

Abrasive Cutting Troubleshooting Guide

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Problem	Possible Cause	Suggested Remedy
Burning (bluish discoloration)	Overheated specimen	Increase coolant flow rate; reduce cutting pressure; select a wheel with softer bonding (faster breakdown)
Rapid wheel wear	Wheel bonding breaks down too rapidly	Select a wheel with harder bonding; reduce cutting pressure
Frequent wheel breakage	Uneven coolant distribution; loose specimen fixturing; abrupt contact with specimen	Adjust coolant flow to be even on both sides of the wheel; clamp the specimen more securely; start cut contact carefully
Wheel breakage at start up	Wheel was previously cracked	Handle carefully, contact Buehler
Resistance to cutting	Slow wheel bond breakdown	Select a wheel with softer bonding; use a "pulse" cutting mode; use cutter with oscillating motion or with minimum area of contact cutting* ability
Stalled wheels	Inadequate cutter capacity; pinched blade due to movement of specimen	Use cutter with greater horsepower; tighten the clamp on one side less than on the other side; reduce pressure or feed rate; use a with cutter oscillating motion or with MACC ability

*Minimum Area of Contact Cutting as on the Delta Orbital Abrasive Cutter

Tips, Tricks & Techniques:

For the best performance from your cutter and wheels:

- Maintain the coolant & recirculation tank
- Make sure flanges are properly installed
- Keep the hood open to avoid trapping humidity
- Wash cutter out frequent

Current Cutters

		SamplMet® 2	Delta® AbrasiMet®	AbrasiMatic® 300	Delta® Manual	Delta® Medium	Delta® Large
Wheel Size	9" (229mm)	■					
	10" (254mm)		■				
	12" (305mm)			■		■	
	14" (350mm)				■	■	
	16" (400mm)						■
	18" (455mm)						■
Cut Action Type	Manual Z-Chop	■	■	■	■		
	Pulse Chop			■			
	Auto Chop					■	■
	Manual X-Table			■			
	Manual Y-Table			■			
	Auto Y-Table			■			
	Auto Orbital					■	■
Power Source	1 phase	■					
	3 phase		■	■	■	■	■
Mounting Type	Table-Top	■	■	■			
	Floor Mount				■	■	■
Controls	Push-Button	■	■		■		
	LCD				■		■
	Touch-Screen			■			

Buehler's Cut-off Wheels



AcuThin™ Abrasive Cut-off Wheels



MetAbrase® Abrasive Cut-off Wheels



Delta® Orbital Cut-off Wheels



Delta® Superalloy Wheels

Wheel Choices for 9" (229mm) Abrasive Cutters 1¼" (31.75mm) Arbor, 10 per package

	Recommended Use/Thickness	Catalog Number/ Price
MetAbrase®	HRC 60 & Up 0.07" (1.8mm)	10-4110-010
	HRC 50-60 0.07" (1.8mm)	10-4112-010
	HRC 35-50 0.07" (1.8mm)	10-4116-010
	HRC 15-35 0.063" (1.6mm)	10-4120-010
	Delicate Cutting 0.032" (0.8mm)	10-4127-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.063" (1.6mm)	10-4145-010
	Non-Ferrous, Soft Materials (Al, Brass) 0.063" (1.6mm)	10-4150-010
AcuThin™	HRC 45 0.025" (0.635mm)	10-4160-010
	HRC > 45 0.025" (0.635mm)	10-4161-010
BuehlerMet® II	HRC 50 & Up 0.063" (1.6mm)	10-5110-010
	HRC 35-50 0.063" (1.6mm)	10-5112-010
	HRC 15-35 0.063" (1.6mm)	10-5116-010

Wheel Choices for 10" (254mm) Abrasive Cutters 1¼" (31.75mm) Arbor, 10 per package

	Recommended Use/Thickness	Catalog Number/ Price
MetAbrase®	Super Alloy 0.055" (1.4mm)	12-4205-010
	HRC 60 & Up 0.07" (1.8mm)	10-4210-010
	HRC 50-60 0.07" (1.8mm)	10-4212-010
	HRC 35-50 0.07" (1.8mm)	10-4216-010
	HRC 15-35 0.063" (1.6mm)	10-4220-010
	Delicate Cutting 0.032" (0.8mm)	10-4227-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.063" (1.6mm)	10-4245-010
	Non-Ferrous, Soft Materials (Al, Brass) 0.043" (1.1mm)	10-4250-010
	AcuThin™	HRC ≤ 45 0.025" (0.635mm)
HRC ≤ 45 0.025" (0.635mm)		10-4261-010
BuehlerMet® II	HRC 50 & Up 0.063" (1.6mm)	10-5210-010
	HRC 35-50 0.063" (1.6mm)	10-5212-010
	HRC 15-35 0.063" (1.6mm)	10-5216-010
	General Purpose, Non-Ferrous 0.063" (1.6mm)	10-5245-010

Rubber Resin Al₂O₃
 Rubber Al₂O₃
 Rubber SiC

**Wheel Choices for 12" (305mm) Abrasive Cutters
1 1/4" (31.75mm) Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
MetAbrase®	HRC 60 & Up 0.100" (2.5mm)	10-4410-010
	HRC 50-60 0.100" (2.5mm)	10-4412-010
	HRC 35-50 0.100" (2.5mm)	10-4416-010
	HRC 15-35 0.063" (1.6mm)	10-4420-010
	Delicate Cutting 0.045" (1.1mm)	10-4427-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.063" (1.6mm)	10-4445-010
	Non-Ferrous, Soft Materials (Al, Brass) 0.063" (1.6mm)	10-4450-010
AcuThin™	HRC 45 0.025" (0.635mm)	10-4360-010
	HRC > 45 0.025" (0.635mm)	10-4361-010
BuehlerMet® II	HRC 50 & Up 0.063" (1.6mm)	10-5410-010
	HRC 35-50 0.063" (1.6mm)	10-5412-010
	HRC 15-30 0.100" (2.5mm)	10-5416-010
	General Purpose, Non-Ferrous 0.100" (2.5mm)	10-5445-010

**12" (300mm) Abrasive Wheels for Delta® Orbital
Cutters 1 1/4" (31.75mm) Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
Delta®	Superalloy 0.055" (1.4mm)	12-4405-010
	HRC 60 & Up 0.105" (2.7mm)	12-4410-010
	HRC 35-50 0.105" (2.7mm)	12-4416-010
	HRC 15-35 0.105" (2.7mm)	12-4420-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.055" (1.4mm)	12-4445-010 ^{SO}
	Non-Ferrous, Soft Materials (Al, Brass) 0.055" (1.4mm)	12-4450-010 ^{SO}
	SO - Special Order Items may have lead times and minimum orders	

**12" (300mm) Abrasive Wheels for Delta® Chop
and AbrasiMatic® 300 Cutters 1 1/4" (31.75mm)
Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
Delta®	HRC 60 & Up 0.105" (2.7mm)	12-4110-010
	HRC 50-60 0.105" (2.7mm)	12-4112-010
	HRC 35-50 0.105" (2.7mm)	12-4116-010
	HRC 15-35 0.105" (2.7mm)	12-4120-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.055" (1.4mm)	12-4145-010
	Non-Ferrous, Soft Materials 0.055" (1.4mm)	12-4150-010

Rubber Resin Al₂O₃
 Rubber Al₂O₃
 Rubber SiC

**Wheel Choices for 14" (355mm) Abrasive Cutters
1 1/4" (31.75mm) Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
MetAbrace®	HRC 60 & Up 0.075" (1.9mm)	10-4310-010
	HRC 50-60 0.115" (2.9mm)	10-4312-010
	HRC 35-50 0.100" (2.5mm)	10-4316-010
	HRC 15-35 0.100" (2.5mm)	10-4320-010
	Delicate Cutting 0.055" (1.4mm)	10-4327-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.075" (1.9mm)	10-4345-010
	Non-Ferrous, Soft Materials (Al, Brass) 0.085" (2.2mm)	10-4350-010
BuehlerMet® II	HRC 50 & Up 0.085" (2.2mm)	10-5310-010
	HRC 35-50 0.085" (2.2mm)	10-5312-010
	General Purpose, Non-Ferrous 0.100" (2.5mm)	10-5345-010

**14" (350mm) Abrasive Wheels for Delta® Orbital
Cutters 1 1/4" (31.75mm) Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
SO - Special Order Items may have lead times and minimum orders		
Delta®	Superalloy 0.063" (1.6mm)	12-4305-010
	HRC 60 & Up 0.105" (2.7mm)	12-4310-010
	HRC 50-60 0.105" (2.7mm)	12-4312-010
	HRC 35-50 0.105" (2.7mm)	12-4316-010
	HRC 15-35 0.105" (2.7mm)	12-4320-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.063" (1.6mm)	12-4345-010 ^{SO}

**16" (400mm) Abrasive Wheels for Delta® Orbital
Cutters 1 1/4" (31.75mm) Arbor, 10 per package**

	Recommended Use/Thickness	Catalog Number/ Price
SO - Special Order Items may have lead times and minimum orders		
Delta®	Superalloy 0.075" (1.9mm)	12-5605-010
	HRC 60 & Up 0.125" (3.0mm)	12-5610-010
	HRC 50-60 0.125" (3.0mm)	12-5612-010
	HRC 35-50 0.125" (3.0mm)	12-5616-010
	HRC 15-35 0.125" (3.0mm)	12-5620-010
	Non-Ferrous, Hard Materials (Ti, U, Zr) 0.075" (1.9mm)	12-5645-010
	Non-Ferrous, Soft Materials (Al, Brass) 0.075" (1.9mm)	12-5650-010 ^{SO}

Rubber Resin Al₂O₃
 Rubber Al₂O₃
 Rubber SiC

18" (455mm) Abrasive Wheels for Delta® Orbital Cutters 1¼" (31.75mm) Arbor, 10 per package

SO - Special Order Items may have lead times and minimum orders

Cut-off Wheel/Thickness	12-5805-010 SuperAlloy	12-5810-010 HRC 60 & Up	12-5812-010 ^{SO} HRC 50-60	12-5816-010 ^{SO} HRC 35-50	12-5820-010 ^{SO} HRC 15-35	12-5845-010 Nonferrous, Hard Materials (Ti, U, Zr)	12-5850-010 Nonferrous, Soft Materials (Al, Brass)
Delta® Orbital 0.100" (2.4mm)	■					■	■
Delta® Orbital 0.153" (3.8mm)		■	■	■	■		

■ Rubber Resin Al₂O₃ ■ Rubber Al₂O₃ ■ Rubber SiC

Precision Cutting Tips, Tricks & Techniques:

For the best performance and longer life from your blades:

- Always tightly clamp your samples
- Use double saddle chuck for long parts, such as rods
- DO NOT hand dress
- Encapsulate spheres, unusual shapes, friable materials
- Use appropriate flange size
- Soft materials can build up during cut and can cause blade breakage, do not cut such materials unattended. For extremely gummy materials dress during cut
- Wash machine out frequently

AcuThin™ & MetAbrase Abrasive Cut-off Wheels for IsoMet® Precision Saws



AcuThin™ Abrasive Cut-off Wheels



MetAbrase® Abrasive Cut-off Wheels

Buehler's AcuThin™ & MetAbrase® Cut-off Wheels have been formulated for fast sectioning of both small, delicate specimens and large, sturdy specimens. The overall wheel thickness offers minimal kerf loss and a cooler cut. These blades give versatile cutting options over a wide variety of specimen types and perform best with manual operation.

Abrasive Wheels for IsoMet®2000, 4000 & 5000 Precision Saws, ½" (12.7mm) Arbor, 10 per package

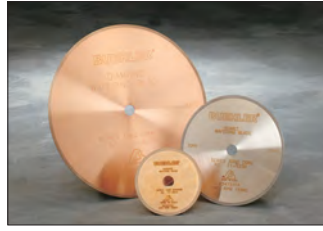
Cut-off Wheel/Thickness	10-4060-010 5" (127mm) for cutting tool or hard steel, HRC45 and above	10-4061-010 5" (127mm) For cutting medium hard, soft steel HRC45 and below	11-4207-010 7" (178mm) Steels & Stainless Steels	11-4217-010 7" (178mm) Hard or Soft Nonferrous Materials
AcuThin™ 0.019" (0.480mm)	■			
AcuThin™ 0.019" (0.480mm)		■		
MetAbrase® 0.030" (0.76mm)			■	
MetAbrase® 0.030" (0.76mm)				■

■ Rubber Resin Al₂O₃ ■ Rubber Al₂O₃ ■ Rubber SiC

IsoMet® Diamond Wafering Blades & Dressing Sticks

Buehler® IsoMet® Diamond Wafering Blades

This proprietary high-tech family of blades was developed specifically to provide precise and accurate sectioning of samples. These specially formulated diamond blades give accurate cuts without the mess or inconvenience of thicker conventional abrasive cut-off wheels.



½" (12.7mm) Arbor, for IsoMet® LS, IsoMet® 1000, 2000, 4000 and 5000 Saws, 1 per box

Diameter/ Thickness	Use with Saws*	30HC Polymers, Rubber, Soft Gummy Materials	20HC Aggressive Sectioning of Metals	15HC Metal Matrix Composite, PCBs, Bone, Ti, TSC	20LC Hard Tough Materials, Structural Ceramics	15LC Hard Brittle Materials, Glass, Al ₂ O ₃ , Zr ₂ O ₃ , Concrete	10LC Medium to Soft Ceramics, Glass Fiber Reinforced Comp.	5LC Soft, Friable Ceramics, Comp. with Fine Reinforcing: CaF ₂ , MgF ₂ , Carbon Comp.
3" (76mm)/ 0.007" (0.2mm) <small>** best on IsoMet Low Speed Saw</small>	All		11-10066		11-10067	11-10068	11-10069	
4" (102mm)/ 0.012" (0.3mm)	All		11-4244		11-4254			
5" (127mm)/ 0.015" (0.4mm)	All		11-4245		11-4255	11-4285	11-4295	
5" (127mm)/ 0.020" (0.5mm)	All	11-4215		11-4225				
5" (127mm)/ 0.030" (0.76mm)	1k, 2k, 4k, 5k	11-4239						
6" (152mm)/ 0.020" (0.5mm)	1k, 2k, 4k, 5k		11-4246		11-4276			
7" (178mm)/ 0.020" (0.5mm)	1k, 2k, 4k, 5k					11-4287		
7" (178mm)/ 0.025" (0.6mm)	1k, 2k, 4k, 5k	11-4237	11-4247	11-4227	11-4277			
7" (178mm)/ 0.030" (0.76mm)	1k, 2k, 4k, 5k	11-4241						
8" (203mm)/ 0.035" (0.9mm)	4k, 5k	11-4242 ^{SO}	11-4238	11-4248	11-4228	11-4279	11-4288 ^{SO}	
Dressing Stick ½" x ½" x 3" (13mm x 13mm x 76mm)	LS, 1K, 4K, 5K		11-1190				11-1290 ^{SO}	
Dressing Stick 1" x ½" x 3" (25.4mm x 13mm x 76mm)	1K, 2K		11-2490				11-2495 ^{SO}	

*LS = IsoMet Low Speed 1k = IsoMet 1000 2k = IsoMet 2000 4k = IsoMet 4000 5k = IsoMet 5000
 †Series 30 Blades do not come with dressing stick as they do not require dressing

SO - Special Order Items may have lead times and minimum orders

IsoCut® Wafering Blades



IsoCut® Wafering Blades
The IsoCut family of wafering blades was specifically developed to section iron-, cobalt-, and nickel-based alloys and superalloys.

These thin blades provide precise sectioning capability on difficult to cut samples. The special formulation of bonded cubic boron nitride on IsoCut blades can significantly reduce your sectioning time on ferrous materials compared to conventional diamond blades. The High Concentration blades will provide even faster sectioning times. Periodic use of the 11-1190 dressing stick is recommended.

½" (12.7mm) Arbor IsoCut® Wafering Blades for IsoMet® LS, IsoMet® 1000, 2000, 4000 and 5000 Saws, 1 per box

Diameter/ Thickness	Use with Saws*	CBN - Low Concentration	CBN - High Concentration
3" (76mm)/ 0.0007" (0.2mm)	All	11-10070	
4" (102mm)/ 0.012" (0.3mm)	All	11-4264	11-5264
5" (127mm)/ 0.015" (0.4mm)	All	11-4265	11-5265
6" (152mm)/ 0.020" (0.5mm)	1k, 2k, 4k, 5k	11-4266	11-5266
7" (178mm)/ 0.025" (0.6mm)	1k, 2k, 4k, 5k	11-4267	11-5267
8" (203mm)/ 0.035" (0.9mm)	4k, 5k	11-4268	11-5268
Dressing Stick ½" x ½" x 3" (13mm x 13mm x 76mm)		11-1190	

* 1k = IsoMet 1000 2k = IsoMet 2000 4k = IsoMet 4000 5k = IsoMet 5000

Buehler Cup Grinders



Buehler Cup Grinders are designed to be used on the IsoMet® 5000 Linear Precision Saw. The cup grinders are used for automatic grinding to a target depth and for thin section preparation.

½" (12.7mm) Arbor Cup Grinders for IsoCut® 5000 Saw, 1 per box

Application	Diameter	60 Grit (P60) Al ₂ O ₃ /Vitrified	60 Grit (P60) SiC/Vitrified	240 Grit (P280) Diamond/ Resin
Ferrous Metals	6" (150mm)	11-2720 ^{SO}		
NonFerrous Metals	6" (150mm)		11-2730 ^{SO}	
Ceramic & Geological	5" (127mm)			11-2740

SO - Special Order Items may have lead times and minimum orders

Cutting Fluids



CoolMet® 2 Fluid, 1 gal. (3.8ℓ)



IsoCut® Fluid, 1 qt. (0.95ℓ)



IsoCut® PLUS Fluid, 1 pt. (0.46ℓ)

IsoCut® Fluid is an oil-based coolant which can reduce cutting times significantly on many types of materials. It is only for use with IsoMet LS Saws or saws with the maximum speed of 500 rpm. IsoCut® Fluid is used in an undiluted form.

IsoCut® PLUS Fluid is water-based and can be used to lubricate and cool both conventional and advanced engineering materials. The cutting fluid mixing ratio for IsoCut® PLUS is 9 (water) to 1 (coolant). All coolants should be mixed with distilled water to optimize performance.

CoolMet® 2 Cutting Fluid is an odorless, water miscible fluid concentrate with excellent lubrication and corrosion inhibiting qualities designed for a wide range of abrasive cutting. The cutting fluid mixing ratio for CoolMet® 2 is 30 (water) to 1 (coolant). All coolants should be mixed with distilled water to optimize performance.

Cutting Fluids

Fluid	For Use with Machine	1 pt. (0.476ℓ)	1 qt. (0.95ℓ)	33.8 oz (1ℓ)	1 gal. (3.8ℓ)	5 gal. (19ℓ)
IsoCut® Fluid*	IsoMet® LS Saws		11-1193-032		11-1193-128	
IsoCut® PLUS Fluid	IsoMet® LS, 1k, 2k, 4k, 5k Saws	11-2293-016				
CoolMet® 2 Fluid	Abrasive Cutters			10-4330-095	10-4330-128	10-4330-640

Sectioning Accessories

SO - Special Order Items may have lead times and minimum orders

Accessory	For Use with Machine	3 pieces 1" x 6" (25.4mm x 152mm)	1" x 1" x 6" (25.4mm x 25.4mm x 152mm)	½" x ½" x 4" (12.7mm x 12.7mm x 102mm)
Chuck Padding	IsoMet® Chucks	11-2496 ^{SO}		
Dressing Stick	Abrasive Wheels		10-4000 ^{SO}	
Dressing Stick	Diamond & CBN Blades		15-6190*	40-4510

* and diamond grinding discs



Abrasive Wheel Dressing Sticks



Diamond Dressing Sticks

PetroThin® and PetroCut™ Sectioning Supplies

Size		For Use with Machine	Diamond	CBN
8" x 0.045" x 1" (203mm x 1.1mm x 25.4mm)	Blade	PetroThin®	11-4278	11-4280
8" x ¼" x 1" (203mm x 6.35mm x 25.4mm)	Cup Grinder	PetroThin®	40-4508	
8" x 0.055" x 1" (203mm x 1.4mm x 25.4mm)	Cup Grinder	PetroThin®		40-4512
10" x 0.045" x 1.25" (254mm x 1.1mm x 31.75mm)	Blade	PetroCut™	11-10074	

Tip

Dressing of PetroThin® blades is best done by attaching a portion of the dressing stick (15-6190) to a glass slide and sectioning the dressing stick as if it were a sample. Attaching the dressing stick to the slide can be done quickly using Crystalbond wax. Because of the vacuum chuck positioning relative to the blade there is no need to attach a portion of the stick thicker than about ¼". This thickness is sufficient to make two passes through the stick. New blades should be dressed with two passes through the 1" x 1" cross-section of this stick slowly, taking a few minutes for each pass. Subsequent dressing will typically require only one pass through the stick.

Lapro® & Trim Saw Sectioning Supplies

Thickness/Arbor	For Use with Machine	6" (152mm) Diameter	10" (254mm) Diameter	18" (457mm) Diameter	24" (609mm) Diameter
0.040" (1.02mm) / 5/8" Arbor	Trim Saw		11-10051		
0.020" (0.51mm) / 5/8" Arbor	Trim Saw	11-10050			
0.064" (1.6mm) / ¾" or 1" Arbor	Lapro®			11-10015	
0.075" (1.9mm) / ¾" or 1" Arbor	Lapro®				11-10016



Lapro® Slab Saw Blades 18" (457mm) and 24" (609mm) shown