

Fig. 1 Schematic diagram of the experimental setup

Table 1 Mechanical&Physical properties of Materials

	Tensile stress (N/mm ²)	Elongation (%)	Thermal conductivity (W/mK)	Melting point (°C)	Density (Mg/m ³)	Thermal expansion	electric resistance	Hardness (Hn)
Inconel 600	550	35~55	11.7	1395	8.47	13.3	103.0	220
STS 304	515	40	14.9	1400	8	-	-	210

(cold mounting)
 sand paper #400, #800, #1000, #1200
 z=-1.0mm
 6um, 1um (polishing)
 HNO3, HCl,
 1.0m/min
 1.3
 ~1.6kW
 1.4kW
 가 가
 3mm
 1.4kW
 0.8, 1.0, 1.2, 1.4, 1.6, 1.8m/min

3. 3

3mm Ni
 600

3.1

STS304

Table. 2 Table. 3

Table 2 Chemical component of Materials

	C	Si	Mn	P	Ni	Cr	Fe	Cu
Inconel 600	0.01	0.1	0.3	0.3>	76	15.5	8	0.2
STS 304	0.08	1.00	2.00	0.04	8.0~10.5	18~20	69	-

가 100mm, 40mm
 (bead on plate)
 (butt welding)

sand paper(#220)
 40um)

가

기존의 연구방법은 레이저빔 시편에 spot welding하여 spot size를 가지고 초점위치를 구하여 Z=0으로 놓고 실험하였다. 그러나 초점위치와 작업거리의 차이는 분명히 차이가 있기 때문에 Bead on plate 방식을 선택하여 실험하였다.

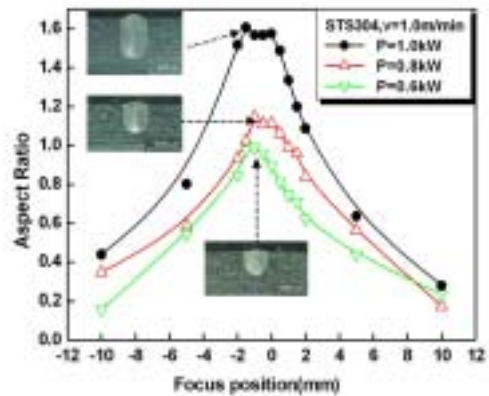


Fig 2 The aspect ratio on the focus position

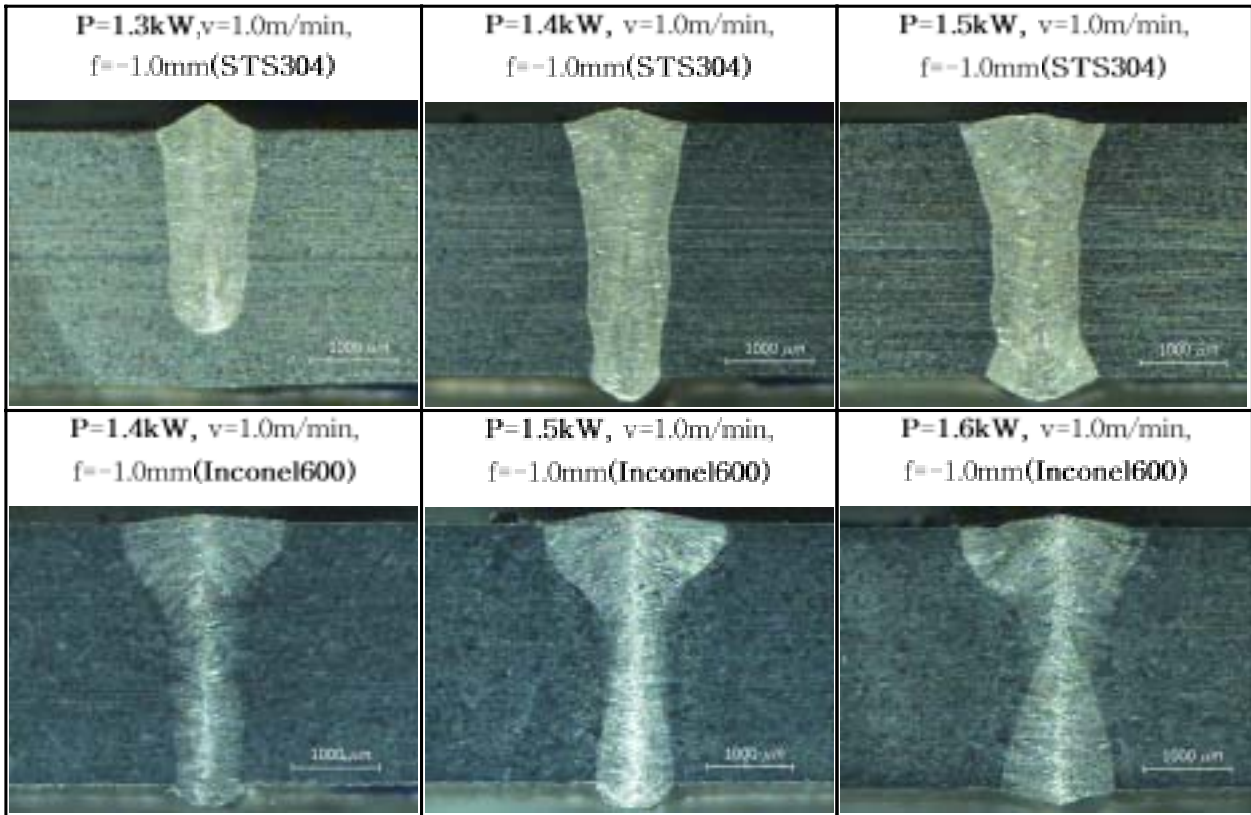


Fig 3 Welding Cross-section of the laser beam power(STS304, Inconel 600)

Fig. 2 600W, 800W, 3.2 Inconel 600 STS304
 1000W , 1 m/min Nickel Nickel Nickel 가
 가 , Stainless Steel 가
 . Fig. 2 Inconel 가
 가 , 가 Austenite Stainless
 Steel 가
 가 (W) 가 Inconel 600
 Inconel 600 STS304 15.5%Cr 8%Fe Ni-Cr-Fe 3
 가 (GTAW) 가
 Fig 3 1.0m/min, -1.0mm Fig. 4 1.4kW, Z=-1.0mm
 1.4kW 가 0.2m/min 가
 1.4kW 가 1.0, 1.2,
 1.4m/min

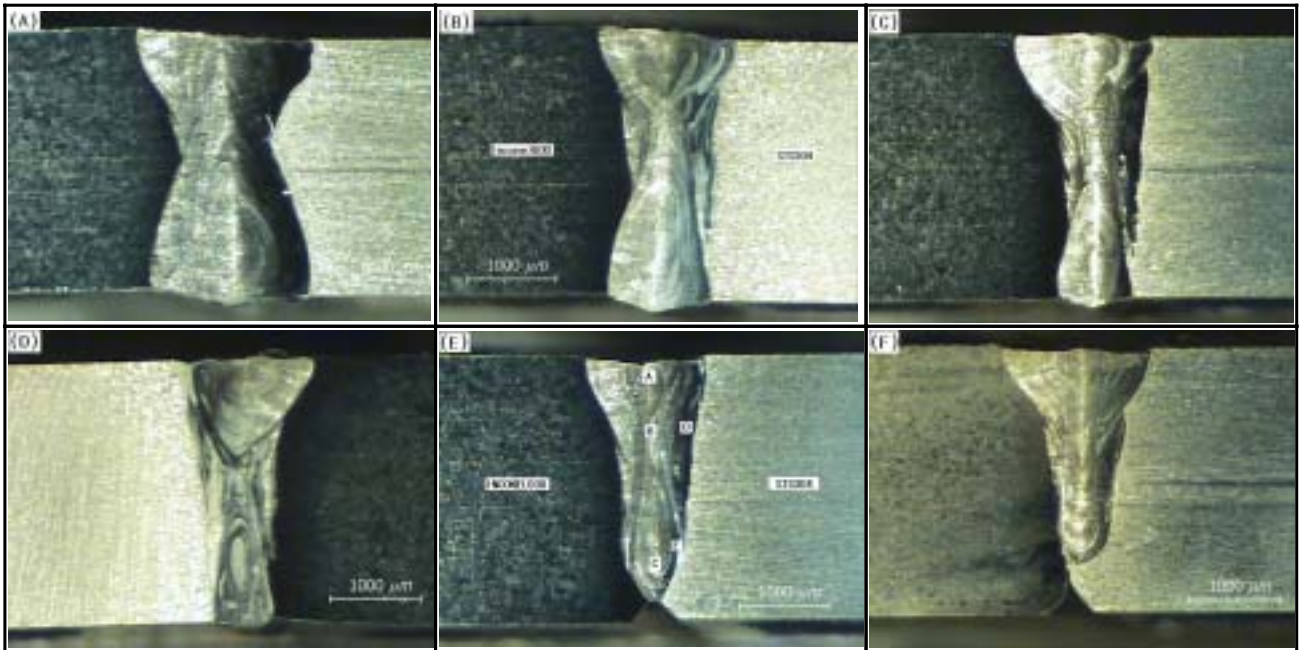


Fig 4 Dissimilar metal Welding of the Cross-section by laser welding speed (Z=-1.0mm, P=1.4kW)

가
 Fig 5 Fig 4 (E)
 Fig 5-A
 600 STS304 가 5-D
 가
 600 (HAZ)
 STS304 (MC, M6C
 Carbide, Laves phases and -phase)

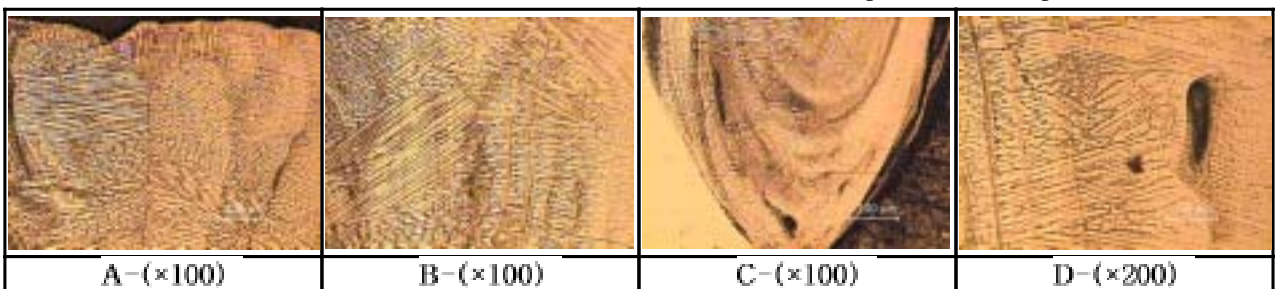


Fig 5 Photographs of fusion zones in laser welding power 1.4kW, and welding speed 1.6m/min

Ti, MC-type (HAZ)
 가 (HAZ)
 가 가 가 (HAZ)
 가 가 가 (HAZ)
 (GTAW, etc)
 가 (microfissure)
 1.4kW, 가 -1.0mm
 1.0m/min 가 가
 4.
 Inconel 600
 304 Nd:YAG
 1) Bead on plate
 가 가
 Z=-1.0mm 가
 2) 1.0m/min,
 -1.0mm
 1.4kW 가
 3) 가 1.0, 1.2, 1.4m/min
 4) 1.4kW, 가 1.0m/min
 가

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