

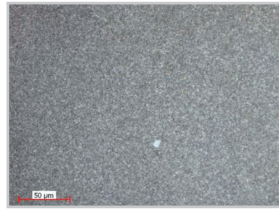
16

세라믹 텅스텐 카바이드 (WC)

각 대표재료별 시편전처리 연마공정 및 결과소개

1. 시편 종류

- 텅스텐 카바이드 (WC)



Tungsten carbide, etched, 50x, Brightfield

2. 시편 절단 및 성형 공정

Table 1. Cutting Parameters

NEW TechCut 5x™	
Coolant	Lubri-Cut Cutting Fluid
Wheel Type	Aluminum Oxide
Wheel Bond	Resin
Size	8"
Wheel RPM	4000
Feed Rate	12.7 mm/min

Table 2. Hot Mounting Parameters

TechPress3™	
Mold Size	1.25" (32 mm)
Powder	Black glass-filled epoxy powder
Pre-Heat	Off
Heat Temp/Time	160°C / 9 min
Cool Time	6 min
Pressure	4.5 bar

3. 연삭 및 연마 공정

Table 3. MetPrep3™/PH-3™ Gridding/Polishing Procedure

Step	1	2	3	4	5	6	
Consumables	Abrasive Size (P-Grading)	70 µm	15 µm	6 µm	3 µm	1 µm	0.05 µm
	Type	Diamond	Diamond	Diamond	Polycrystalline Diamond	Polycrystalline Diamond	Colloidal Silica
	Carrier	Metal Bond Dia-Grid	Metal Bond Dia-Grid	Metal Bond Dia-Grid	Glycol Suspension	Glycol Suspension	Suspension
	Polishing Cloth	-	-	-	Gold Label	White Label	Final A
	Coolant	Water	Water	Water	GreenLube	GreenLube	Water**
Settings	Platen Speed(RPM) / Direction	150 Comp	150 Comp	150 Comp	150 Contra	150 Contra	150 Contra
	Sample Speed (RPM)	150	150	150	150	150	150
	Force (lbf/N) *	5/22	5/22	5/22	6/27	6/27	3/13
	Time (min)	2*	2	2	3	2	1

* 시편이 평탄 할 때까지 작업

+ 1.25" (32mm) 몰드 사용 시: 만일 총 표면면적이 변하는 경우는, 적용하는 압력을 일정하게 유지하기 위해 Force를 조절해 주어야 함.

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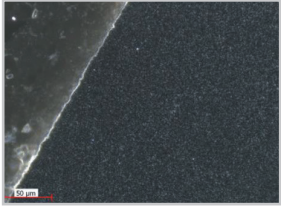
Comp 플레이트, 시편홀더 동일회전 방향

Contra 플레이트, 시편홀더 반대회전 방향

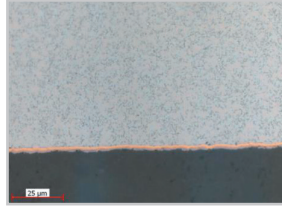
Table 4. AD-5™ Dispensing Parameters

Step	4&5	6
Type	Diamond Suspension & GreenLube	Colloidal Silica Suspension
Pulses/Min	6	10
Pulse Length	0.5 sec	2.0 sec
Water Flush	Off	On

4. 결과 사진



Tungsten carbide, as-polished, 50x, Darkfield



TiCN coating, as-polished

5. 사용 소모품 소개

- #60-20081 7" Resin Bonded Diamond Blade
- #80-10130 Lubri-Cut
- #150-10105 Black Glass-Filled Epoxy Powder
- #200-10006 PTFE Spray Mold Release
- #50-50010M 70 µm Dia-Grid Grinding Disc
- #50-50025M 15 µm Dia-Grid Grinding Disc
- #50-50040M 6 µm Dia-Grid Grinding Disc
- #90-30020 3 µm Polycrystalline Diamond Suspension
- #90-30015 1 µm Polycrystalline Diamond Suspension
- #180-20000 0.05 µm Colloidal Silica Suspension
- #90-209000 GreenLube™ Polishing Lubricant
- #90-700-210 Gold Label Rigid Back Disc
- #90-700-500 White Label Rigid Back Disc
- #180-10705 Final A Rigid Back Disc
- #148-10000 Micro Organic Soap
- #200-20000 Aero-Duster Compressed Air
- #95-10230 GP Cleaning Solution

** 소모품 샘플은 무료로 제공해 드리고 있습니다

6. 참조자료

분류 목록 명 : 텅스텐 카바이드

15. 텅스텐 카바이드 (WC)

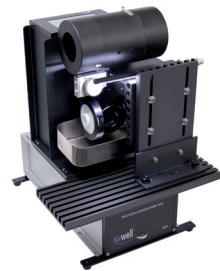
16. 실리콘카바이드 및 나이트라이드

17. Si₃N₄ & ZrB₂-SiC

21. 텅스텐 카바이드 디스크



NEW TechCut 5x™ Precision High Speed Saw



WELL 3500 Premium Diamond Wire Cutting System



TechPress3™ Hydraulic-Pneumatic Mounting Press / 1 1/4" Mold Assembly

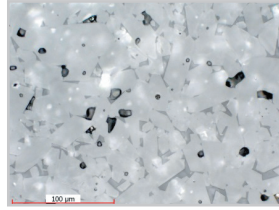


MetPrep3™ / PH-3™ Grinding/ Polishing System, AD-5™ Automatic Fluid Dispenser

상세 기술자료, 소모품 샘플 및 기술상담이 필요하시면,
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1. 시편 종류

- 알루미나 (Alumina, Al₂O₃)



Aluminum oxide, as-polished, 500x, Brightfield

2. 시편 절단 및 성형 공정

Table 1. Cutting Parameters

NEW TechCut 5x™	
Coolant	Lubri-Cut Cutting Fluid
Wheel Type	Diamond
Wheel Bond	Resin
Size	7"
Wheel RPM	4000
Feed Rate	12.7 mm/min

Table 2. Cold Mounting Parameters

EpoxySet	
Mold Size	1.25" (32 mm)
Mix Ratio (weight) Resin : Hardener	100 : 12
Cure Time	8 Hours (25°C)

3. 연삭 및 연마 공정

Table 3. MetPrep3™/PH-3™ Gridding/Polishing Procedure

Step	1	2	3	4	5	6	
Consumables	Abrasive Size (P-Grading)	70 µm	15 µm	9 µm	6 µm	1 µm	0.04 µm
	Type	Diamond	Diamond	Polycrystalline Diamond	Polycrystalline Diamond	Polycrystalline Diamond	Colloidal Silica
	Carrier	Metal Bonded DiaGrid Disc	Metal Bonded DiaGrid Disc	Suspension	Suspension	Suspension	Suspension
	Polishing Cloth	-	-	PLAN-Cloth	Gold Label	TECH-Cloth	Final A
	Coolant	Water	Water	GreenLube	GreenLube	GreenLube	Water**
Settings	Platen Speed(RPM) / Direction	150 Comp	150 Comp	150 Comp	150 Comp	150 Comp	150 Comp
	Sample Speed (RPM)	150	150	150	150	150	150
	Force (lbf/N) *	5	5	6	6	5	4
	Time (min)	2*	12	4	4	2	1

* 시편이 평탄 할 때까지 작업

+ 1.25" (32mm) 몰드 사용 시: 만일 총 표면면적이 변하는 경우는, 적용하는 압력을 일정하게 유지하기 위해 Force를 조절해 주어야 함.

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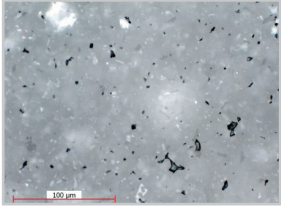
Comp 플레튼, 시편홀더 동일회전 방향

Contra 플레튼, 시편홀더 반대회전 방향

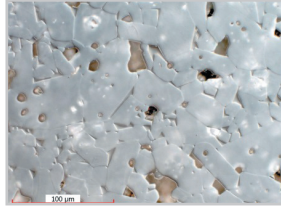
Table 4. AD-5™ Dispensing Parameters

Step	4&5	6
Type	Diamond Suspension & RedLube	Colloidal Silica Suspension
Pulses/Min	6	10
Pulse Length	0.5 sec	2.0 sec
Water Flush	Off	On

4. 결과 사진



Aluminum oxide, as-polished, 500x, Brightfield



Aluminum oxide, as-polished, 500x, C-DIC

5. 사용 소모품 소개

- #60-20081 7" Resin Bonded Diamond Blade
- #80-10130 Lubri-Cut
- #145-20000 EpoxySet Kit
- #197-10005 1¼" 2-Part Mounting Cups
- #50-50010M 70 µm Dia-Grid Grinding Disc
- #50-50025M 15 µm Dia-Grid Grinding Disc
- #90-30030 9 µm Polycrystalline Diamond Suspension
- #90-30020 6 µm Polycrystalline Diamond Suspension
- #90-30015 1 µm Polycrystalline Diamond Suspension
- #180-25000 0.04 µm Non-Stick/Rinsable Colloidal Silica
- #90-209000 GreenLube™ Polishing Lubricant
- #85-500-005 PLAN-Cloth Polishing Cloth
- #90-700-210 Gold Label Rigid Back Disc
- #85-700-500 TECH-Cloth Polishing Cloth
- #180-10705 Final A Rigid Back Disc
- #148-10000 Micro Organic Soap
- #200-20000 Aero-Duster Compressed Air
- #95-10230 GP Cleaning Solution

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6. 참조자료

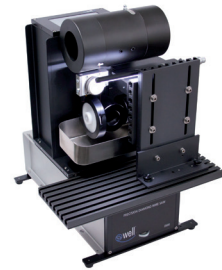
분류 목록 명 : 세라믹 재료

1 ~ 50 : 일반 세라믹

- | | |
|-------------------------|------------------------------------|
| 1. 세라믹 캐패시터 & 알루미늄 옥사이드 | 10. 다양한 크기의 캐패시터 |
| 2. 세라믹 캐패시터 | 11. 세라믹 부품(알루미튬 옥사이드 코팅) |
| 3. 리튬 글라스 세라믹 (MP) | 12. 기공세라믹 재료 (실리콘카바이드 및 지르코늄 옥사이드) |
| 4. 리튬 글라스 세라믹 (오토폴리셔) | 13. 일반 가공세라믹 재료 |
| 5. 리튬 나이오비드 글라스 | |
| 9. 대형 세라믹 캐패시터 | |



NEW TechCut 5x™ Precision High Speed Saw



WELL 3500 Premium Diamond Wire Cutting System



VacuPrep™ Epoxy Impregnation System



MetPrep3™ / PH-3™ Grinding/ Polishing System, AD-5™ Automatic Fluid Dispenser

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email: info@chinwoo.co.kr 전화: 031-777-1277

1. 시편 종류

- 시멘트 (Cement)



Cement Clinker BF

2. 시편 절단 및 성형 공정

Table 1. Cutting Parameters

NEW TechCut 5x™	
Coolant	Lubri-Cut Cutting Fluid
Wheel Type	Diamond
Wheel Bond	Resin
Size	7"
Wheel RPM	3000
Feed Rate	6.35 mm/min

Table 2. Cold Mounting Parameters

EpoxyMount	
Mold Size	1.25" (32 mm)
Mix Ratio (weight) Resin : Hardener	10 : 3
Cure Time	2 Hours (25°C)

3. 연삭 및 연마 공정

Table 3. MetPrep3™/PH-3™ Grinding/Polishing Procedure

Step	1	2	3	4	5	
Consumables	Abrasive Size (P-Grading)	320 Grit (P-400)	600 Grit (P-1200)	6 μm	1 μm	0.04 μm
	Type	Silicon Carbide	Silicon Carbide	Polycrystalline Diamond	Polycrystalline Diamond	Colloidal Silica
	Carrier	Abrasive Disc	Abrasive Disc	Glycol Suspension	Glycol Suspension	Suspension
	Polishing Cloth	-	-	White Label	White Label	Final A
	Coolant	Water	Water	GreenLube	GreenLube	Water**
Settings	Platen Speed(RPM) / Direction	300 Comp	300 Comp	150 Contra	150 Contra	150 Contra
	Sample Speed (RPM)	150	150	150	150	150
	Force (lbf/N) *	5/22	5/22	5/22	5/22	5/22
	Time (min)	1*	2	8	8	2

* 시편이 평탄 할 때까지 작업

+ 1.25" (32밀리미터) 사용 시: 만일 총 표면면적이 변하는 경우는, 적용하는 압력을 일정하게 유지하기 위해 Force를 조절해 주어야 함.

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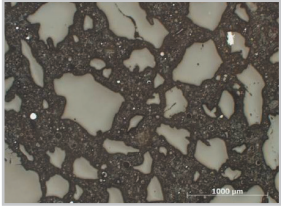
Comp 플레이트, 시편홀더 동일회전 방향

Contra 플레이트, 시편홀더 반대회전 방향

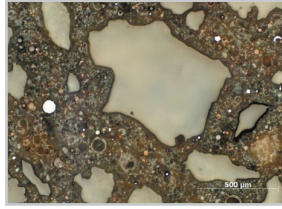
Table 4. AD-5™ Dispensing Parameters

Step	3&4	5
Type	Diamond Suspension & GreenLube	Colloidal Silica Suspension
Pulses/Min	6	10
Pulse Length	0.5 sec	1.0 sec
Water Flush	Off	On

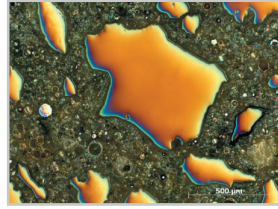
4. 결과 사진



Cement Mortar, 50x, Brightfield



Cement Mortar, 100x, Brightfield



Cement Mortar, 100x, C-DIC

5. 사용 소모품 소개

- #80-11710 8" Resin Bonded Aluminum Oxide Blade
- #80-10130 Lubri-Cut
- #145-10005 EpoxyMount Kit
- #197-10005 1¼" 2-Part Mounting Cups
- #50-10065 320 Grit Silicon Carbide Abrasive Disc
- #50-10075 600 Grit Silicon Carbide Abrasive Disc
- #90-30025 6 µm Polycrystalline Diamond Suspension
- #90-30015 1 µm Polycrystalline Diamond Suspension
- #180-25000 0.04 µm Non-Stick/Rinsable Colloidal Silica
- #90-209000 GreenLube™ Polishing Lubricant
- #90-700-550 DiaMat Rigid Back Disc
- #180-10705 Final A Rigid Back Disc
- #148-10000 Micro Organic Soap
- #200-20000 Aero-Duster Compressed Air
- #95-10230 GP Cleaning Solution

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6. 참조자료

분류 목록 명 : 세라믹 재료
50 ~ 70 : 시멘트 등

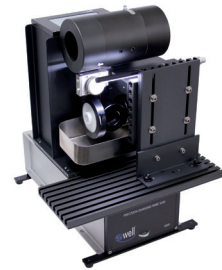
- 51. 시멘트 클링커
- 52. 시멘트 몰탕 ESD, EBSD 시편
- 53. 시멘트 페이스트 블록 ESD 시편
- 54. 콘크리트 빌렛

분류 목록 명 : 광물

- 1. 황철광
- 3. 광물(아연광, 방해석, 투회석) SEM 시편(MP)
- 4. 수정 및 방해석 IMS용 표준시편 제조 (MP)
- 5. 실리카(모래) (MP)
- 6. 운석 (철계)
- 7. 토양
- 8. 암석 (큰 경도차이를 갖는 4가지 암석)
- 9. 화산 부석



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WELL 3500 Premium Diamond Wire Cutting System



VacuPrep™ Epoxy Impregnation System



MetPrep3™ / PH-3™ Grinding/ Polishing System, AD-5™ Automatic Fluid Dispenser

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1. 시편 종류

- 세라믹 볼



세라믹 볼

2. 시편 절단 및 성형 공정

Table 1. Cold Mounting Parameters

EpoxyMount	
Mold Size	1.25" (32 mm)
Mix Ratio (weight) Resin : Hardener	10:3
Cure Time	2Hours (25°C)

3. 연삭 및 연마 공정

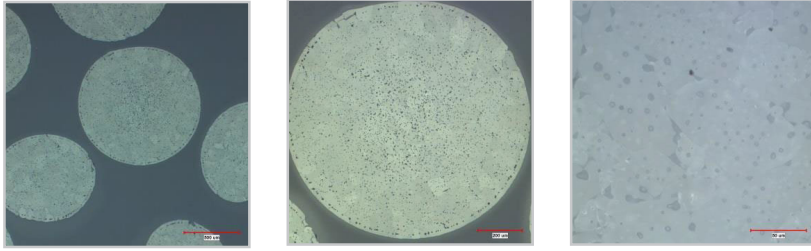
Table 2. Grinding/Polishing - Auto Polisher

Step	Grinding		Polishing		
	1	2	3	4	5
Abrasive	600Grit (P-1200)	800 Grit (P-2400)	9 μm	3 μm	0.04 μm
Type	Dia-Grid	SiC	Diamond	Diamond	Colloidal Silica
Carrier	Diamond Disc	Abrasive Disc	Suspension	Suspension	Suspension
Polishing Cloth			Gold Label	DiaMat	Chem-Pol
Coolant	Water	Water	GreenLube	GreenLube	-
Platen Speed(RPM) / Direction	100/Comp	100/Comp	100/Contra	100/Contra	100/Contra
Sample Speed (RPM)	90	90	90	90	90
Force (IbF)	4	5	5	5	4
Time (min)	Until Flat	3'00"	5'00"	3'00"	3'00"

Table 3. AD-5™ Dispensing Parameters

Step	3&4	5
Type	Diamond Suspension & GreenLube	Colloidal Silica Suspension
Pulses/Min	6	6
Pulse Length	0.5sec	1sec
Water Flush	Off	On

4. 결과 사진



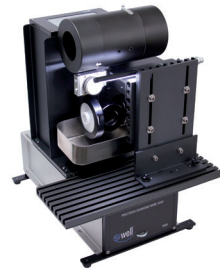
5. 사용 소모품 소개

- #145-10005 EpoxyMount Kit
- #197-10005 1¼" 2-Part Mounting Cups
- #50-70805M 600 Grit(P-1200) Dia-Grid Grinding Disc
- #50-10076 800 Grit Silicon Carbide Abrasive Disc
- #90-30030 9 µm Polycrystalline Diamond Suspension
- #90-30020 3 µm Polycrystalline Diamond Suspension
- #180-25000 0.04 µm Colloidal Silica Suspension
- #90-209000 GreenLube™ Polishing Lubricant
- #90-700-210 Gold Label Rigid Back Disc
- #90-700-550 DiaMat Rigid Back Disc
- #180-10750 Chem-Pol Rigid Back Disc
- #148-10000 Micro Organic Soap

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MetPrep3™ / PH-3™ Grinding/ Polishing System, AD-5™ Automatic Fluid Dispenser

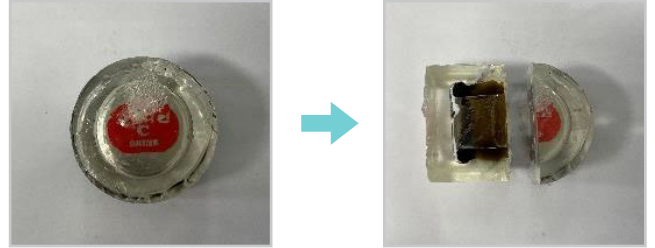
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1. 시편 종류

- Glass+Al

2. 시편 준비 과정

- 1) 시편을 Wire 절단기(WELL 4500)를 이용하여 분석하고자 하는 부분을 절단한다.
- 2) 절단된 시편을 1차로 Cold Mounting(EpoxySet)을 진행한다. [결합된 시편의 탈락 방지]
- 3) 1차 Mounting된 시편을 Wheel 절단기(NEW TechCut 5x™)를 이용하여 분석 면을 절단한다.
- 4) 2차 Cold Mounting(EpoxySet)을 진행한다.



3. 연삭 및 연마 공정

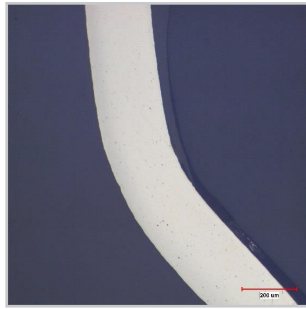
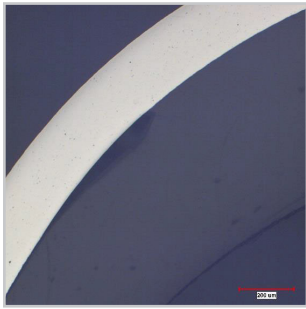
Table 1. Grinding/Polishing - Auto Polisher

Step	Grinding				Polishing	
	1	2	3	4	5	6
Abrasive	320Grit (P-400)	600Grit (P-1200)	800Grit (P-2400)	1200Grit (P-4000)	3 μm	0.05 μm
Type	SiC	SiC	SiC	SiC	Diamond	FinalPrep
Carrier	Abrasive Disc	Abrasive Disc	Abrasive Disc	Abrasive Disc	Suspension	Solution
Polishing Cloth	-	-	-	-	DiaMat	Chem-Pol
Coolant	Water	Water	Water	Water	GreenLube	-
Platen Speed(RPM) / Direction	100/Comp	100/Comp	100/Comp	100/Comp	100/Contra	100/Contra
Sample Speed (RPM)	90	90	90	90	90	90
Force (lbF)	8	8	9	9	8	8
Time (min)	Until Target	3'00"	2'30"	2'30"	3'00"	3'00"

Table 2. AD-5™ Dispensing Parameters

Step	5
Type	Diamond Suspension & GreenLube
Pulses/Min	6
Pulse Length	0.5sec
Water Flush	Off

4. 결과 사진



x100

5. 사용 소모품 소개

- #A3-3 Diamond Wire Ø 300 μm
- #145-20000 EpoxySet Kit
- #197-10005 1¼" 2-Part Mounting Cups
- #50-10065 320 Grit Silicon Carbide Abrasive Disc
- #50-10075 600 Grit Silicon Carbide Abrasive Disc
- #50-10076 800 Grit Silicon Carbide Abrasive Disc
- #50-10077 1200 Grit Silicon Carbide Abrasive Disc
- #90-30020 3 μm Polycrystalline Diamond Suspension
- #180-187775 0.05 μm FinalPrep Polishing Solution
- #90-209000 GreenLube™ Polishing Lubricant
- #90-700-550 DiaMat Rigid Back Disc
- #180-10750 Chem-Pol Rigid Back Disc
- #148-10000 Micro Organic Soap

** 소모품 샘플은 무료로 제공해 드리고 있습니다

6. 참조자료

1. 비정형유리
2. Quartz Glass Blocks
3. Soda-Lime Glass Discs
4. Silicate Glass Disc
5. Quartz Glass Fiber Optic Rods



WELL 4500



NEW TechCut 5x™ Precision High Speed Saw



VacuPrep™ Epoxy Impregnation System



MetPrep3™ / PH-3™ Grinding/ Polishing System, AD-5™ Automatic Fluid Dispenser

상세 기술자료, 소모품 샘플 및 기술상담이 필요하시면,
 (주)진우테크 시편전처리 센터로 연락 주시기 바랍니다
 email: info@chinwoo.co.kr 전화: 031-777-1277

1. 시편 종류

- Glass

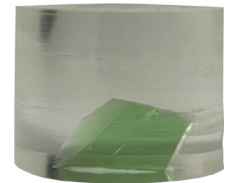
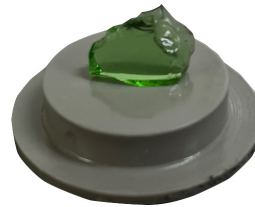


Glass

2. 시편 절단 및 성형 공정

Table 1. Cold Mounting Parameters

EpoxyMount	
Mold Size	1.25" (32 mm)
Mix Ratio (weight) Resin : Hardener	100:12
Cure Time	8Hours (25°C)



3. 연삭 및 연마 공정

Table 2. Grinding/Polishing - Auto Polisher

Step	Grinding		Polishing	
	1	2	3	4
Abrasive	600Grit (P-1200)	800Grit (P-2400)	3 μm	0.5 μm
Type	SiC	SiC	Diamond	Cerium Oxide
Carrier	Abrasive Disc	Abrasive Disc	Suspension	Suspension
Polishing Cloth	-	-	DiaMat	Final A
Coolant	Water	Water	GreenLube	-
Platen Speed(RPM) / Direction	80/Comp	80/Comp	80/Comp	80/Comp
Sample Speed (RPM)	60	60	60	60
Force (lbF)	3	4	3	3
Time (min)	Until Flat	2'30"	2'00"	1'00"

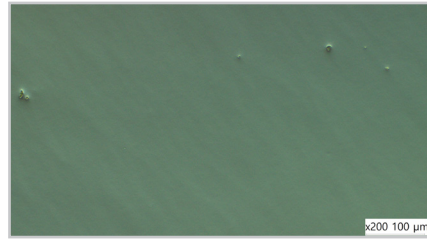
Table 3. AD-5™ Dispensing Parameters

Step	3
Type	Diamond Suspension & GreenLube
Pulses/Min	6
Pulse Length	0.5sec
Water Flush	Off

4. 결과 사진



x200 - BF



x200 - C-DIC

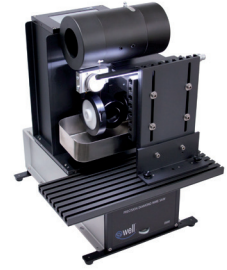
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- #90-30020 3 μm Polycrystalline Diamond Suspension
- #90-187915 0.5 μm Cerium Oxide Polishing Slurry
- #90-209000 GreenLube™ Polishing Lubricant
- #90-700-550 DiaMat Rigid Back Disc
- #180-10705 Final A Rigid Back Disc
- #148-10000 Micro Organic Soap

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WELL 3500 Premium Diamond Wire Cutting System



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