

# Application Guide Polishing



**BUEHLER**

Solutions for Materials Preparation, Testing and Analysis

## Cloth Selection Guide

	ChemoMet™	MasterTex™	MicroCloth™	MicroFloc	Nylon	PoliCloth	TexMet™ C	TexMet P	TriDent™	UltraPad™	UltraPol™	VelTex	VerduTex	WhiteFelt™
Aluminum	•		•	•	•	•	•		•	•		•	•	•
Cast Iron		•	•	•			•	•	•				•	•
Ceramic			•					•		•			•	
Ceramic Thermal Spray	•							•					•	
Copper	•		•	•	•	•	•					•		•
Generic Bulk Mount			•				•	•	•		•		•	
Generic Thin Section			•				•	•	•		•		•	
Hard Steels	•		•	•	•		•	•	•				•	•
Heat Treated Steels	•		•	•	•		•							•
High Temperature Solder in Ceramic	•		•					•	•				•	
Metallic Thermal Spray	•							•					•	
Micro-Electronic Material	•	•	•					•						
Nickel Base Alloys	•		•	•	•	•	•		•				•	•
Non Populated PCB	•	•	•				•		•				•	
Polymers			•	•			•							
Silicon in Micro-Electronics	•	•	•											
Sintered Carbides	•				•			•					•	
Soft Steels	•	•	•	•	•	•	•		•	•		•	•	•
Stainless Steel	•		•	•	•		•		•	•		•	•	•
Titanium	•		•	•	•		•			•	•			•

See page 4 for samples of our polishing cloths.

## Recommended Methods

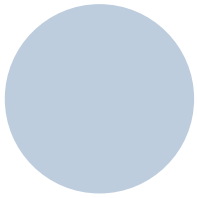
Each material, application and need can require specialized methods. Excellent results can be achieved using one of the basic polishing methods shown. For complete methods including grinding steps, forces, times, speeds and other tips and tricks please consult the Buehler SumMet™ guide or our eClub at [www.buehler.com](http://www.buehler.com).



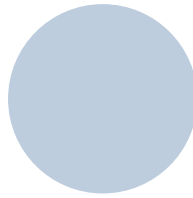
Material		Polishing Step 1	Polishing Step 2
Ceramics & Coatings	Ceramic 	VerduTex 3µm MetaDi™ Supreme Diamond Suspension	VerduTex 1µm MetaDi Supreme Diamond Suspension
	Metallic Thermal Spray Coating 	TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet™ Silica
	Ceramic Thermal Spray Coating 	TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica
	Sintered Carbides 	VerduTex 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica

	Material		Polishing Step 1	Polishing Step 2	Polishing Step 3	
Electronic Materials	Non Populated Printed Circuit Board		TriDent™ 3µm MetaDi™ Supreme Diamond Suspension	ChemoMet™ MasterPrep™ Alumina		
	Silicon in Micro-Electronics		TexMet™ C 3µm MetaDi II Diamond Paste	ChemoMet MasterMet™ Silica		
	High Temperature Solder in Ceramic Devices		TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica		
	Micro-Electronic Material		TexMet P 9µm MetaDi Supreme Diamond Suspension	VerduTex 3µm MetaDi Supreme Diamond Suspension	MasterTex™ MasterPrep Alumina	
Ferrous & Non-Ferrous Materials	Aluminum Alloys		UltraPad™ 9µm MetaDi Supreme Diamond Suspension	TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica	
	Nickel Based Superalloys		TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica		
	Titanium Alloys		UltraPad 9µm MetaDi Supreme Diamond Suspension	ChemoMet MasterMet Silica		
	Copper & Copper Alloys		TexMet C 9µm MetaDi Supreme Diamond Suspension	2A. VerduTex 3µm MetaDi Supreme Diamond Suspension	2B. VerduTex 1µm VerduTex ChemoMet MasterMet Silica	
	Hard Steels		TriDent 3µm MetaDi Supreme Diamond Suspension	MicroCloth™ MasterPrep Alumina		
	Soft Steels		UltraPad 9µm MetaDi Supreme Diamond Suspension	TriDent 3µm MetaDi Supreme Diamond Suspension	MicroCloth MasterPrep Alumina	
	Heat Treated Steel		MicroFloc 3µm MetaDi Supreme Diamond Suspension			
	Stainless & Maraging Steel		UltraPad 9µm MetaDi Supreme Diamond Suspension	TriDent 3µm MetaDi Supreme Diamond Suspension	ChemoMet MasterPrep Alumina	
	Petrographic Materials	Generic Bulk Mount Preparation		TriDent 9µm MetaDi Supreme Diamond Suspension	TriDent 3µm MetaDi Supreme Diamond Suspension	MicroCloth MasterPrep Alumina
		Generic Thin Section Mount		TriDent 9µm MetaDi Supreme Diamond Suspension	TriDent 3µm MetaDi Supreme Diamond Suspension	MicroCloth MasterPrep Alumina

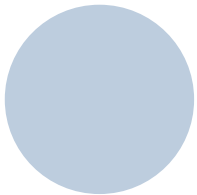
## Polishing Cloth Guide



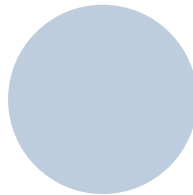
**ChemoMet™**  
Soft, porous, chemically resistant,  
synthetic cloth  
1 to 0.02µm, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>



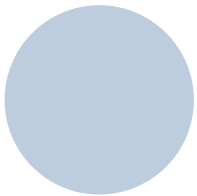
**MasterTex™**  
Soft synthetic velvet with low nap  
1 to 0.05µm, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>



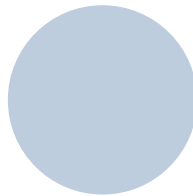
**MicroCloth™**  
Soft, versatile, long napped  
synthetic rayon cloth  
5 to 0.02µm, Diamond, Al<sub>2</sub>O<sub>3</sub>,  
SiO<sub>2</sub>



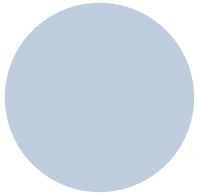
**MicroFloc**  
Soft, long napped cloth  
3 to 0.02µm, Diamond, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>



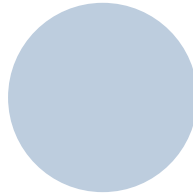
**Nylon**  
Oil resistant, medium hard woven,  
no nap  
6µm & up, Diamond



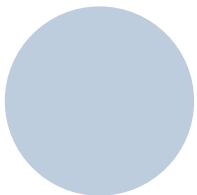
**PoliCloth**  
Medium hard, woven wool cloth  
6 to 1µm, Diamond



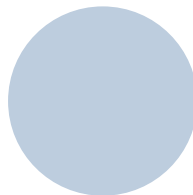
**TexMet™ C**  
Non-woven pressed cloth  
15 to 0.02µm, Diamond, Al<sub>2</sub>O<sub>3</sub>,  
SiO<sub>2</sub>



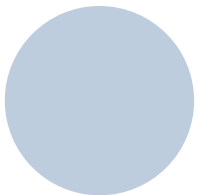
**TexMet P**  
Hard perforated, non-woven cloth  
6µm & up, Diamond



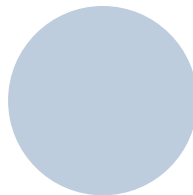
**TriDent™**  
Soft, durable, synthetic woven  
cloth, no nap  
15 to 0.02µm, Diamond



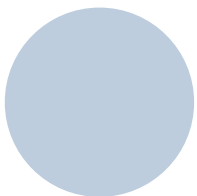
**UltraPad™**  
Hard woven, no nap  
6µm & up, Diamond



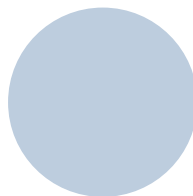
**UltraPol™**  
Hard woven, nonaggressive silk cloth  
6µm & up, Diamond



**VelTex**  
Short napped synthetic velvet cloth  
9 to 1µm, Diamond



**VerduTex**  
Durable, medium hard synthetic  
silk cloth  
9 to 1µm, Diamond



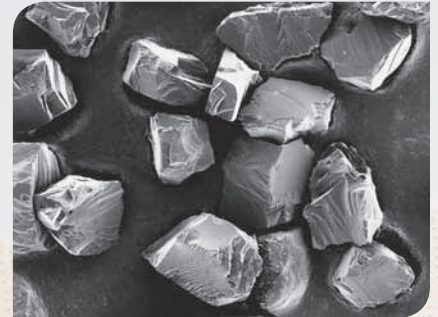
**WhiteFelt™**  
Soft, durable matted wool cloth  
6 to 0.02µm, Diamond, Al<sub>2</sub>O<sub>3</sub>,  
SiO<sub>2</sub>

# Diamond Polishing Suspensions & Pastes

Diamond is routinely used for the preparation of most materials due to its high removal rates. Available in a wide range of micron sizes, carriers and diamond type MetaDi™ diamond products are a versatile preparation tool.

## MetaDi and MetaDi Supreme Suspensions

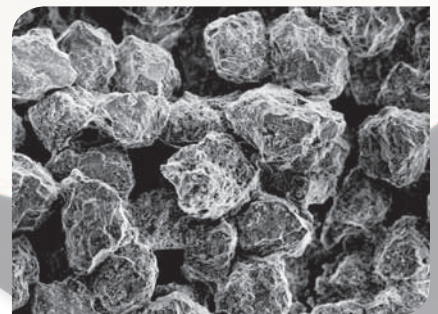
- Contain synthetic diamond graded for particle size as well as shape
- Diamond particles are uniformly suspended for ease-of-use and consistent application
- MetaDi suspensions contain sharp, blocky monocrystalline particles that provide clean and efficient cutting action
- The angular polycrystalline particles of MetaDi Supreme provide additional cutting facets resulting in less subsurface deformation
- Available in both water-based and oil-based carriers
- Suspensions are applied using a spray nozzle or with the automated dispensing system such as the Burst Dispensing System
- All Diamond suspensions are nontoxic, noncombustible and environmentally safe



*Sharp edges of monocrystalline diamonds ensure clean and efficient cutting action.*

## MetaDi Diamond Pastes

- Diamond pastes are best suited to materials prone to diamond embedding
- Available in MetaDi – natural monocrystalline particles, MetaDi II – synthetic monocrystalline particles and MetaDi Ultra – a blend of natural and synthetic polycrystalline particles
- Paste are typically applied to a clean cloth by rotating the platen at approximately 50rpm and by placing the syringe tip about 2in [5cm] out from the center of the platen. Start dispensing the paste onto the cloth, resulting, in a spiral pattern
- Require a lubricant such as MetaDi Fluid for most materials or Polishing Oil or AutoMet™ Lapping Oil for water sensitive materials
- All Diamond pastes are nontoxic, noncombustible and environmentally safe



*Angular, blocky-shaped polycrystalline diamonds provide numerous cutting facets on the particle surface, resulting in less deformation.*

There are materials that simply do not respond to diamond polishing, regardless of cloth (Lead, CP Al, Indium). The use of diamond results in a poor surface finish with embedded abrasives. If you are preparing these materials or similar materials, choose an alternative abrasive, primarily Alumina.

# Final Polishing Suspensions

Final polish solutions remove the final layer of surface deformation often invisible to the naked eye. Yet the removal of this deformation is essential when evaluating with high magnifications, polarized light, differential interference contrast as well as using EBSD techniques. A variety of application specific suspensions are available to provide superior performance.

Suspensions are typically applied using a dispensing system or directly from the bottle or a small container. New cloths should be charged with enough suspension to wet the cloth, providing enough lubrication during the polishing cycle. Cloths that have been in use previously should be charged with just enough new suspension to provide sufficient lubrication. Cease dispensing suspension the last 10-15 seconds of the polishing cycle, flushing the cloth surface with running water.

All final polishing suspensions are compatible with automated dispensing systems, such as the Burst Dispensing System, and the VibroMet™ 2 Vibratory Polisher.



*EcoMet™/AutoMet™ Pro with Burst Dispensing System*



## MasterPrep™ Alumina Suspension

- Sol-gel alumina suspension with a pH ~8.5
- Finely dispersed, nonagglomerated 0.05µm particles
- Excellent for low melting point alloys, ferrous & nickel based alloys, cobalt, precious metals, polymer-mixed composites, non-populated circuit boards, micro-electronics, lead-free solder, and electronic devices

## MasterMet™ Colloidal Silica Suspension

- Fine 0.06µm Amorphous colloidal silica suspension with a pH ~10
- Provides fine surface finishes through a chemo-mechanical polishing action
- Excellent for most non-ferrous metals, thermal spray coatings, minerals, ceramics, and polymers



## MasterMet 2 Non-Crystallizing Colloidal Silica Suspension

- Fine non-crystallizing 0.02µm amorphous colloidal silica suspension with a pH ~10.5
- Provides gentle material removal without deformation through a chemo-mechanical polishing action
- Excellent for most non-ferrous metals, thermal spray coatings, minerals, ceramics, and polymers

## MasterPolish™ Suspension

- Blend of 0.05µm high purity alumina and colloidal silica with a pH ~9
- Contains minimal water and is optimal for water sensitive materials
- Excellent for most magnesium alloys, cobalt alloys, most iron alloys, nickel, and metal matrix composites



## MasterPolish 2 Suspension

- 0.06µm high purity iron oxide with a pH ~10
- Provides superior surface finishes through a chemo-mechanical polishing action
- Excellent for sapphire, glass, alumina, silicon nitride, and metal-ceramic composites

## MicroPolish™ Alumina Powder and Suspensions

- Agglomerated alumina offers higher removal rates than other aluminas of the same size
- Available in 1, 0.3, & 0.05µm particle sizes
- Excellent for low melting temperature alloys, magnesium, lead and their alloys



## MicroPolish II Alumina Powder and Suspensions

- High quality deagglomerated alumina producing enhanced surface finishes over agglomerated versions
- Available in 1 & 0.3µm particle sizes
- Excellent for ferrous and non-ferrous materials and most minerals

# Ordering Information

(available online at [www.buehler.com](http://www.buehler.com))

## Diamond Polishing Suspensions & Pastes



### MetaDi™ Supreme Polycrystalline Diamond Suspension

0.05µm	●	Charcoal	8oz [0.24ℓ]	40-6627
0.1µm	●	Charcoal	8oz [0.24ℓ]	40-6628
0.25µm	●	Grey	8oz [0.24ℓ]	40-6629
0.25µm	●	Grey	1gal [3.28ℓ] Refill	40-6629-128
1µm	●	Blue	8oz [0.24ℓ]	40-6630
1µm	●	Blue	32oz [0.95ℓ]	40-6630-032
1µm	●	Blue	1gal [3.28ℓ] Refill	40-6630-128
3µm	●	Green	8oz [0.24ℓ]	40-6631
3µm	●	Green	32oz [0.95ℓ]	40-6631-032
3µm	●	Green	1gal [3.28ℓ] Refill	40-6631-128
6µm	●	Yellow	8oz [0.24ℓ]	40-6632
6µm	●	Yellow	32oz [0.95ℓ]	40-6632-032
6µm	●	Yellow	1gal [3.28ℓ] Refill	40-6632-128
9µm	●	Deep Red	8oz [0.24ℓ]	40-6633
9µm	●	Deep Red	32oz [0.95ℓ]	40-6633-032
9µm	●	Deep Red	1gal [3.28ℓ] Refill	40-6633-128
15µm	●	Brown	8oz [0.24ℓ]	40-6634
15µm	●	Brown	32oz [0.95ℓ]	40-6634-032
15µm	●	Brown	1gal [3.28ℓ] Refill	40-6634-128

### MetaDi Monocrystalline Diamond Suspension

1µm	●	Blue	8oz [0.24ℓ]	40-6530
1µm	●	Blue	32oz [0.95ℓ]	40-6530-032
1µm	●	Blue	1gal [3.28ℓ]	40-6530-128
1µm	●	Blue	16oz [0.47ℓ] Oil	40-6540
3µm	●	Green	8oz [0.24ℓ]	40-6531
3µm	●	Green	32oz [0.95ℓ]	40-6531-032
3µm	●	Green	1gal [3.28ℓ]	40-6531-128
3µm	●	Green	16oz [0.47ℓ] Oil	40-6541
6µm	●	Yellow	8oz [0.24ℓ]	40-6532
6µm	●	Yellow	32oz [0.95ℓ]	40-6532-032
6µm	●	Yellow	1gal [3.28ℓ]	40-6532-128
6µm	●	Yellow	16oz [0.47ℓ] Oil	40-6542
9µm	●	Deep Red	8oz [0.24ℓ]	40-6533
9µm	●	Deep Red	32oz [0.95ℓ]	40-6533-032
9µm	●	Deep Red	1gal [3.28ℓ]	40-6533-128
9µm	●	Deep Red	16oz [0.47ℓ] Oil	40-6543
15µm	●	Brown	8oz [0.24ℓ]	40-6534
15µm	●	Brown	32oz [0.95ℓ]	40-6534-032
15µm	●	Brown	1gal [3.28ℓ]	40-6534-128
15µm	●	Brown	16oz [0.47ℓ] Oil	40-6544

### MetaDi Ultra Polycrystalline Diamond Paste\*†, 20g

1µm	●	Blue	40-1-6301	9µm	●	Deep Red	40-1-6307
3µm	●	Green	40-1-6303	15µm	●	Brown	40-1-6309
6µm	●	Yellow	40-1-6305				



### MetaDi Heavy Concentration Monocrystalline Diamond Paste†

0.25µm	●	Grey	5g	40-6112	6µm	●	Yellow	5g	40-6172
0.25µm	●	Grey	20g	40-6102	6µm	●	Yellow	20g	40-6162
1µm	●	Blue	5g	40-6138	9µm	●	Deep Red	5g	40-6192
1µm	●	Blue	20g	40-6128	9µm	●	Deep Red	20g	40-6182
3µm	●	Green	5g	40-6152	15µm	●	Brown	5g	40-6212
3µm	●	Green	20g	40-6142	15µm	●	Brown	20g	40-6202

### MetaDi II Medium Concentration Monocrystalline Diamond Paste†

0.25µm	●	Grey	5g	40-6241	6µm	●	Yellow	5g	40-6250
0.25µm	●	Grey	20g	40-6240	6µm	●	Yellow	20g	40-6249
1µm	●	Blue	5g	40-6244	9µm	●	Deep Red	5g	40-6253
1µm	●	Blue	20g	40-6243	9µm	●	Deep Red	20g	40-6252
3µm	●	Green	5g	40-6247	15µm	●	Brown	5g	40-6256
3µm	●	Green	20g	40-6246	15µm	●	Brown	20g	40-6255

### Additional Accessories & Consumables for MetaDi

60-3255	Applicator Bottle, 8oz [0.24ℓ]
40-6650	Spray Pump for 8oz [0.24ℓ] bottles
40-6016	MetaDi Fluid, 16oz [0.47ℓ] (water soluble)
40-6032	MetaDi Fluid, 32oz [0.95ℓ] (water soluble)

40-6064-085	MetaDi Fluid, 85oz [2.5ℓ] (water soluble)
40-8142-128	Polishing Oil, 1gal [3.8ℓ]
60-3250-006	AutoMet™ Lapping Oil, 6oz [0.18ℓ]
60-3250-128	AutoMet Lapping Oil, 1gal [3.8ℓ]

## Final Polishing Suspensions

### MasterPrep™ Alumina, 0.05µm

63-6377-006	6oz [0.18ℓ]
40-6377-032	32oz [0.95ℓ]
40-6377-064	64oz [1.9ℓ]

### MasterMet™ Colloidal Silica, 0.06µm

40-6370-006	6oz [0.18ℓ]
40-6370-064	64oz [1.9ℓ]

### MasterMet 2 Non-Crystallizing Colloidal Silica, 0.02µm

40-6380-006	6oz [0.18ℓ]
40-6380-064	64oz [1.9ℓ]

### MasterPolish™ Final Polish, 0.05µm

40-10084	32oz [0.95ℓ]
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### MasterPolish 2 Final Polish, 0.06µm

40-6376-032	32oz [0.95ℓ]
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### MicroPolish™ Alumina Powder & Suspension

Powders			Suspensions		
0.05µm	1lb [0.45kg]	40-10075	0.05µm	6oz [0.18ℓ]	40-10083
0.05µm	5 lb [2.3kg]	40-10076	0.3µm	6oz [0.18ℓ]	40-10082
0.3µm	1 lb [0.45kg]	40-10077	1µm	6oz [0.18ℓ]	40-10081
0.3µm	5 lb [2.3kg]	40-10078			
1µm	1 lb [0.45kg]	40-10079			
1µm	5 lb [2.3kg]	40-10080			

### MicroPolish II Alumina Powder & Suspension

Powders			Suspensions		
0.3µm	1 lb [0.45kg]	40-6323-016	0.3µm	6oz [0.18ℓ]	40-6363-006
0.3µm	5 lb [2.3kg]	40-6323-080	0.3µm	1gal [3.8ℓ]	40-6363-128
1µm	1 lb [0.45kg]	40-6321-016	1µm	6oz [0.18ℓ]	40-6361-006
1µm	5 lb [2.3kg]	40-6321-080			

\*This product is grey in color with color coded packaging

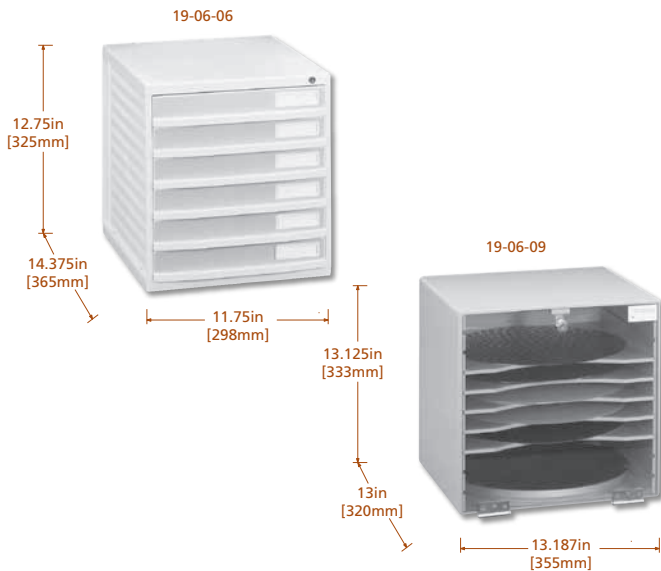
†MetaDi Fluid is recommended for use with all MetaDi Pastes and most material applications

## Premium Polishing Cloths, PSA Backed



Cloth	Quantity	2.875in [73mm]*	8in [203mm]	10in [254mm]	12in [305mm]
ChemoMet™	10	40-7902	40-7918	40-7920	40-7922
MasterTex™	10	40-7702	40-7738	40-7740	40-7742
MicroCloth™	10	40-7212	40-7218	40-7220	40-7222
MicroFloc	10		40-8318 <sup>SO</sup>	40-8320 <sup>SO</sup>	40-8322 <sup>SO</sup>
Nylon	10	40-7052	40-7068	40-7070	40-7072
PoliCloth	10		40-8418	40-8420	40-8422
TexMet™ C	10	40-1102	40-1108	40-1110	40-1112
TexMet P	5		40-7638	40-7640 <sup>SO</sup>	40-7642
TriDent™	10	40-7502	40-7518	40-7520	40-7522
UltraPad™	10	40-7112 <sup>SO</sup>	40-7118	40-7120	40-7122
UltraPol™	10	40-7442	40-7448	40-7450	40-7452
VelTex	10		40-8218	40-8220 <sup>SO</sup>	40-8222 <sup>SO</sup>
VerduTex	10		40-8018	40-8020 <sup>SO</sup>	40-8022
WhiteFelt™	5		16-2002	16-2502 <sup>SO</sup>	16-3002 <sup>SO</sup>

\*2.875in [73mm] cloths are packaged in quantities of 20  
 SO - Special Order. Items may have long lead times and minimum orders.



### Apex™ Storage Cabinets

- Durable, easy to clean storage of platens and surfaces
- Two models:
  - 8in [203mm] / 10in [254mm]
  - 12in [305mm]

19-06-06 Apex Cabinet for 8in [203mm] / 10in [254mm] discs and platens

19-06-09 Apex Cabinet for 12in [305mm] discs and platens

19-06-10 Additional Shelves for 19-06-09

For a complete listing of consumables, please refer to our Buehler Buyer's Guide or contact your local Buehler Sales Engineer. Buehler continuously makes product improvements; therefore technical specifications are subject to change without notice.

Sectioning  
 AbrasiMet • AbrasiMatic • IsoMet

Mounting  
 SimpliMet

Grinding & Polishing  
 EcoMet • AutoMet • MetaServ

Imaging & Analysis  
 OmniMet

Hardness Testing  
 Wilson® Hardness



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 Email: china@buehler.com.hk