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### 激光与光电子技术应用

## 激光-MIG复合焊接304不锈钢工艺研究

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**摘要:** 为了研究304不锈钢光纤激光-MIG(metal inert-gas welding)复合焊接性能,采用正离焦的方法进行了大量的焊接实验。分析了送丝速率、弧长、激光功率、光丝距离、焊接方向和不同对接接头等参量对焊接成形的影响。结果表明,在焊丝的干伸长度为15mm、光丝距离为2mm、采用前送丝时,通过适当调节送丝速率、弧长可以实现较好的焊接效果;小直径焊丝有利于形成较小熔宽和余高的焊缝,而通过加入引弧板可以解决初始位置焊缝成形较差的问题。因此,采用合适的激光-MIG复合焊接工艺可以实现304不锈钢较好的焊接效果。

**关键词:** 激光技术 激光-MIG复合焊接 焊接参量 激光功率 光丝距离 对接接头 焊缝形状

### Research of techniques of laser-MIG hybrid welding of 304 stainless steel

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**Abstract:** By adopting the positive defocusing amount, the effect of fiber laser-metal inert-gas welding(MIG) hybrid welding parameters on the weld morphology of 304 stainless steel, mainly including wire feeding speed, arc length, laser power, the distance between laser and MIG arc, welding direction and butt joint, was studied through many welding experiments. Results indicate that the good welding effects can be obtained by matching proper wire feeding speed and arc length when the

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extension length is 15mm and the distance between laser and MIG is 2mm. The results also show that small diameter wire will help to make the narrow weld width and low weld reinforcement, end tab will solve the problem of bad welding morphology at welding initial position. A conclusion is drawn that good welding quality of 304 stainless steel can be achieved when the proper welding procedure of laser-MIG hybrid welding is adopted.

Keywords: laser technique laser-MIG hybrid welding welding parameters laser power distance between the laser and filler wire butt joint welding morphology

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