

## 핀치이론의 수정 모델을 이용한 스프레이 모드의 해석

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### Analysis of Spray Mode Using Modified Pinch Instability Theory

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#### Abstracts

While the pinch instability theory (PIT) has been widely employed to analyze the spray transfer mode in the gas metal arc welding (GMAW), it cannot predict the detaching drop size accurately. The PIT is modified in this work to increase the accuracy of prediction and to simulate the molten tip geometry to be more physically acceptable. Since the molten tip becomes a cone shape in the spray mode, the effective wire diameter is formulated that the effective diameter is inversely proportional to current square. Modifications are also made to consider the finite length of the liquid column and current leakage through the arc. While the effective diameter influences drop transfer significantly, the current leakage has negligible effects. The effects of modifications on drop transfer are analyzed, and the predicted drop diameters show good agreements with the experimental data of the steel wire.

**Key Words** : Modified pinch instability theory, Spray transfer mode, Effective radius, Finite liquid column, Current leakage