

## ABSTRAK

*Electroplating* berkembang pesat dan menjadi kebutuhan di bidang perindustrian dan menjadi pilihan utama dari berbagai metode pelapisan. Pipa ASTM A106 adalah spesifikasi standar untuk pipa baja karbon seamless dengan layanan bersuhu tinggi. Tujuan penelitian ini adalah untuk mengetahui pengaruh variasi rapat arus *electroplating* nikel terhadap ketebalan lapisan, penampilan dan ketahanan korosi pada pipa seamless A106.

Metode penelitian adalah metode eksperimen. Bahan yang digunakan adalah pipa seamless A106. Perbandingan proses *electroplating* nikel adalah 40V dengan rapat arus  $7,6 \text{ A/dm}^2$ , 60V dengan rapat arus  $11,4 \text{ A/dm}^2$ , dan 80V dengan rapat arus  $15,2 \text{ A/dm}^2$  dalam kurun waktu 60 menit. Proses pemotongan material dan *electroplating* dilakukan di home industry Srambit Khrum. Pengujian ketebalan lapisan dan uji ketahanan korosi dilakukan di laboratorium bahan teknik UGM Yogyakarta.

Hasil penelitian menunjukkan bahwa semakin lama waktu pencelupan maka ketebalan lapisan nikel-krom semakin besar. Hal ini disebabkan semakin banyak ion nikel yang mengendap pada substrat pipa seamless A106. Hasil uji *electroplating* dengan tegangan 40V terlihat kusam dan kasar, 60V terlihat agak mengkilap namun secara fisik masih kasar, dan 80V terlihat mengkilap dan halus pada fisiknya. Semakin tinggi rapat arus yang digunakan maka akan menurunkan laju korosi pipa seamless A106.

**Kata kunci:** rapat arus, *electroplating*, nikel, pipa seamless a106

### **ABSTRACT**

*Electroplating develops rapidly and becomes a necessity in the industrial field and the first choice of various coating methods. ASTM A106 pipe is a standard specification for seamless carbon steel pipe for high temperature services. The purpose of this study was to investigate the effects of variations in the current density of nickel electroplating on coating thickness, appearance and corrosion resistance of A106 seamless pipe.*

*The research method was an experimental method. The material was A106 seamless pipe. The comparisons of nickel electroplating processes were 40V with the current density of 7.6 A/dm<sup>2</sup>, 60V with the current density of 11.4 A/dm<sup>2</sup>, and 80V with the current density of 15.2 A/dm<sup>2</sup> within 60 minutes of time. The process of cutting the material was done at home industry Srambit Khrum. Coating thickness and corrosion resistance tests were carried out at the Technical Materials Laboratory of UGM Yogyakarta.*

*This study showed that the longer the dyeing time, so the greater the thickness of the nickel-chrome layer. This is due to the fact that more nickel ions are deposited on the A106 seamless pipe substrate. Electroplating test results indicated that the voltage of 40V looked dull and rough, 60V with the current density of 11.4 A / dm<sup>2</sup> look a bit shiny but physically still rough, and 80V looked shiny and smooth on the physic. The higher current density used reduced the corrosion rate of A106 seamless pipe.*

**Keywords:** *current density, electroplate, nickel, seamless pipe a106*