

PENFLEX

AUGUST 2022 METAL MARKET BRIEF

With these regular updates, we seek to paint a clearer picture of the myriad factors impacting supply and demand of stainless steel and special alloys which—ultimately—affect the price and availability of our products.

CENTRAL BANKS AIM TO CURB INFLATION

The news is full of headlines about inflation and predictions about the U.S. Federal Reserve's policy response. After its meeting in late July, the Fed announced it will lift interest rates by another 75 basis points in an effort to curb inflation. During the press conference Chairman Jerome Powell noted that future rate hikes of a similar magnitude are likely.

Central banks around the world are taking similar action. The European Central Bank raised its three interest rates in July, ending an era of negative rates. It was the first increase in 11 years. The Bank of Canada raised its rates earlier in the month as well, increasing the overnight rate a full percentage point to 2.5%.

JULY MANUFACTURING PMI

Rate hikes to tame inflation support sentiments that a recession is looming. Orders have slowed and inventories are growing, according to The Institute for Supply Management. Findings from its July Manufacturing ISM® Report on Business® showed continued expansion in the U.S. manufacturing sector, but at a slower rate than in previous months. The Manufacturing PMI fell to 52.8% from 53.0% in June.¹

¹ Institute for Supply Management®. (2022, August 1) *Manufacturing PMI® at 52.8% July 2022 Manufacturing ISM® Report on Business®*. Retrieved August 3, 2022 from <https://www.ismworld.org/supply-management-news-and-reports/reports/ism-report-on-business/pmi/july/>.

At a glance

In this edition, we review recent **economic indicators that support concerns around an impending recession** while also looking at one sector that's bucking the trend of slowing growth: **aerospace**.

A requirement in the production of stainless steel and special alloys—as well as aircrafts by extension—is nickel. We then outline the relationship between these two industries to better explain the **anxieties around future supply**.

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A slowdown is being felt on the other side of the world as well. Driven by criticism to curb its carbon emissions and catalyzed by continuing pandemic-related shutdowns and the ensuing softening of demand, production in China has slowed. The country's official manufacturing purchasing managers' index (PMI) similarly fell in July, to 49.0% from 50.2% in June.² The 50-point mark divides growth from contraction.

AEROSPACE BUCKS SLOWING GROWTH TREND

While negative sentiment may reign this week, there are signs of accelerating growth in some sectors. Aerospace supply chains are returning, adding to the demand for stainless steel and, more so, for certain nickel alloys.

Aircraft manufacturers are projecting a full recovery by 2024 but orders are coming in now. Most recently, in July, news that Delta placed an order with Boeing for one hundred 737 Max 10 planes, with options for 30 more made headlines. Deliveries to the Atlanta-based Delta are not expected to be complete until 2025.

Nickel alloys, such as Hastelloy C-276, are used in hot section components like exhaust systems, bleed air systems, heat shields, fasteners, honeycomb seals, and hydraulic lines. Stainless steel Types 304, 316 and 321 are commonly used for fuel tanks.

NICKEL ALLOY SUPPLIERS SEE INCREASED PROFITABILITY

The spike in demand amid an inflationary environment has allowed nickel alloy producers an opportunity to increase profitability, helping to offset losses suffered during the pandemic.

One Haynes International executive reported aerospace orders have rebounded to 95% of pre-pandemic levels off the back of stellar third quarter earnings. The company, a producer of high-performance alloys, saw top line revenue come in at \$130.2 million, a jump of 47.7% over the same period last year.³ Gross margin and net income saw similarly impressive results.

Demand from aerospace is unlikely to meaningfully impact stainless steel supply, but the same cannot be said for the exotics. Production capacity constraints continue to plague supply chains and mills are encouraging customers to buy early and often.

NICKEL: A KEY ALLOYING ELEMENT

One of the biggest drivers of stainless steel and nickel alloy prices is the cost of nickel. It is a key alloying element in the 300 series stainless steels, giving them their austenitic structure, and

² National Bureau of Statistics of China (2022, August 2) *Purchasing Managers Index for July 2022*. Retrieved August 3, 2022 from http://www.stats.gov.cn/english/PressRelease/202208/t20220802_1886994.html.

³ Haynes International. *Haynes International, Inc. Reports Strong Third Quarter Fiscal 2022 Financial Results*. Retrieved August 3, 2022 from <https://haynesintl.com/docs/default-source/investor-relations/2022/haynes-earnings-press-release--3rd-q-.pdf>

thereby making them easier to work with and suitable for a diverse range of applications. Thanks to nickel, these alloys have good formability and can be easily shaped into many products, from a corrugated hose to an orthopedic implant.

Nickel also improves weldability and toughness. While other metals (including non-austenitic stainless steels) become brittle and fracture at low temperatures, 300 series steels do not and, as a result, are used in cryogenic applications. Nickel also improves strength at elevated temperatures.

For the austenitic stainless steels, nickel content ranges from 8% - 14% of total composition, with Type 304 seeing nickel content range from 8% - 10.5% while Types 316/316L alloys see nickel content range from 10% - 14%.⁴ There is no substitute for nickel in the production of these stainless and other alloy steels.

ANNUAL NICKEL PRODUCTION AND RESERVES

Stainless steel prices and, ultimately, its long term availability are closely tied to the nickel market given the production requirements.

While nickel is a relatively common element, annual production is quite small compared to other extractable resources. Two-point-seven million tons of nickel were produced in 2021 while—as a point of comparison—68 million tons of aluminum were produced.⁵

Production trends often echo the situation with reserves, or the amount that can ultimately be extracted through mining. Known reserves of bauxite ore, the primary source of aluminum, are estimated to be between 55 billion and 75 billion tons and far outweigh known reserves of nickel, which are estimated at 300 million tons.⁶

To note, it is widely accepted that extensive nickel deposits lay beneath the ocean floor but mining technology has not yet evolved to a point where extraction is efficient—or even possible. These potential reserves are not included in the tally above.

COMPETITION FOR NICKEL PRODUCTION

The stainless steel industry is the largest consumer of nickel each year, accounting for 69% of annual production. Another 7% is used to make non-ferrous alloys, and a further 3% to make alloy steels.⁷

⁴ Penflex. (2021, June 29) *Differences Between the 300 Series Stainless Steels*. Retrieved July 28, 2022 from <https://www.penflex.com/differences-between-300-series-stainless-steels/>.

⁵ U.S. Geological Survey. *Mineral Commodity Summaries 2022*. Retrieved July 28, 2022 from <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-nickel.pdf>

⁶ U.S. Geological Survey. *Mineral Commodity Summaries 2022*. Retrieved July 28, 2022 from <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-nickel.pdf>

⁷ Nickel Institute. *About Nickel*. Retrieved July 28, 2022 from <https://nickelinstitute.org/en/about-nickel-and-its-applications/#02-nickel-availability>

But there is a new game in town whose growing presence is putting pressure on the stainless steel industry and its consumers—electric vehicles. Certain electric vehicle (EV) batteries, including the most widely used lithium-ion batteries, require nickel. Currently EV battery manufacturers consume 11% of world nickel production annually, but as the push for e-mobility and carbon neutrality escalates, these manufacturers will be demanding bigger and bigger slices of the pie.

Estimates for the future of electric vehicles are enthusiastic. The International Energy Agency expects EV sales to reach 20% of all car sales in 2030, increasing stock 11-fold from today's levels to 200 million vehicles.⁸ This projection depends on the production of 180 million EV batteries over the next eight years.

Unless production levels increase, nickel could be a limiting factor to the industry's growth. In such a scenario, stainless steel and nickel alloy consumers could also expect to pay more.

U.S. GEOLOGICAL SURVEY ADDS NICKEL TO CRITICAL MINERALS LIST

The rise of EVs, resurgence of resource nationalism, price volatility and concerns over access are pushing some of the world's largest economies to shore up supply chains of critical resources.

Albeit a bureaucratic gesture, the USGS added nickel to its List of Critical Minerals earlier this year, a designation given to minerals essential to the economic or national security of the United States which have a supply chain vulnerable to disruption.⁹

Of the 50 minerals on the list, 23 are used in steelmaking processes underscoring just how important the industry is to the nation's security. Eight of the minerals are used in the production of rechargeable batteries, an indication of the commitment to and focus on advancing technologies that will diversify our energy mix and reduce carbon emissions.

Along with cobalt, lanthanum, manganese, and praseodymium, nickel is one of the few minerals required to support both industries. Its addition to the list just this year suggests concerns that supply may not be able to keep pace with increasing demand.

⁸ IEA (2022), *Global EV Outlook 2022*. Retrieved August 3, 2022 from <https://www.iea.org/reports/global-ev-outlook-2022/executive-summary>

⁹ U.S. Geological Survey. (2022, February 22) *U.S. Geological Survey Releases 2022 List of Critical Minerals*. Retrieved July 29, 2022 from <https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals>.