The Outotec Nickel Matte Chloride Leaching Process

The Outotec nickel matte chloride leaching process is especially suitable for small capacity stand-alone nickel refineries. The matte is leached with hydrochloric acid and oxygen in multiple steps in atmospheric OKTOP® reactors. Oxygen feed prevents reductive conditions and hydrogen formation in the leaching. A sufficiently high acid concentration keeps the iron dissolved in the solution. Iron is removed after leaching by precipitation and the pregnant leach solution continues to metals recovery. The metals recovery from the chloride solution is done by solvent extractions, where ammonia is used for pH control. Copper and nickel are stripped from the organic phase into sulfate solutions. Metals can be recovered from the purified solution by conventional electrowinning. Other alternatives are precipitation or hydrogen reduction processes. The ammonium chloride in the SX raffinate is regenerated into ammonia. The calcium chloride solution from ammonia regeneration is routed to acid regeneration where sulfuric acid is added and ultra pure gypsum is precipitated. The hydrochloric acid solution from this step is recycled back to leaching. The process yields good overall metal recoveries and expensive chemicals are regenerated using cheaper chemicals. Generation of waste and by-products is minimized in the process.