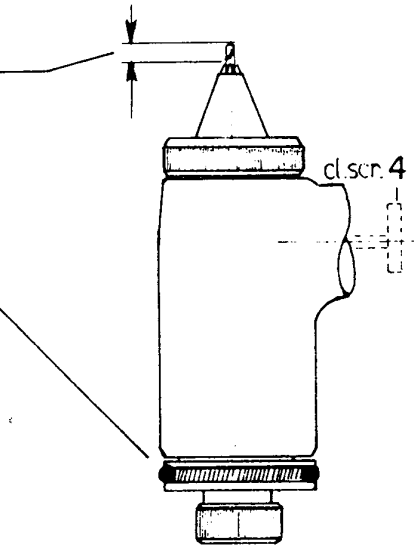
   3.1 Using Magnifier: Loosen clamp screw (4) to allow rotation of the rotating sleeve. Bring magnifier bracket (2) into inspection position and align the drill according to the sketch with reference to the pointers built into the magnifier. Tighten clamp screw (4).

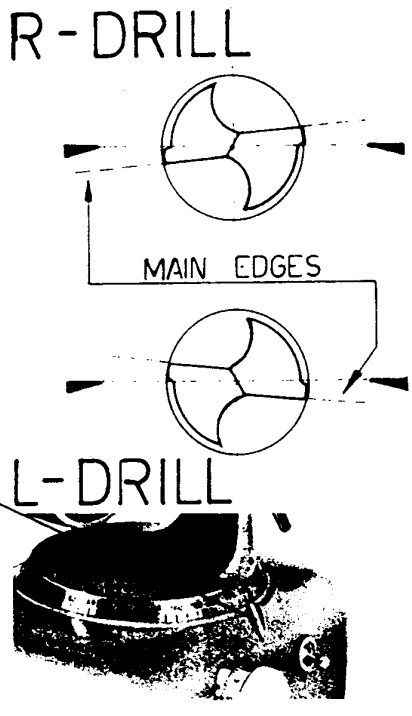
   3.2 Using Microscope: Align the drill to the cross hair of the microscope (attention: The optics of this microscope present the drill point in mirrorsymmetric inversion).

   3.3 Left Hand Drill (b): Proceed as under 3.1 and 3.2 and align the drill according to sketch herewith.

4. Point Angle Selection (a + b)

   The point angle is adjusted according to scale (9) of the rotating table. For right handed drills using scale to the right, for left handed drills scale to the left beyond the 180° point. Lock rotating table with lever (10).





5. Clearance Angle Adjustment (a + b)

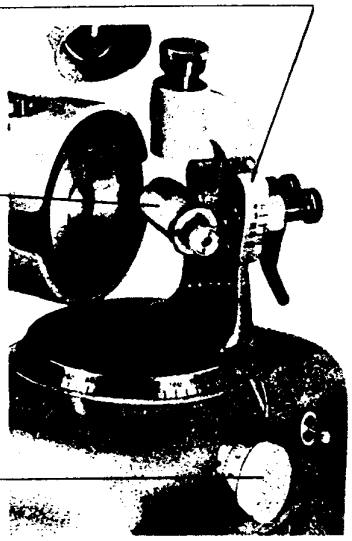
Adjust to scale (6) according to the values established for a specific material. Lock with screw (5).

6. Grinding Position for Drill (a + b)

Tilt workholder carrier (3) by swinging lever (8) with the right hand. This puts the drill into grinding position.

7. Feed (a + b)

Bring drill point into contact with grinding wheel by turning knob (12) (one division = .0008").

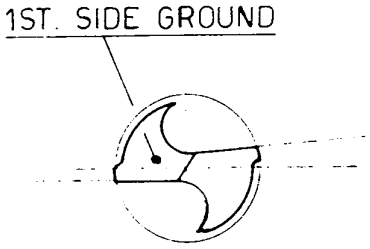


8. Actual Grinding (a + b)

Start motor. Hold lever (8) in grinding position with right hand. Use left hand on grinding motor tilt lever (14) and rock grinding wheel back and forth across the point. Feed using knob (12) until the left hand drill edge is ground cleanly.

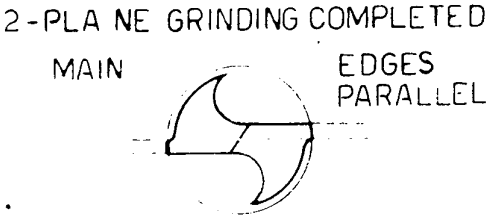
9. Edge Inspection (a + b)

Tilt workholder bracket to inspection position. Observe the ground edge with magnifier or microscope and compare to sketch. If the appearance is like sketch, proceed to next step. If appearance is not like sketch, edge may have to be reground and newly positioned according to step (3).



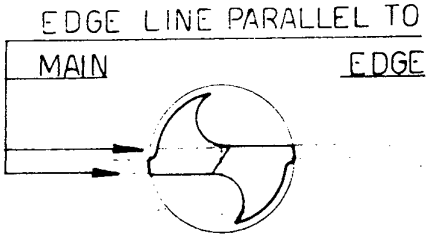
10. Grinding Second Edge (a + b)

With right hand on the knurled edge of the chuck, turn it 180° and allow it to snap in. Without changing the feed knob, slowly tilt workholder bracket forward while grinding until the lower stop is contacted. Then, feed in .01 mm (1/2 graduation space), grind over the edge, turn the chuck 180° and regrind the first side without applying new feed.

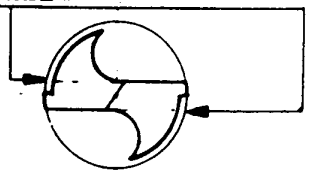


11. Four-Plane-Grinding (a + b)

Release clearance angle clamp screw (5), readjust the stop position for the workholder bracket at approximately 23°. Readjust the feed knob (2) until the drill point touches the grinding wheel. Then grind according to step 8 until the edge line of the second plane is in line with the transversal edge (web).

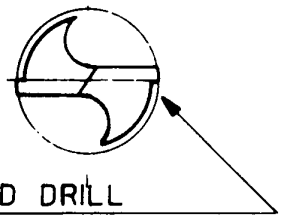


EDGE LINES PARALLEL



Inspect according to sketch and, if need be, reposition rotating sleeve. Turn chuck 180° and grind the second point plane without readjusting the feed knob.

Alternately grind the two point sides while carefully feeding forward until the margin line between the planes of the point run straight across the web.

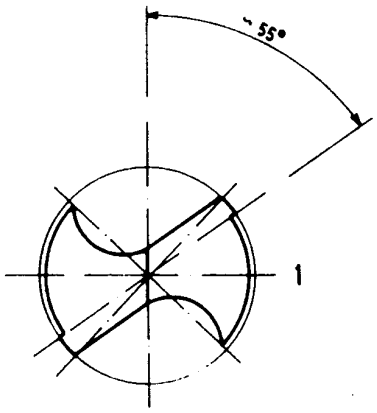


CORRECTLY GROUND DRILL

Point Thinning of Small Twist Drills

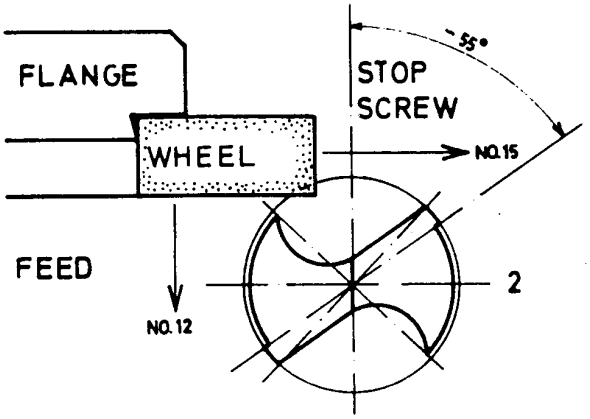
The chisel edges of very small drills are usually quite large and will therefore, when using the 4-surfaces-principle, have a negative effect on the drill point.

To obtain maximum usage and to gain the best conditions at the cutting edges, it is advisable to point-thin those drills. In this case the 4-surfaces principle is not applied, but the drill is ground directly on two surfaces; relief angle approx. 10-14° .



Instructions for adjusting of METEOR Machine and Twist Drill for the best point thinning forms

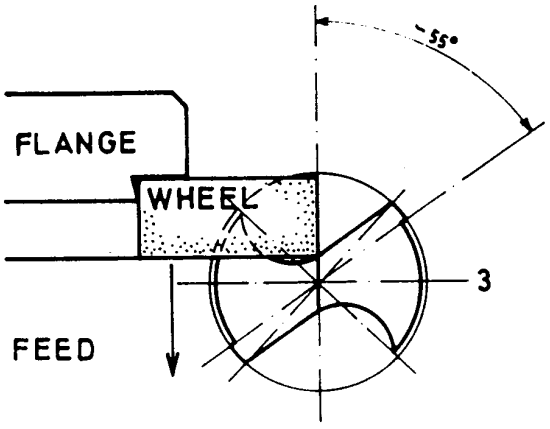
1. The drill point angle (120°) and relief angle (10-14°) stay the same (depending of material to be drilled). The cutting edges of the drill are to be lined up under eye piece (clamp screw 4) to approx. 55°, sketch No. 1 . Point thinning ring to "out" position.



2. Turn spring holder (13) to the front; motorblock will come to stop to the right.

3. Bring tip of the drill to the grinding wheel by means of level (8) make sure chisel edge is on the right, outside the edge of the grinding wheel. Adjust stop (15) to obtain this.

4. Advance micrometer screw (12) until grinding wheel touches drill on the back.



5. By rotating grinding wheel advance screw (12) and stop 15 to get a triangle whose edge lies at the level of the chisel edge.

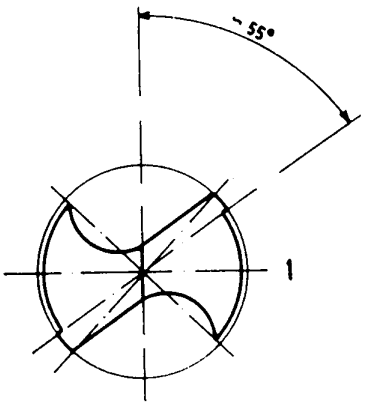
6. The adjustable stop (15) will allow the grinding wheel to move to the right into the drill to touch the chisel point with the edge of the wheel.

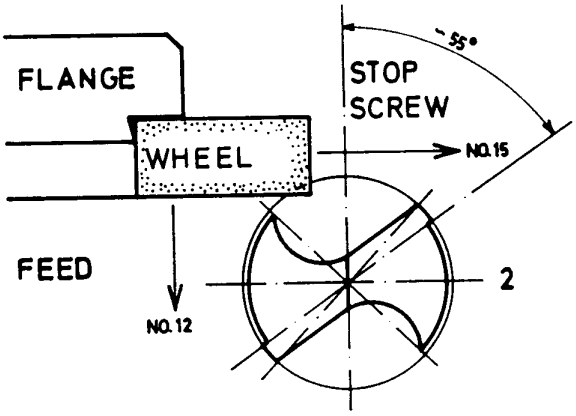
7. Turn four-jaw chuck 180° without changing advance (12), pull motor-block (18) to the left and let grinding wheel slowly under spring pressure, thin out the other side of the drill.

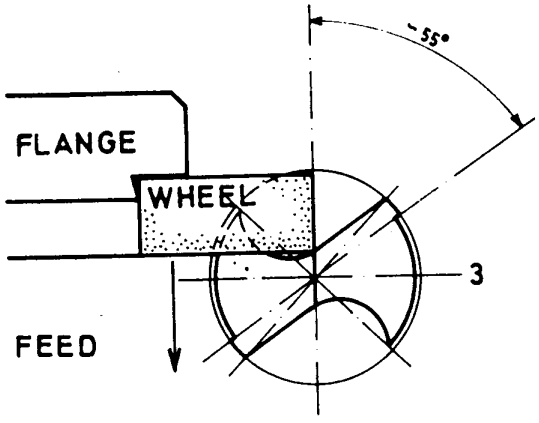
8. Advance micrometer screw, thin point to approx. 8 % of drill diameter, switching to both sides of drill.

9. In the same manner drills can be point thinned in a way where the chisel edge is totally removed (cross pointed)

10. The METEOR KBS drill pointers will also grind easily different types of small cutting tools where point angles and relief angles can be set.







G E N E R A L I N F O R M A T I O N

1. Care of the Machine

Clean the machine regularly. Apply an acid free grease frequently to grease nipple (21).

Never take the chuck apart. Merely wash it out in clean solvent, dry with air blast.

2. Dressing the Wheel

Chuck with diamond delivered with the machine in the universal chuck like you would a drill. Dress in the usual manner. Adjust rotating table to 180°, adjust clearance angle 0°.

3. Direction of Rotation of Grinding Wheel

To keep the smallest drill (having a diameter of, say .008" to .024") from braking, the grinding wheel rotation can be reversed using switch (17).

4. Special Accessories

- Microscope with 25 magnification
- Collet holder MZ3 (for KBS-3 only) with retention nut. Individual collets for center drills up to 8 mm diam. (5/16").
- Collet holder MZ6 (for KBS-6 only) with retention nut. Individual collets for center drill up to 12.5 mm (½").
- Grinding wheels with mounting flange in grits 80 to 1000 K.
- Diamond grinding wheels for carbide tools, style D7, D15, D30, D50 and D70.