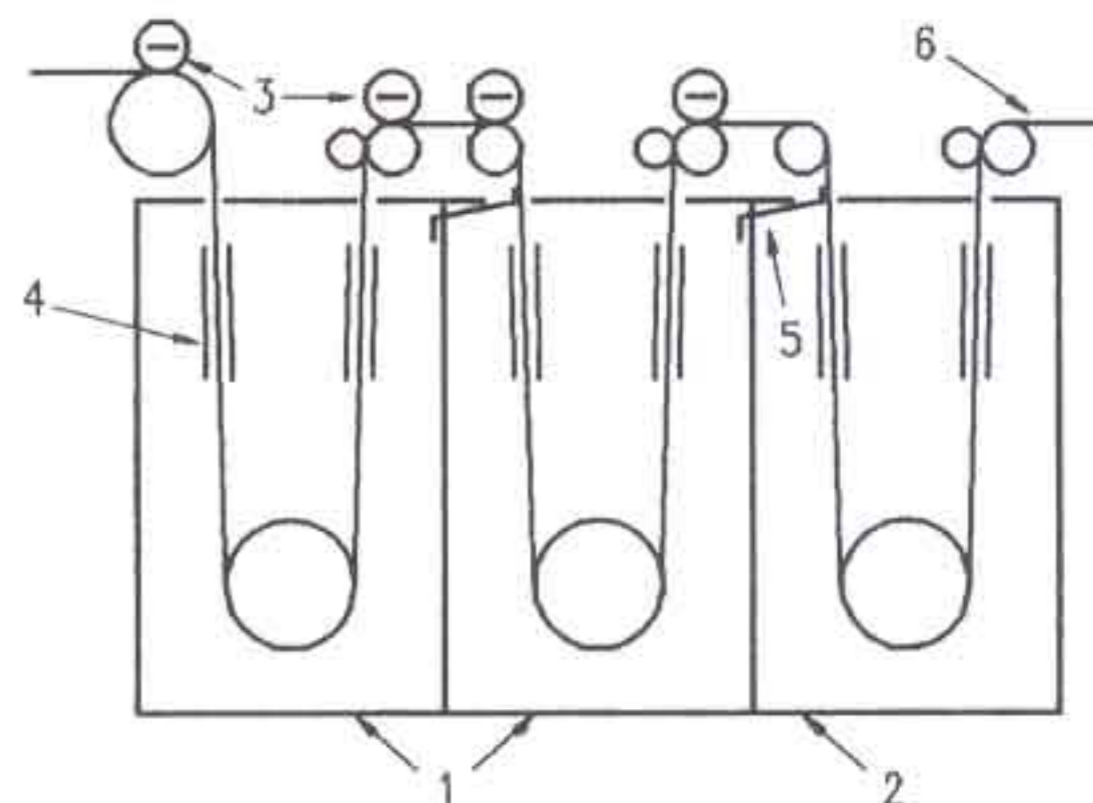
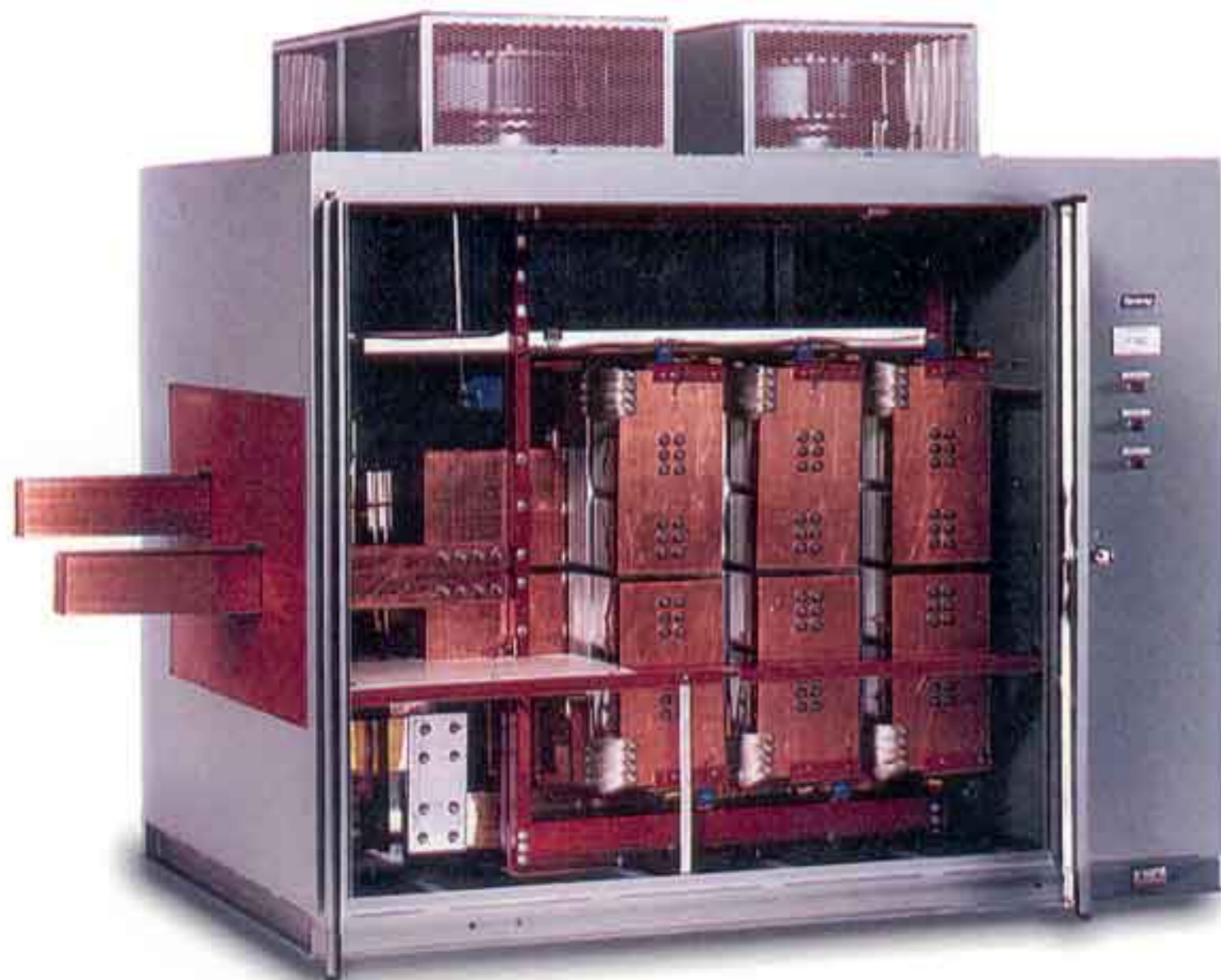


Spang Power Electronics

PROJECT PROFILE



Vertical-pass plating and rinsing cell design for chromium plating of strip. 1 - plating cells, 2 - rinse tank, 3 - contact rolls, 4 - special insoluble anode grids, 5 - drip collection tray, and 6 - strip.

Spang Power Electronics designed and manufactured two (2) 600 kw plating rectifiers for Weirton Steel Corp. in Weirton, WV. These rectifiers can continuously supply 15,000 ADC at 40 VDC. These rectifiers are being used on an automatic process line in a high speed, steel strip, chromium plating application.

System Operation

Each rectifier consists of a 753 KVA, 3-phase, rectifier-transformer, a 6-pulse full wave bridge and a primary control section with switches and visual alarms. A SPANG SCR Power Control Unit, with current limit and current regulation features, regulates the incoming power. The rectifier-transformer isolates the line from the load and steps down the 575 volt input to 71 volts. A dual wound double wye secondary feeds the output to a full wave silicon diode bridge rectifier with interphase transformer and converts the incoming voltage to 0-40VDC. 1st fuses protect the rectifier diode bridge. Blowers cool the entire system with forced air.

Chromium Plating of Steel Strip

Chromium plating applications typically use vertical pass plating cells (see schematic).

Two rectifiers connect to a single plating tank. Grid anodes, immersed in a chromium electrolyte solution, are located on each side of the entering and exiting strip. The steel strip moves through the plating cell as a cathode. The rectifiers supply a low voltage to the anode and cathode which cause the chromium ions in the solution to move to the cathode and deposit on it as a film or coating

600 KW Plating Rectifiers for Weirton Steel Corporation

of chromium. The strip passes down under a bottom sink roll and back out at the top. The amount of chromium deposited is directly proportional to the current flowing through the cell. The coating can be controlled by controlling the current flow. After exiting the chromium plating tank, the steel strip passes through a reclaim and rinse station and into a chemical treatment station. This treatment produces a coating that seals pores or cracks in the chromium coating for a more uniform surface.