

### CS3

## Effects of Alloying Elements on the Scale Structure and Pickling Process of High Strength Hot-rolled Steel

### 합금 첨가 원소가 고강도 열연 강판의 scale 구조 및 산세과정에 미치는 영향

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Thermal oxide scale should be previously removed from hot-rolled steel in order to prevent wear on dies and rolls during the subsequent rolling process and to avoid surface defects in the final product. The scale removal is usually done by pickling in acids. The present work involves the effects of alloying elements on the scale structure and the pickling process of the high strength hot-rolled steel by using scanning electron microscopy, electron probe micro-analysis, open circuit potential transient technique and electrochemical impedance spectroscopy. The scale structure was examined by the help of scanning electron microscopy and electron probe micro-analysis. Open circuit potential during the dissolution of thermal oxide scales formed on hot-rolled steels was recorded with pickling time in aqueous 10wt.% HCl solution. It was observed that the addition of alloying elements changed the open circuit potential transients in shape, which was caused by the variation of the scale structure with the addition of alloying elements. In order to determine the variation of oxide scale resistance during pickling process, electrochemical impedance spectroscopy was performed on the pickled specimens in aqueous 0.5M Na<sub>2</sub>SO<sub>4</sub> solution as a function of pickling time. From the experimental findings, the variation of the scale structure and the pickling process of high strength hot-rolled steel with the addition of alloying elements were discussed in terms of the variation of open circuit potential transient and oxide scale resistance.

#### References

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