

**BUEHLER®**

**IsoMet® 4000 & 5000**

**FAMILY OF LINEAR PRECISION SAWS**

- **SMARTCUT System Prevents Sample and Machine Damage**
- **Built-in Micrometers for 1-2 $\mu$ m Precision Sample Positioning**
- **8" (203mm) Blade Capacity**
- **Metric or Imperial Units**
- **Heavy Duty Cast Aluminum Base**
- **Adjustable Automatic Sample Cutting Length**
- **55-method Programmability on the IsoMet® 5000**



**BUEHLER**

# Precision Cutting and Versatility Combined



## IsoMet® Family

The IsoMet® 4000 & 5000 Family of Linear Precision Saws are designed for cutting various types of materials with minimal sample deformation. Their compact tabletop design fits on almost any laboratory table. The IsoMet 4000 and 5000 saws give today's laboratory a precision sectioning tool capable of cutting virtually any material, including brittle and ductile metals, ceramics, composites, cements, laminates, plastics, electronic components and biomaterials.

## Features

The front panel consists of a large easy-to-read Liquid Crystal Display (LCD) with backlighting, eleven (11) dedicated buttons and an emergency stop button. In addition, the IsoMet® 5000 also features five (5) software/multifunction soft-key buttons. All buttons have positive-action tactile

feedback. A built-in coolant pump minimizes sample deformation by reducing heat build-up. The clear plastic, splash-proof safety shield encloses the entire cutting area to protect the operator, prevent coolant loss and decrease noise. Magnetic inter-lock provides safety by preventing accidental operation while the hood is open. Two externally mounted gas cylinders secure the hood in a raised position when open. Other features include ergonomic design, universal power source and built-in circuit protection.

## Easy-to-Use Automatic System

- Automatic system allows user to start and walk away - the saw completes the cut without operator assistance
- SMARTCUT system automatically monitors and adjusts the feed rate to provide consistent, quality cuts and to prevent specimen and

machine damage, regardless of the operator or the material being sectioned

- Automatic blade dressing system
- Sealed membrane keypad makes clean up easy

## Precise and Durable

- Manual 1µm (micron) sample positioning on IsoMet 4000 (automatic 2µm on the IsoMet 5000), for precise sectioning allows cutting of delicate specimens with minimal deformation (sample size will vary with sample thickness)
- Linear feed mechanism
- User selectable feed rate allows even the most delicate samples to be cut without deformation
- Heavy duty aluminum casting provides stable, vibration resistant base with precision components and linear bearings

## Productive

- Powerful 1.25HP (950 Watt) motor, full 5000 rpm and 8" (200mm) blades for the quickest cut
- Select the feed rate and the SMARTCUT system automatically adjusts to give fastest cut without deformation
- Operator can change the feed rate and blade speed during operation
- Manual blade positioning handle provides quick blade set up and retraction

## Versatile

- Precision saw combined with longer sample sectioning capability

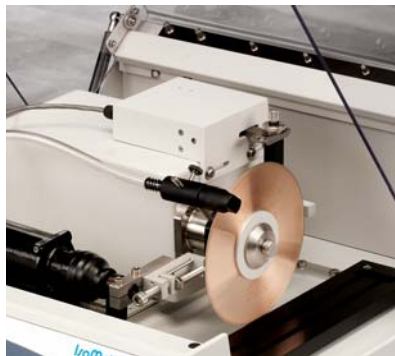
- Can be used for highest precision applications and for general low deformation, low kerf loss sectioning
- Large workspace with removable T-slot beds maximizes cutting envelope and provides versatile sample positioning
- Hand held coolant hose allows for easy cleaning
- Most comprehensive selection of sample fixturing, flanges and blades:
  - Precision stainless steel chucks and flanges
  - Standard IsoMet® series chucks and flanges
  - Long sample and application specific vising
  - Diamond, IsoCut® and abrasive blades

## IsoMet 5000

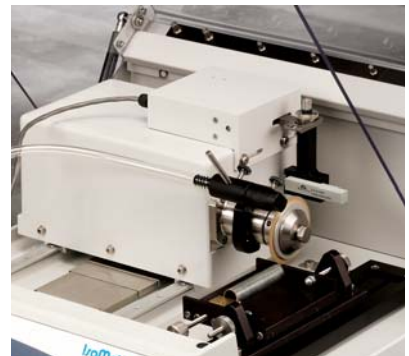
- Expands upon the capabilities of the IsoMet 4000 saw by increasing automation
- Automatic sample positioning to 2µm via Facia Panel and linear feed advance and retract
- 55 method programmability increases productivity and sample consistency
- Automatic serial sectioning positions the sample for multiple cuts to a desired length and thickness
- Cup grinding system provides automatic grinding to target depth for thin section preparation
- Compatible with all IsoMet® 4000 accessories and vises



Samples can be positioned with 2µm accuracy with the IsoMet 5000's 11-2750 Precision 2µm Sample Positioning System. The 11-2683 stainless steel single saddle chuck, 11-2690 flange, and 11-2496 Chuck Padding shown.



Stainless steel fastener vise 11-2687 allows longitudinal sectioning for examination of thread machining and heat treat.



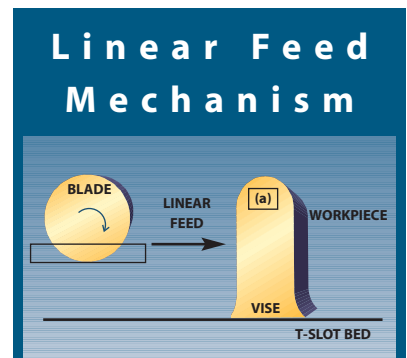
The IsoMet 4000 and 5000 have vises to hold longer samples for applications such as slot cutting 11-2692 (shown) and cutting samples on angle.



The 11-2694-115 Precision Table for sectioning thin materials rotates 180° in 1° increments to facilitate sectioning along a line of features on a die.



Accessory rotating vise 11-2695 with Minimal Area of Contact Cutting (MACC) reduces cut time, doubles sectioning capacity and maximizes samples cooling.



The IsoMet 4000's and 5000's blade feeds into the fixed workpiece on precision linear bearings. The linear travel provides constant feed rate cutting and allows sectioning of longer and irregular shaped samples. The workpiece can be positioned at the top (a) center or underneath the blade (b).

## Technical Data for IsoMet 4000 and IsoMet 5000 Linear Precision Saws:

### Operation:

Automatic with constant feed rate or SMARTCUT process control

### Cutting Action:

Linear blade feeds automatically into workpiece

### Motor Power (PEAK):

1.25 HP, 950 Watt

### Feed Rate:

0.05-0.75 inch/min 0.01" increments  
(1.2-19mm/min, 0.2-0.3mm increments)

### Blade Speed:

200-5000 rpm in 50 rpm increments

### Programmable Cutting Length with Auto Shut-off:

0.01-8", 0.01" increments (0.25-200mm, 0.25mm increments)

### Electronics:

Microprocessor Controlled

### Display:

240 x 64 pixel Liquid Crystal Display (LCD) with backlighting

### Touch Pad Controls

Membrane keypad with tactile feedback buttons

### Process Prompts:

"Warning Hood Open"  
"Blade Pinched"  
"Distance Remaining"  
"Emergency Stop"  
"Arm Limit"

### Languages:

English, French, German, Portuguese, Spanish, Chinese, Japanese, Korean

### Blades:

*Wafering Blade Diameters:*

3-8" (75-200mm)

*Abrasive Blade Diameters:*

5-7" (125-180mm)

### Coolant Systems:

Built-in Recirculating System

Optional External Recirculating System

### Capacity:

0.9 gal (4ℓ)

### Flow Rate:

0.7 gal/min (3ℓ/min)

### Main Power:

85-264V/50-60Hz/1 phase

Volts	Amp	Watts
120	5	600
240	2.3	570

### Safety Features:

Emergency Stop,  
Magnetic Safety Interlock

### Other Features:

Cutting chamber clean-out hose, Manual Blade Positioning Handle

### Shipping Weight:

130 lb. (59kg)

### Cutting Envelope:

*Maximum Diameter of Sample*

2" (50mm)

*Maximum Rectangular Sample*

6" L x 2" D x ½" H (150mm x 50mm x 13mm) with 8" (200mm) blade

### Dimensions:

21½" L x 29½" D x 13¼" H  
(546mm x 750mm x 337mm)

### X-axis Working Space:

16" L x 4" D x 4" H (406mm x 100mm x 100mm)

### Y-axis Working Space:

10" L x 8" D x 4" H (250mm x 200mm x 100mm)

### Approvals:

Accordance with EC Directive(s)

## Technical Data for IsoMet 4000 Only:

### Programming:

Retains last settings

### Manual Sample Position Settings:

0" - 0.9842", 0.00025" increments (0mm - 25mm, 1µm increments)

## Technical Data for IsoMet 5000 Only:

### Programming:

20 Customizable Methods and 35 Preset Buehler Methods, for a variety of materials including Ferrous Metals, Non Ferrous Metals, Ceramics and Geological Specimens

### Serial Cut Quantity:

1 - 100

### Blade Thickness Settings:

0.000", 0.006", 0.012", 0.015", 0.020", 0.025", 0.030", 0.035", (0.000mm, 0.150mm, 0.305mm, 0.381mm, 0.508mm, 0.635mm, 0.762mm, 0.889mm)

### Automated Sample Position Settings:

0" - 0.9842", 0.0008" increments (0mm - 25mm, 2µm increments)

### Cutting Action:

Automatic Linear Blade Feed and Retraction



The IsoMet's feature a spacious interior, versatile sample fixturing, and easy sample retrieval. Manual Blade Positioning Handle provides quick setup. The IsoMet's precision is a result in the superior mechanical design, precision linear bearings, and vibration dampening aluminum casting. Removal X and Y-axis T-Slot beds allow sample positioning on either axis.



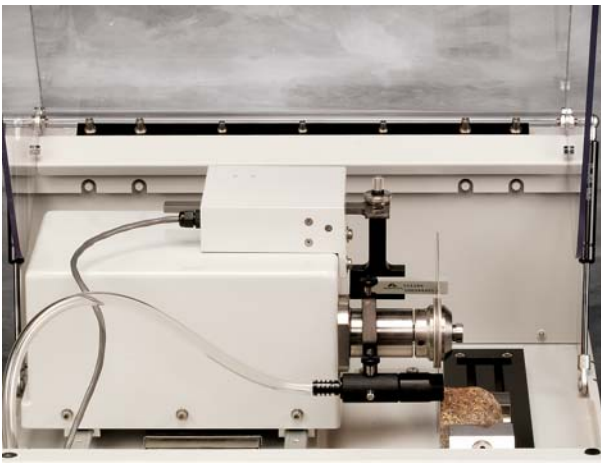
The IsoMet 5000's touch button control of sample positioning and blade advance and retract increase productivity and sample consistency. When multiple cuts are needed from the same sample, the automatic serial sectioning feature can be used. Cup grinding (shown above) can grind to target or be used for thin section preparation.



The IsoMet 4000 has manual  $1\mu\text{m}$  sample positioning via a precision micrometer. The blade advances automatically and is retracted manually.



For easy maintenance the coolant hose can be used as a clean-out hose and the recirculating system tank can be cleaned without removing the blade.



The 11-2696 Automatic Dressing System dresses the blade prior to and during operation to optimize cutting conditions, prolong blade life, and provide the best cut surface. General Usage Vise 11-2691 shown.



Since adequate coolant volume and positioning is critical for good cutting, the IsoMets provide a full 0.7gal/min (3l/min) presented to both sides of the blade. The coolant tracks with the blade for long cuts.

## Ordering Information

**11-2680 IsoMet 4000 Linear Precision Saw**, includes one 11-2699 1µm automatic sample positioning system, one 11-4267 IsoCut® Wafering Blade 7" x 0.025" x ½" (180mm x 0.6mm x 13mm), 11-2689 Flanges, 11-2683, 11-2684, 11-2686 chucks, 11-2696 Dressing System, sample of IsoCut® Plus Cutting Fluid, operating instructions and warranty. For worldwide operation on 85-264V/50-60Hz/1 phase.

**11-2681 IsoMet 4000 Linear Precision Saw**, same as above except no accessories or blade included.

**11-2675 IsoMet 4000 Linear Precision Saw with External Recirculation System.**

**11-2780 IsoMet 5000 Linear Precision Saw**, includes one 11-2750 2µm automatic sample positioning system, automatic linear feed advance/retract, one 11-4267 IsoCut® Wafering Blade 7" x 0.025" x ½" (180mm x 0.6mm x 13mm), 11-2689 Flanges, 11-2683, 11-2684, 11-2686 chucks, 11-2696 Dressing System, sample of IsoCut® Plus Cutting Fluid, operating instructions and warranty. For worldwide operation on 85-264V/50-60Hz/1 phase.

**11-2781 IsoMet 5000 Linear Precision Saw**, same as above except no accessories or blades are included.

**11-2775 IsoMet 5000 Linear Precision Saw with External Recirculation System.**

## Wafering Blades and Cut-off Wheels ½" (12.7mm) Arbor

Type and Use	Diameter and Thickness					
	3" x 0.006" (76mm x 0.15mm)	4" x 0.012" (102mm x 0.3mm)	5" x 0.015" (127mm x 0.4mm)	6" x 0.020" (152mm x 0.5mm)	7" x 0.025" (178mm x 0.6mm)	8" x 0.035" (203mm x 0.9mm)
<b>Diamond Wafering Blades</b>						
<b>Series 30HC Diamond</b> , for use with plastics, polymers, and rubber			11-4239**		11-4241**	11-4242
<b>Series 20HC Diamond</b> , for aggressive general sectioning of ferrous and non-ferrous materials including titanium alloys			11-4215*		11-4237	11-4238
<b>Series 15HC Diamond</b> , for general use with ferrous and non-ferrous alloys, copper, aluminum, metal matrix, composites, PC boards, thermal spray coatings, and titanium alloys	11-4243	11-4244	11-4245	11-4246	11-4247	11-4248
<b>Series 20LC Diamond</b> , for use with hard/tough materials, structural ceramics, boron carbide, boron nitride, and silicon carbide			11-4225*		11-4227	11-4228
<b>Series 15LC Diamond</b> , for use with hard/brittle materials structural ceramics, boron carbide, boron nitride, and silicon carbide	11-4253	11-4254	11-4255	11-4276	11-4277	11-4279
<b>Series 10LC Diamond</b> , for use with medium to soft ceramics, electronic packages, unmounted integrated circuits, GaAs, AlN and glass fiber reinforced composites	11-4283		11-4285		11-4287*	11-4288
<b>Series 5LC Diamond</b> , for use with soft friable ceramics, electronic packages, unmounted integrated circuits, composites with fine reinforcing media, CaF <sub>2</sub> , MgF <sub>2</sub> , and carbon composites	11-4298		11-4295			
<b>IsoCut Wafering Blades</b>						
Cubin Boron Nitride (CBN) abrasive blades work well for many tough materials giving significantly shorter cut times						
For iron, carbon steels, high alloys steels, cobalt alloys, nickel super alloys, and lead alloys	11-4263	11-4264	11-4265	11-4266	11-4267	11-4268
<b>General Usage Abrasive Cut-off Wheels 0.03" (0.8mm) thick, 10 per package</b>	Bond/ Abrasive					
For ferrous materials, stainless steels, cast irons, and thermal spray coatings	R/Al <sub>2</sub> O <sub>3</sub>				11-4207-010	
For tough non-ferrous metals, aluminum, copper, titanium, uranium, zirconium	R/SiC				11-4217-010	
<b>AcuThin™ Abrasive Cut-off Wheels 0.019" (0.5mm) thick*</b>	Bond/ Abrasive					
For sectioning small, delicate specimens or where minimal deformation and kerf loss is the primary concern						
Tool, hard steel, Rc45 and above	R/Al <sub>2</sub> O <sub>3</sub>		10-4060-010			
Medium hard, soft steel Rc45 and below	R/Al <sub>2</sub> O <sub>3</sub>		10-4061-010			

\*Alternate blade thickness of 0.020" (0.5mm)

\*\* Alternate blade thickness of 0.030" (0.8mm)

✱ External recirculating system recommended

## Accessories for IsoMet 4000 and IsoMet 5000 Linear Precision Saws

### Chucks and Flanges:

**11-2682 Stainless Steel Double Saddle Chuck**, for bar and tube stock up to 1¼" (32mm) diameter

**11-2683 Stainless Steel Single Saddle Chuck**, for bar and tube stock up to 1¼" (32mm) diameter

**11-2684 Stainless Steel Specimen Chuck**, for 25mm, 30mm, 1", and 1¼" diameter mounted samples

**11-2685 Stainless Steel Specimen Chuck**, for 1½" and 40mm diameter mounted samples

**11-2686 Stainless Steel Chuck**, for irregularly shaped samples

**11-2687 Stainless Steel Fastener Chuck**, for longitudinal sectioning of fasteners, tubes and solid cylinders from 1½" to 2½" (29mm-54mm) in length

**11-2704 Stainless Steel Thermal Spray Coating Chuck**

**11-2678 Stainless Steel Precision Flanges**, 2" (50mm) diameter, one set

**11-2679 Stainless Steel Precision Flanges**, 2½" (63mm) diameter, one set

**11-2688 Stainless Steel Precision Flanges**, 3" (75mm) diameter, one set

**11-2689 Stainless Steel Precision Flanges**, 4" (100mm) diameter, one set

**11-2690 Stainless Steel Precision Flanges**, 5" (125mm) diameter, one set

**11-2697 Stainless Steel Precision Flanges**, 6" (150mm) diameter, one set  
*Chucks require 11-2699, 11-2700, or 11-2750 Sample Positioning Systems or 11-2691 General Usage Vise.*

### Sample Vises:

**11-2691 General Usage Vise**, holds up to 1¾" H x 2" D (45mm x 50mm) sample

**11-2703 General Usage Vise**, holds up to 1¾" H x 6" D (45mm x 150mm) sample

### Applications

- Plain Carbon Steels
- Stainless Steels
- Tool Steels
- Aluminum
- Copper Base Alloys
- Magnesium
- Titanium
- Biomedical PCB's
- Petrographic Electronic Packages
- Plastics
- Fasteners
- Refractories
- Integrated Circuits
- Thermal Spray Coatings
- Metal Matrix Composites
- Wafers
- Ceramics

### Precision Longitudinal Cuts and Slot Cutting on Long Samples:

- Implants
- Tubing
- Turbine Blades
- Cutting and Notching
- Ceramic and Plastic Specimens
- Bones
- Aircraft Fasteners

**11-2692 Slotting Vise for Cutting Slots in Samples**, holds up to 1½" H x 4" D (38mm x 100mm) sample

**11-2698 Angle Vise for Cutting Samples on Angle**, holds up to 2" (50mm) sample. 0-90 degree angle cuts in 2 degree increments.

### Additional Accessories:

**11-2693 Precision Goniometer with 3-Axis Control**, in 5 degree increments

**11-2694 Precision Table**, for sectioning thin materials and wafers. 180 degree rotation in 1 degree increments. ¼" (6mm) Z-axis control. Maximum 4" (100mm) wafer diameter. Select 160 or 250 voltage extension according to your local voltage requirements. 11-2679 Flanges and 3" (76mm) Blade required.

**11-2695 Rotating Vise**, increases sample cutting depth and shortens cutting time. For use with 11-2683, 11-2684, and 11-2685 chucks.

**11-2696 Automatic Dressing System**, for use with 11-1190 and 11-1290 Dressing Sticks

**11-2699 Precision 1µm Sample Positioning System**, for use with stainless steel IsoMet 4000 and standard IsoMet vises. Range: 0mm - 25mm.

**11-2700 Precision 0.001" Sample Positioning System**, same as 11-2699 except Imperial units. Range: 0" - 0.95".

**11-2701 T-Slot Bed Kit**, includes one Y-axis bed and fasteners, 16" L x 3" W (406mm - 76mm)

**11-2702 T-Slot Bed Kit**, includes one X-axis bed and fasteners, 6.5" L x 3" W (165mm - 76mm)

**11-2705 Manual Dressing Vise**

**11-2496 Chuck Padding**, three 1" x 6" (25mm x 150mm) adhesive backed strips, for clamping delicate samples in IsoMet chucks

**11-2711 External Recirculating System**

**11-2293-016 IsoCut Plus Cutting Fluid**, 1pt. (0.47ℓ)

**11-1190 Dressing Stick**, ½" x ½" x 3" (13mm x 13mm x 76mm) for IsoCut and Series 30, 20, and 15 blades

**11-1290 Dressing Stick**, ½" x ½" x 3" (13mm x 13mm x 76mm) for Series 10 and 5 blades

## Accessories for IsoMet 5000

**11-2720 Cup Grinder for Ferrous Metals**, Al<sub>2</sub>O<sub>3</sub> abrasive, 60 grit (60P), vitrified bond, 6" (150mm) diameter

**11-2730 Cup Grinder for Nonferrous Metals**, SiC abrasive, 60 grit (60P), vitrified bond, 6" (150mm) diameter

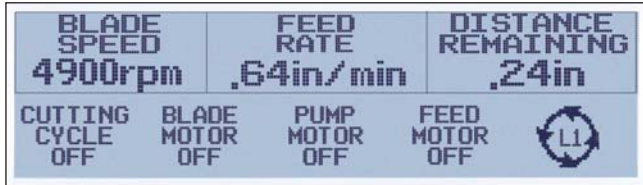
**11-2740 Cup Grinder for Ceramic and Geological Specimens**, diamond abrasive, 60 grit (60P), resin bond, 5" (127mm) diameter

**11-2750 Precision 2mm Sample Positioning System**, Range: 0mm - 25mm.

## IsoMet 4000 & IsoMet 5000 Displays



The front panel consists of a large Liquid Crystal Display (LCD) with backlighting, emergency stop and intuitive touch panel controls for ease-of-use.



The first programming screen features all main controls: Blade Speed, Feed Rate, Distance Remaining (Cutting Length), Cutting Cycle, Blade Motor On/Off, Pump Motor On/Off, and Feed Motor On/Off. When the cutting cycle is activated the LCD displays the total Distance Remaining until end of cut. Feed Rate and Blade Speed can be changed by the operator during the cutting cycle at any time.

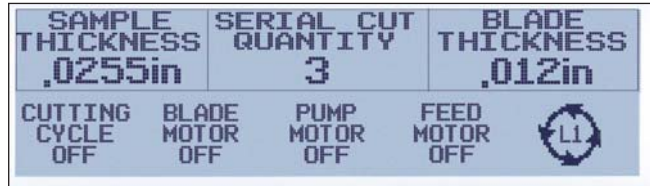


The second screen can activate the cutting cycle, change the cutting parameters, and activate the accessory rotating vise. Soft Start and Soft Stop automatically reduce the feed rate at the beginning and end of cut for delicate and spherical samples.

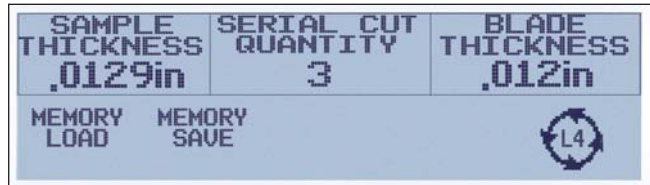


The third screen activates Language selection, blade dressing and units of measure. The ability to change the cutting parameters, start the IsoMet 4000 and IsoMet 5000 from all three programming screens, and the user friendly screen page icon, maximize convenience.

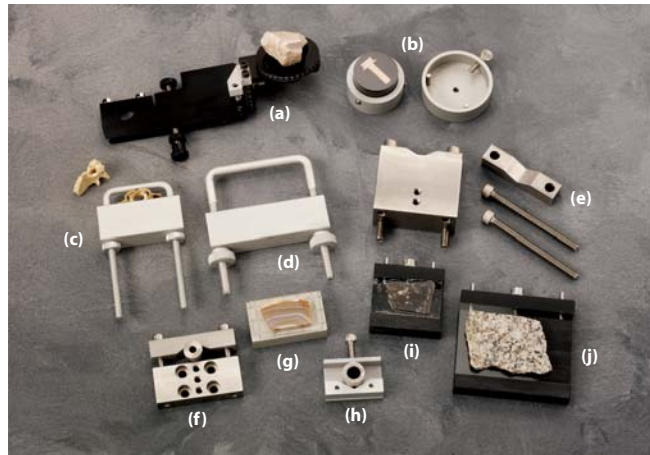
## IsoMet 5000 Only Displays



Select Sample Thickness, Serial Cut Quantity and Blade Thickness for automatic serial sectioning.



Memory Load and Memory Save are accessed from the programming screen.



(a) 11-2693 Goniometer for positioning samples at precise angles, (b) 11-1189 and 11-2489 Round Specimen Chucks, (c) 11-1194 Small Bone Chuck, (d) 11-2494 Large Bone Chuck, (e) 11-2483 Double Saddle Chuck, (f) 11-1187 Single Saddle Chuck, (g) 11-2486 Wafer Chuck, (h) 11-1184 Bar and Tube Chuck, (i) 11-2484 Small Glass Slide Chuck and (j) 11-2488 Large Glass Slide Chuck

For a complete listing of Buehler consumable supplies for use with the IsoMet 4000 and IsoMet 5000, please refer to Buehler's Consumables Buyer's Guide. Buehler continuously makes product improvements; therefore, technical specifications are subject to change without notice.

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