

# 금속 다공체 개발 및 응용사례

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2. ASFLOW 금속분말 소결 다공체 및 응용사례
3. 금속섬유 다공체 및 응용사례

## III. 나가며

# ASFLOW 소개

## Tube & Pipe



## Valve & Regulator



## Fittings



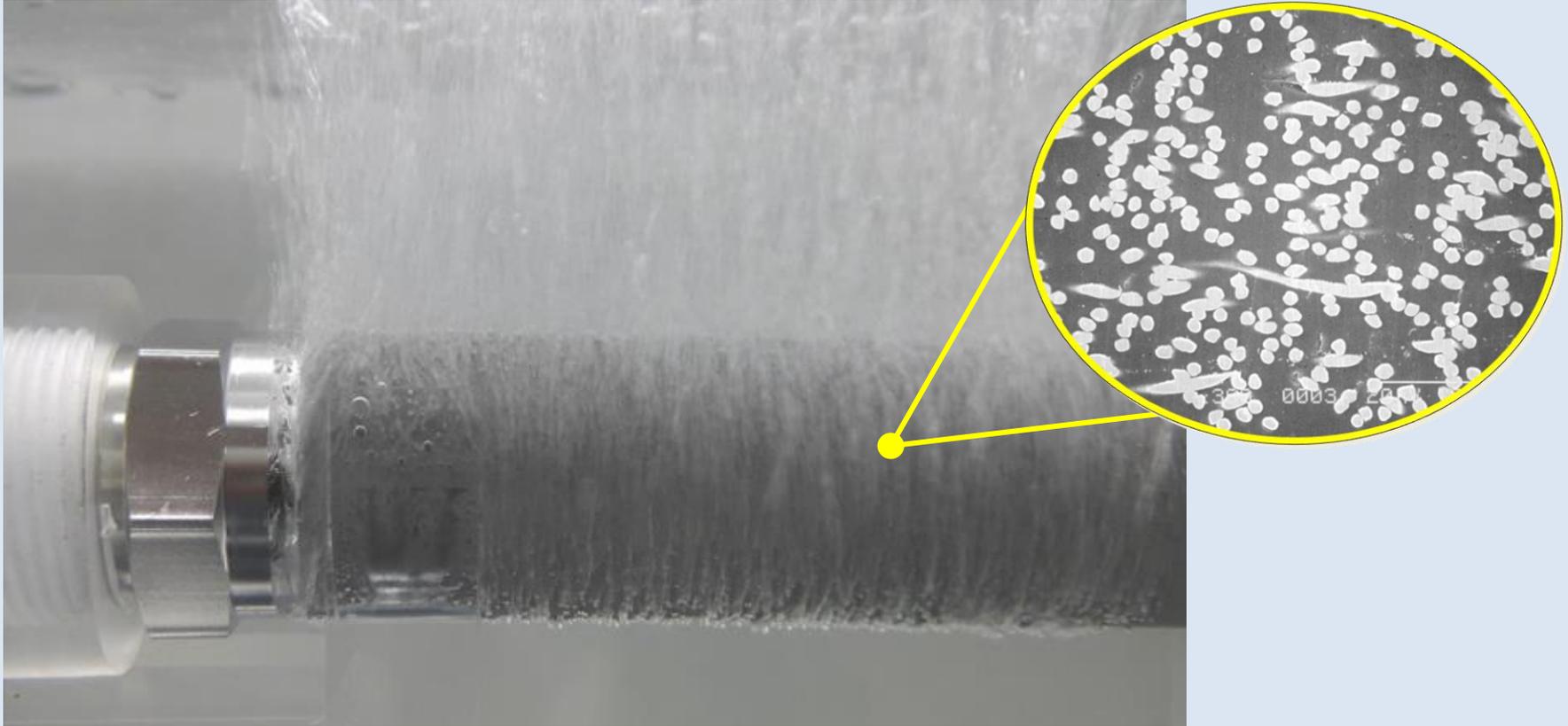
## Metal Powder Filter



ASFLOW

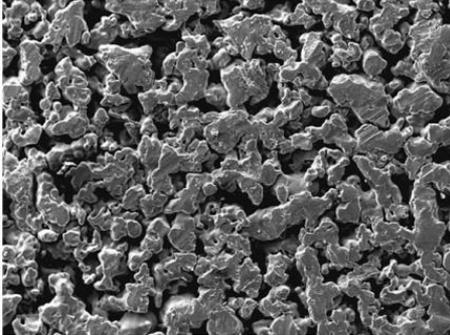
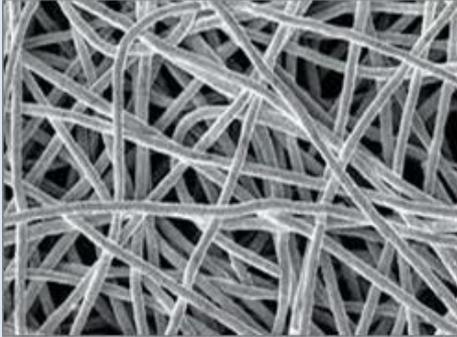
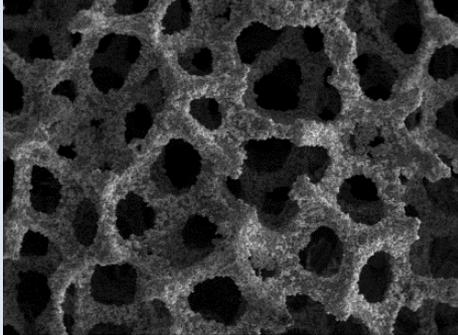
- 반도체 및 디스플레이 생산 공정의 튜브 및 밸브, 레귤레이터, 디퓨저, 필터 등을 공급 중

# 금속다공체란?

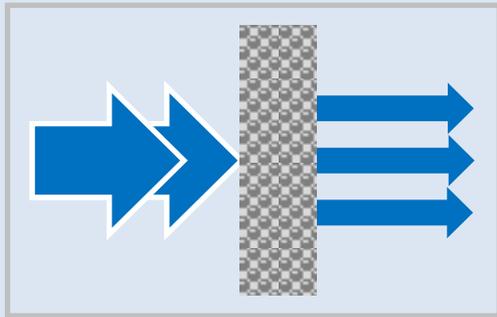


- 소재 내부에 기공이 30% 이상인 소재
- 대표적으로 금속분말 소결체, 금속섬유 소결체, 금속 폼 등이 있음

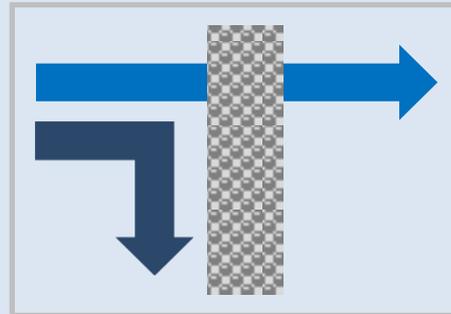
# 금속다공체의 종류

	Metal powder	Metal fiber	Metal foam
<ul style="list-style-type: none"> <li>다공체의 형상</li> </ul>			
<ul style="list-style-type: none"> <li>기공크기 (<math>\mu\text{m}</math>)</li> </ul>	> 10	> 150	> 100
<ul style="list-style-type: none"> <li>기공율 (%)</li> </ul>	< 60	60-80	> 80
<ul style="list-style-type: none"> <li>유체흐름</li> </ul>	X	X	O
<ul style="list-style-type: none"> <li>고온내구성</li> </ul>	높음	낮음	높음
<ul style="list-style-type: none"> <li>주요기업</li> </ul>	ASFLOW, Porvair, Mott	Bekaert, FiberTech	Sumitomo, Alantum

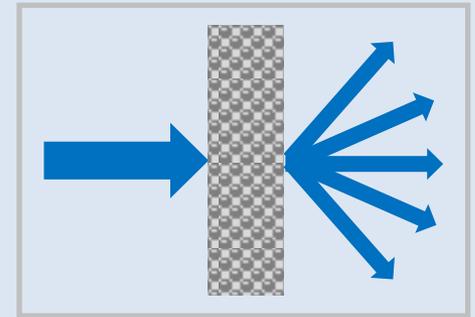
# 금속다공체의 주요기능



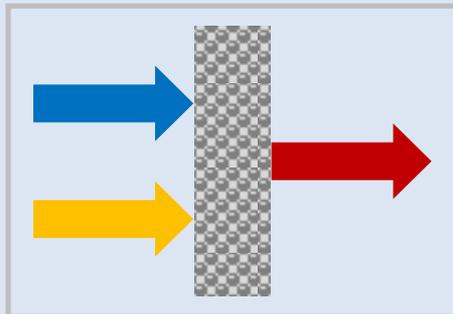
Throttling & Damping



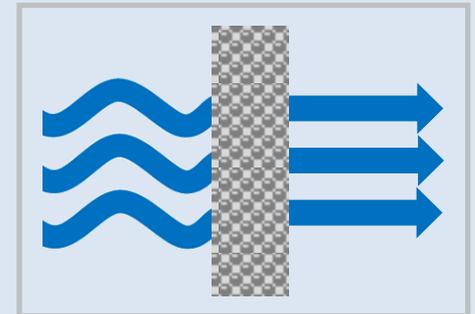
Filtration & Separation



Dispersion



Mixing



Straightening

# 금속다공체의 응용사례

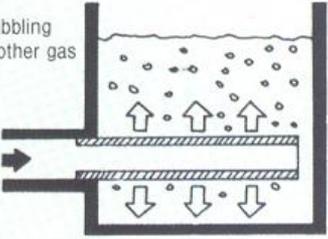
• Classifying & Power Transportation  
Reaction, fermentation, transfer, classifying separating etc. by supplying the gas or air to the open site.



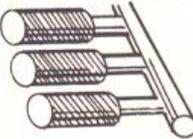
• Air flow hopper  
• Bridge prevention of fine powder  
• Air slider  
• Air conveyor



• Air diffusion  
Fine foaming / bubbling of air, oxygen or other gas in a liquid.



• Air diffuser pipe  
• Air blower  
• Promotion of fermentation



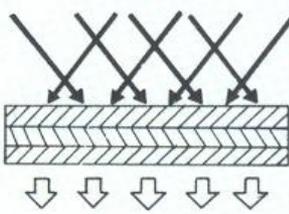
• Cleaning  
Protection for instrument, protection of equipment in critical pressurization protection against the inflow of solid material to the leak valve etc.



• Protection against the inflow of solid material to instruments such as a pressure gauge  
• Pneumatic equipment  
• Draining

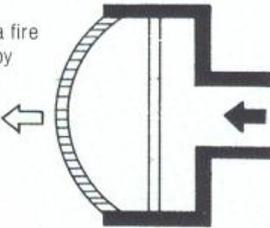


• Kneading & Mixing  
To moderate an abrupt pressure rise or sucking action



• Buffer filter  
• Kneading of screw mixer  
• Line mixer  
• Emulsification mixing  
• Mixing blade/plate

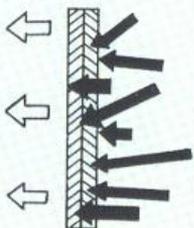
• Flame Arrestment  
To arrest the spread of a fire to such as gas and fuel by shutting off the frame.



• Burner/combustion apparatus oxygen cylinder  
• Gas/smoke sampling port  
• Flame arrester  
• Cooling of combustion chamber



• Sound Attenuation  
Sound attenuation by absorbing the shock wave of the gas.



• Muffler  
• Exhaust silencer  
• Acoustic apparatus



# 금속분말 다공체 응용사례



**Inline Filter**



**IGS Filter**



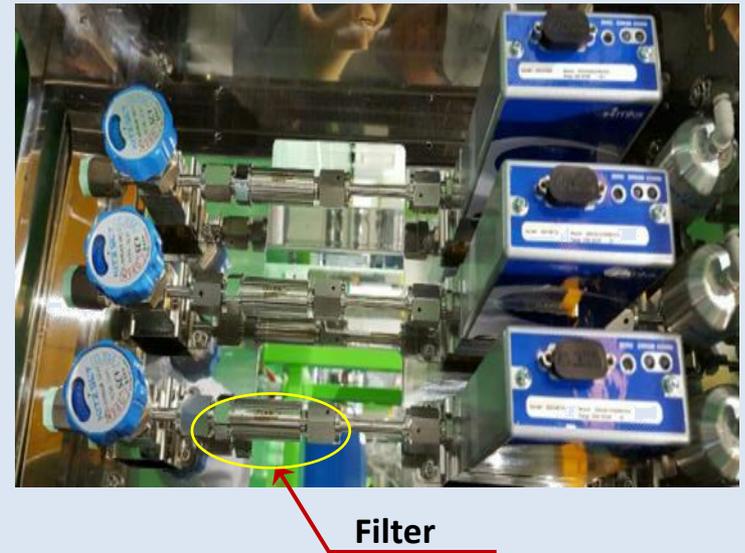
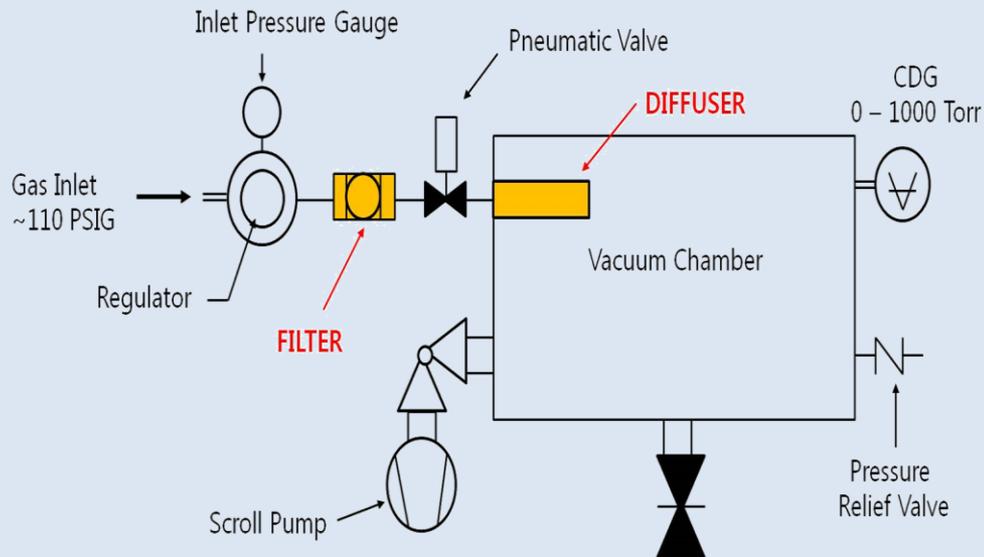
**Gasket Filter**



**Bulk Filter**

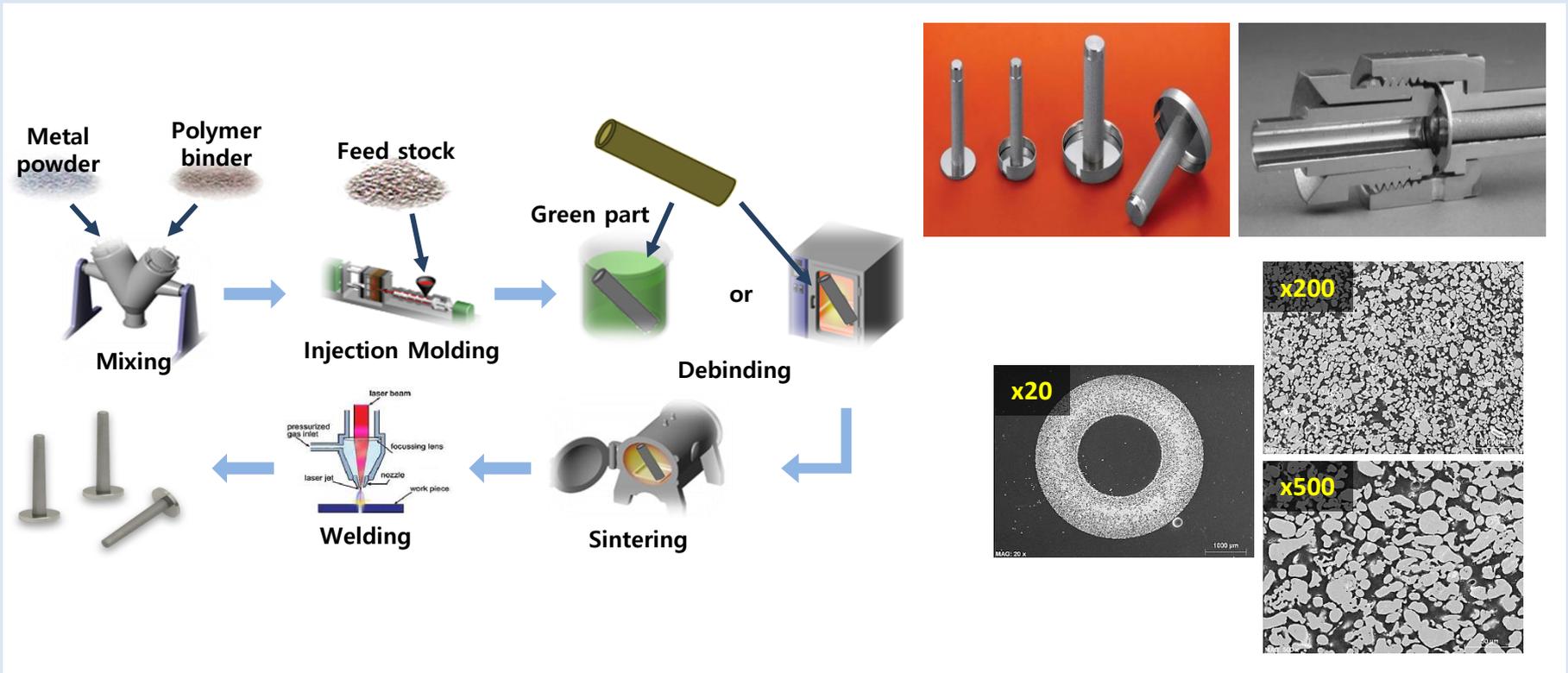
- 수nm 크기의 분진 여과 및 가스 확산 기능의 Stainless Steel 316L / Hastelloy 금속분말 소결품 공급 중

# ASFLOW Diffuser / Filter Applications



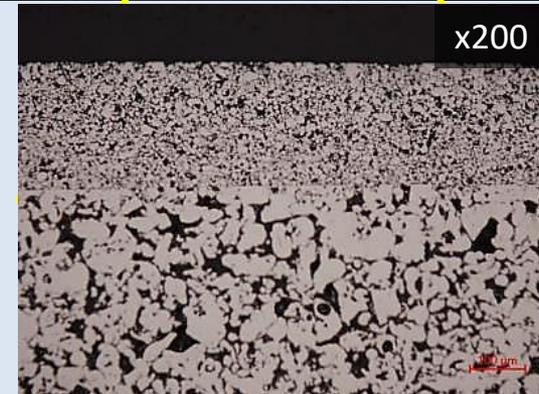
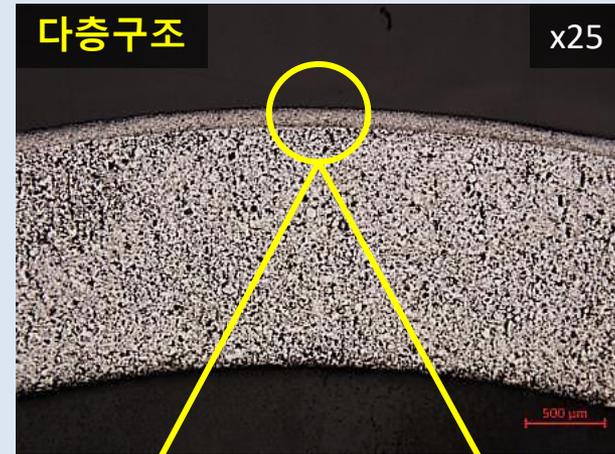
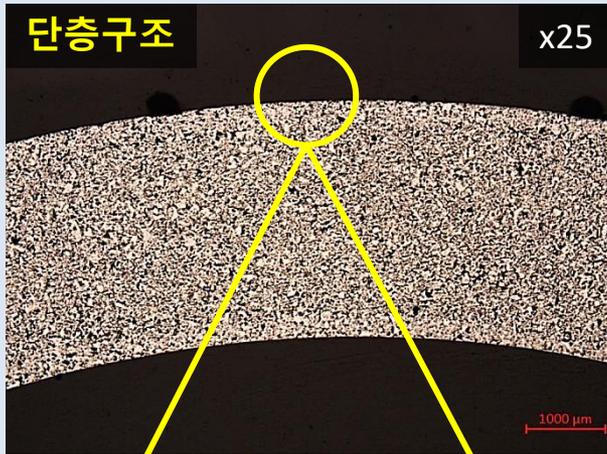
- 반도체 및 디스플레이 생산 장비의 진공 챔버 내외에 설치해서 사용
- 가스 중 이물질을 제거하고, 가스를 균일하게 확산시켜 코팅이 균일해지도록 하는 역할

# 반도체 공정가스 여과용 필터



- IGS용 가스켓 필터 개발 (Dimension :  $\Phi$  4 – 25L)
- $\Delta P$  : 30kPa 이하 (@20LPM)
- 0.3 $\mu$ m 입자 제거율 99.9% 이상

# 반도체 공정가스 여과용 필터

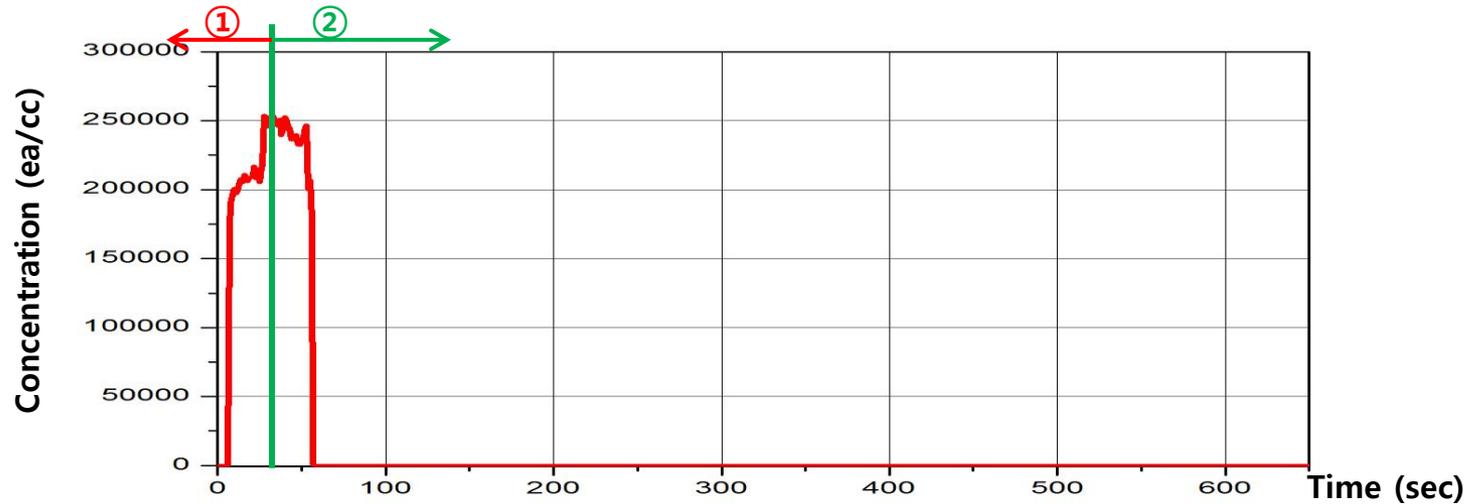
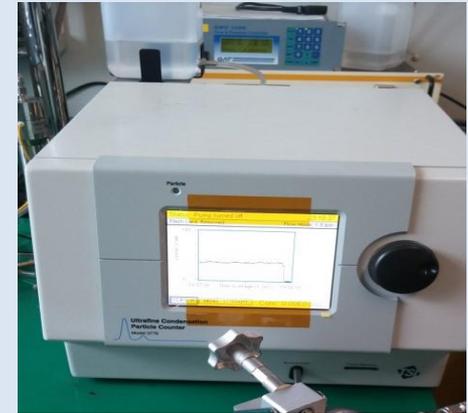
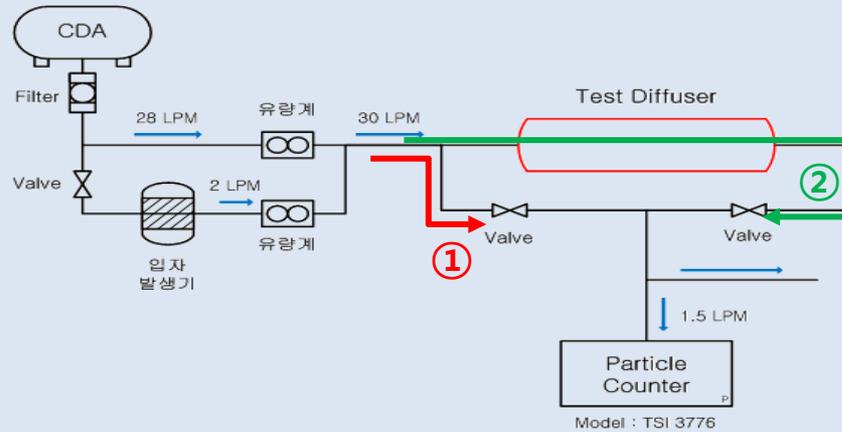


- 미세여과층을 포함하는 다층 구조의 대유량 필터 개발

# 금속분말 다공체 기공율 제어기술

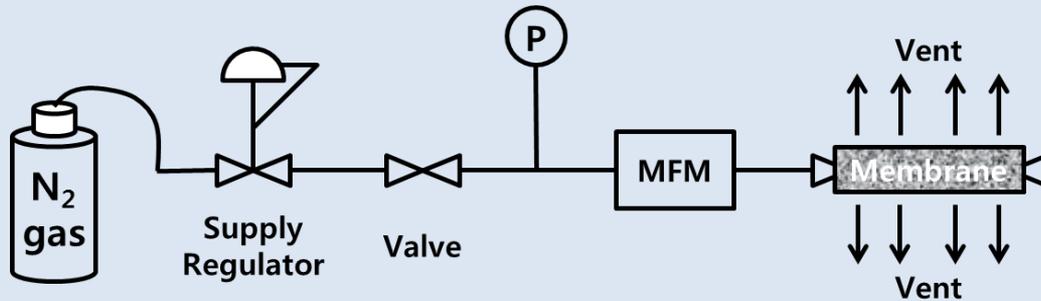
## Particle retention

분석장비	TSI 3776
분석범위	0.0025 ~ 3 $\mu\text{m}$
검출유량	1.5 LPM
사용물질	Ag (Silver)
입자크기	0.007 $\mu\text{m}$
입자농도	200,000 ea/cc
측정시간	600 sec
사용유량	30 LPM

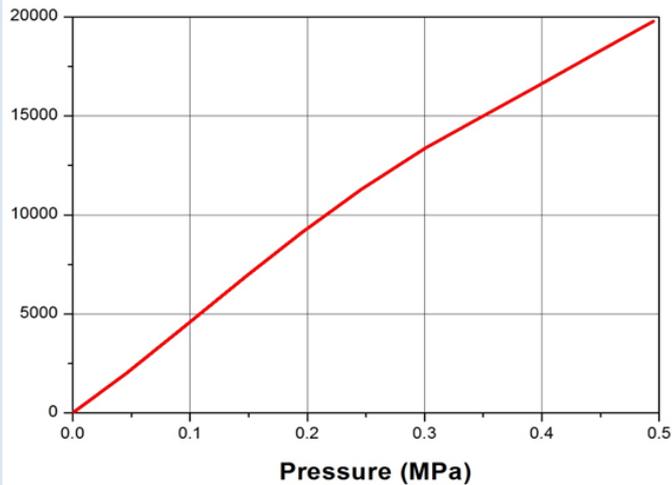


# 금속분말 다공체 기공율 제어기술

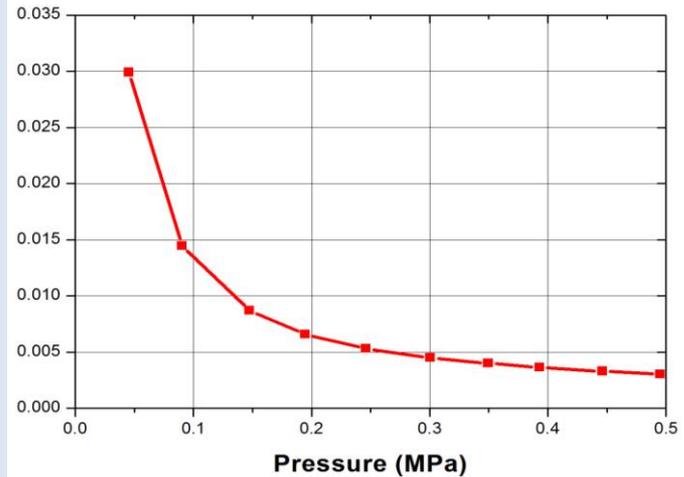
## Flow rate



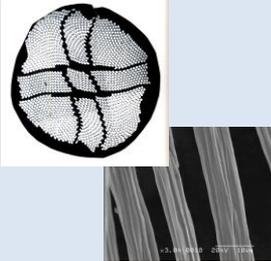
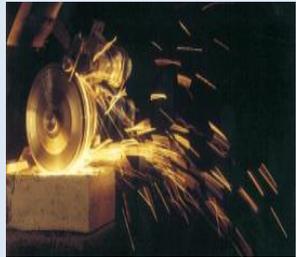
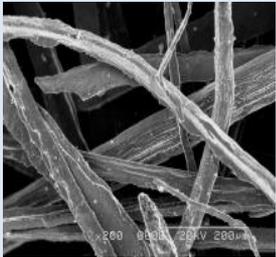
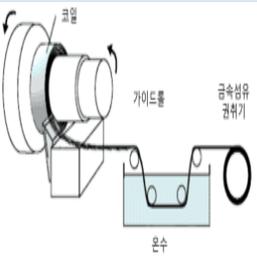
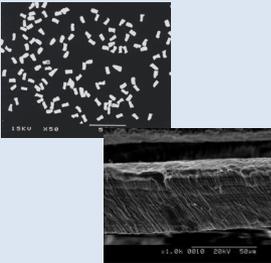
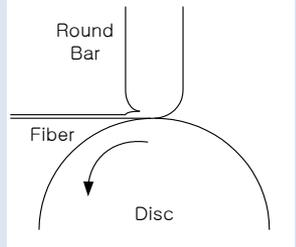
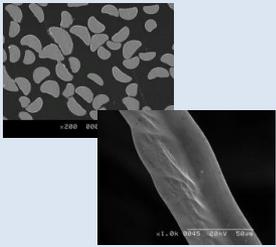
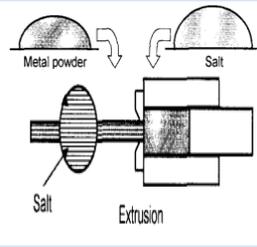
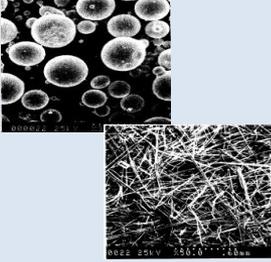
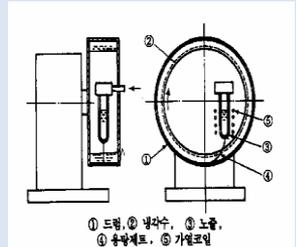
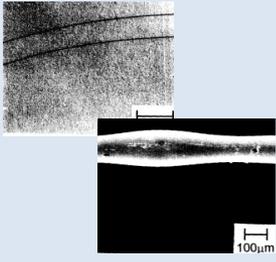
Flow (LPM)



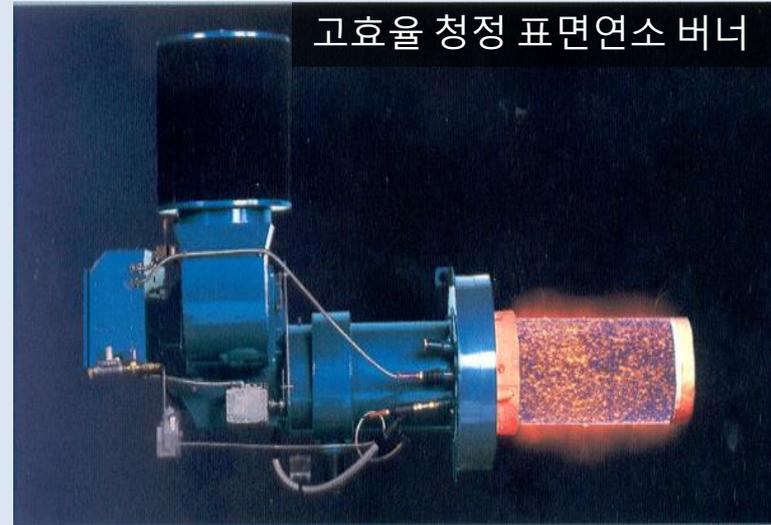
Vent Time (sec/L)



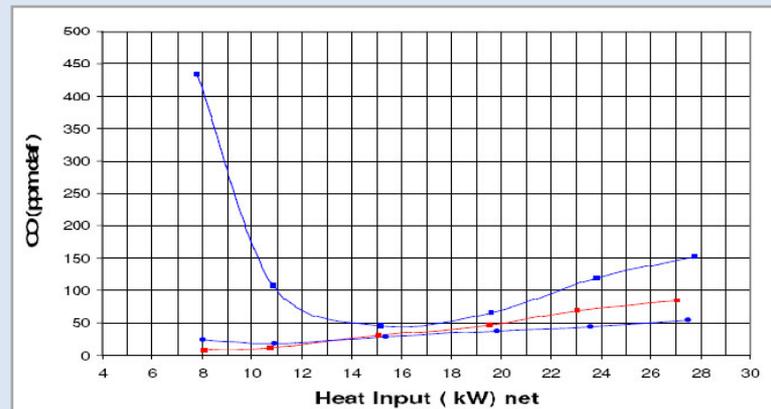
# 기타 : 금속섬유 제조기술

기 계 가 공 법	공 법		금속섬유형상		파 괴 이 기 판	공 법		금속섬유형상	
	다발인발 법 (Bundle Drawing)			CME 공법 (Crucible Melt Extraction)					
	절삭법 (Shaving)			PDME (Pendant Drop Melt Extraction)					
	분말압출법 (Powder Extrusion)			In-Rotating- Water-Spinning					

# 기타 : 금속섬유 다공체 응용사례



면속도 (cm/s)	집진효율 (%)	선경	압력손실 (Pa)
3.5	99.996 (0.3 $\mu\text{m}$ )	1 $\mu\text{m}$	261.55
3.5	99.99 (0.3 $\mu\text{m}$ )	2 $\mu\text{m}$	800
1.25	99.983 (0.3 $\mu\text{m}$ )	5 $\mu\text{m}$ Fiber	9
1.25	99.05 (0.3 $\mu\text{m}$ )	5 $\mu\text{m}$ Powder	74
1.7	98.5 (0.5 $\mu\text{m}$ )	5~10 $\mu\text{m}$	-
8.3	97.7 (0.5 $\mu\text{m}$ )	5~10 $\mu\text{m}$	-



# 나가며

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진공 장비용 금속필터 / 디퓨저 기술  
아스플로가 선도하겠습니다.

“감사합니다!”



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