

Finishing 용 전자빔 집속 장치의 성능 실험

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Performance Experiment of Electron Beam Convergence Instrument

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Abstract

Finishing process includes deburring, polishing and edge radiusing. It improves the surface profile of specimen and eliminates the alien substance on surface. Deburring is the elimination process for debris of edges. Polishing lubricates surfaces by rubbing or chemical treatment. There are two types for electron finishing. The one is using pulse beam. The other is using the convergent and scanning electron beam. Pulse type device appropriates the large area process. But it does not control the beam dosage. Scanning type device has advantages for dosage control and edge deburring. We design the convergence and scan type. It has magnetic lenses for convergence and scan device for scanning beam. Magnetic lenses consist of convergent and objective lens. The lenses are designed by the specification (beam size and working distance). In this paper, we evaluate the convergence performance by pattern process. Also, we analysis the results and important factors for process. The important factors for process are beam size, pressure, stage speed and vacuum. These results will be utilized into systematizing pattern shape and the factors.

Keywords: Line pattern processing(가), Electron Beam Condenser device()

1. 서론

Finishing
(Polishing)

(Deburring)

가

1mm

Finishing

2. 전자빔 finishing 공정 장비의 구성

Finishing

1-3

가 가

Finishing

가

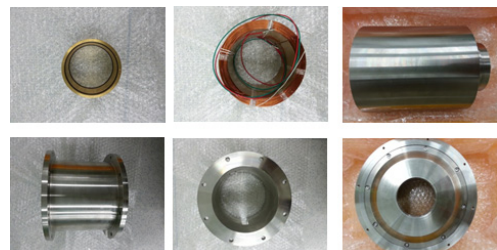


Fig. 1 Magnetic lens.

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가 4.5
1mm 150mm

2

Fig. 1

Fig. 2 finishing



Fig. 2 Finishing instrument.

가 가 가

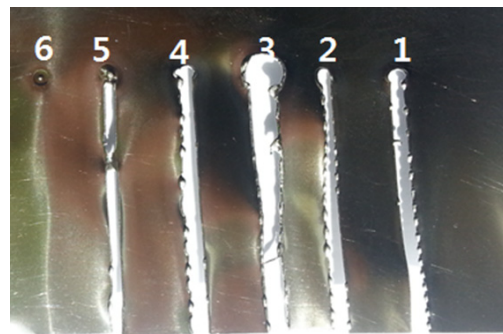
SUS-304

가 100μm

12.5mm/s

Table 1 Fig. 3

Fig. 3 가



(a) Pattern number 1-6

3. 패턴 가공

가

Table 1 Process data

	가 [kV]	[A]	[A]
1	25.0	0.316	2.714
2	25.0	0.348	2.802
3	25.0	0.463	2.662
4	25.0	0.463	2.467
5	24.0	0.369	2.740
6	21.0	0.316	2.702
7	21.0	0.316	2.715
8	21.8	0.316	2.756
9	22.0	0.358	2.737
10	22.0	0.358	2.499
11	22.0	0.368	2.412
12	23.2	0.39	2.580



(b) Pattern number 7-12

Fig. 3 Processed pattern.

가 23kV

6-11 0.3-0.5mm
12 0.8-1.1mm

Fig. 4 9 12 가

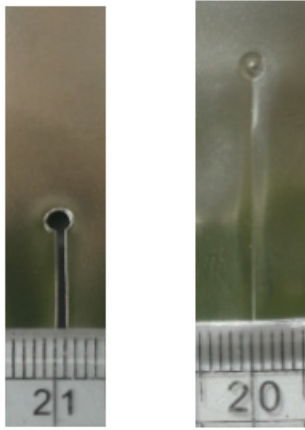


Fig. 4 Expanded figures of 9 and 12.

24kV

가

가

4. 결론

finishing

(1)

1mm

0.3mm

(2)

가

가

가

가

가

(3)

가

가

가

참고문헌

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