

## Overseas Market Information



## Market Survey Report on Machine/Cutting Tools Industry in Korea

### Summary

The Korean machine tools and cutting tools industry play a vital role in helping Korea achieve its goal of becoming a major player in global trade. These sectors form a key component in the country's automobile, electronic, and construction industries - all of which have ignited rapid growth in much of Korea's economy. As Korea continues to improve economically and gradually move towards high-end manufacturing, the sourcing of components and other high technology inputs is becoming increasingly important for many of its industry sectors. As a result, demand for high quality but competitively priced machine and cutting tools is very high, offering millions of dollars in business opportunities.

Rapid technological, economic and market changes in Korea's manufacturing industry sectors are generating increased activities in this sector. This has a great influence on the quality, productivity and technological development of these manufacturing industry sectors. The activity of these sectors is regarded as a leading performance indicator in Korea's industry sectors since the first thing Korean manufacturers do at the start of an economic turn is to invest in new or additional tools, in order to renovate and replace existing facilities and develop new products. The Korean machine/cutting tools market is being spurred by rising demand for new and innovative technologies and products. Korea's major manufacturing industries continue to require new high-end machine tools that are generally unavailable in Korea, and foreign suppliers have been filling this important gap.

Domestic market demand for machine tools decreased sharply by 30% over the previous year in 1998 since the national economic downturn slowed investment in the manufacturing facilities, but recovered immediately in 1999. From 1998 to 1999, demand in the Korean market increased to 65%. This industry showed a decline again in production and imports in 2001, compared to the bullish 2000 market demand that recorded US\$ 2.4 billion. However, considering the world recession in 2001, the size of the domestic market exceeding US\$ 2.0 billion for three consecutive years from 1999 was remarkably attractive for the exporters.

Korea's market demand has changed from standard, cost-effective or general products to high-precision, high-speed, and high-powered machine tools. In line with this trend, market demand for computerized numerically controlled (CNC) machine tools has rapidly increased. Supply of CNC machine tools to Korea was once monopolized by the FANUC Corporation of Japan. Machine tools

for use in the Korean IT industry, including CAD, CAM and system engineering, also showed a drastic increase in the market demand. Korea's metal working sector accounted for 25% of the total machine tools market share, followed by the automobile industry at 24%, the general machinery sector at 22%, the electronics industry at 11%, and the shipbuilding industry at 5%. The CNC cutting machine that includes a lathe, a milling machine, a machining center, and a special purpose machine represented 45% of the total domestic production.

### A. Market Highlights & Best Prospects

#### Market Profile

Korea's machine tools market is currently registering solid growth, spurred by rising end-user interest in new products and imported appliances. According to the statistics from the Korea Machine Tools Manufacturers' Association, the total market demand for machine tools in the first quarter of 2002 increased by 31% over the same period of the previous year. This current market trend reflects promising long-term prospects as an important generator of market demand for Korea's manufacturing industries.

The Korean market is expected to grow between 5% and 10%, led by investment in production facilities by the major manufacturing industries such as automobile, shipbuilding, telecommunications, and electronics. In particular, many small and medium-sized companies as well as large-sized companies are investing in factory automation, which will account for growing market demand for machine tools. As Korea has made progress in resolving technological difficulties that impede introducing high-end equipment and components, Korea's market will still rely on imports for wide range of new, upgraded technology from auto mechanics to information technology and aviation. Although major US companies currently hold strong competitive positions in the Korean market, the competition will be fierce as exporters from Japan and Germany plan to establish their joint ventures with their Korean partners for long-term strategies in the Korean market.

#### Statistical Data

**Table 1. Korean Production (US\$ million)**

	2000	2001
NC Cutting Machine	802.4	810.8
Metal Cutting Machine	198.0	136.3
Metal Forming Machine	530.1	413.8
Machine Parts	179.4	167.5
<b>Total</b>	<b>1,709.9</b>	<b>1,528.4</b>

**Table 2. Korean Imports in 2001 (US\$ thousand)**

	<i>USA</i>	<i>Japan</i>	<i>Germany</i>	<i>Switzerland</i>	<i>Britain</i>	<i>Other Countries</i>	<i>Taiwan</i>	<i>Total</i>
NC Cutting Machine	26,979	106,781	30,250	11,476	807	3,986	1,343	192,207
Metal Cutting Machine	22,916	169,442	33,507	20,024	5,455	14,003	1,160	288,602
Metal Forming Machine	10,881	68,318	15,964	2,750	4,408	5,381	2,251	127,884
Machine for Semi-conductor Production	236,676	81,579	1,429	0	1,503	36	0	322,753
<b>Total</b>	<b>297,452</b>	<b>426,120</b>	<b>81,150</b>	<b>34,250</b>	<b>12,173</b>	<b>23,406</b>	<b>4,754</b>	<b>931,446</b>

**Table 3. Korean Imports in 2002 (US\$ thousand)**

	<i>USA</i>	<i>Japan</i>	<i>Germany</i>	<i>Switzerland</i>	<i>Britain</i>	<i>Other Countries</i>	<i>Total</i>
NC Cutting Machine	16,542	135,428	17,693	8,445	3,098	18,688	199,894
Metal Cutting Machine	45,406	205,325	32,104	18,313	3,630	35,906	340,684
Metal Forming Machine	3,792	83,817	12,568	4,523	2,582	28,694	141,638
Machine for Semi-conductor Production	349,811	141,938	798	727	1,557	1,102	495,933
<b>Total</b>	<b>421,213</b>	<b>566,508</b>	<b>63,163</b>	<b>32,008</b>	<b>10,867</b>	<b>84,390</b>	<b>1,178,149</b>

**Best Sales Prospects**

The Korean tools market will continue to offer vast opportunities for exporters. The private industrial manufacturing sector is expected to grow faster than the public and retail sectors. Thus, the suppliers will have greater sales potential with business applications for the shipbuilding, automobile, telecommunications, electronics, defence, and general machinery industries that will continue to show high growth potential. Opportunities for small and medium-sized firms specializing in machine tool replacement parts and components also will be increasing in the next several years. In Korea, many core parts and components for NC machine tools such as NC controllers, ball screws, linear bearings, servo-motors, and hydraulic parts are still not available from local sources. Imported products supply the current market for core parts and components and a few capable local companies have begun manufacturing these items.

More major opportunities in the public sector will come from the high-speed railway integrated hardware system projects. The high-speed railway that is currently under construction is scheduled to start its operations in the Seoul-Daegu section in 2004. The high-speed railway integrated hardware system is expected to require over US\$ 100 million of high technology machine tools to support the successful startup. Korea's NC gear grinding machines, NC multi-spindle auto lathes, NC jig grinding machines, and

electrical discharge machines still lag behind products imported from overseas.

The following items are forecast to have the best sales potential in the Korean market over the next several years :

- HS 8456-10-2000 Laser cutters for cutting contacting tracks in semi-conductor production
- HS 8456-10-9000 Machines for the production of semi-conductor wafers
- HS 8457-30-0000 Multi-station transfer machines
- HS 8461-50-0000 Sawing or cutting-off machines
- HS 8462-91-3000 Machines of the maximum pressure more than 300 metric tons
- HS 8462-99-1000 Machines of the maximum pressure between 30 & 100 metric tons
- HS 8463-10-0000 Draw-benches for bars, tubes, profiles, and wires
- HS 8454-10-1000 Machines for sawing monocrystal semi-conductor wafers into chips
- HS 8464-20-3000 Machines for processing of semi-conductor wafers, including lapping machines

## B. Competitive Analysis

### Domestic Production

The Korean machine/cutting tools industry has gradually upgraded levels of technology mostly through technology imports from Japan, the US, Germany, Switzerland, and Italy. Thus, Korea-made products are considered compatible in the world market in terms of functional technologies such as machining and assembly process, but local capabilities for designing and developing highly functional, speedy, versatile, ultra-precise and automated machine tools still lag behind those of advanced nations.

There are about 150 machine tools manufacturers in Korea, most of which are medium and small-sized companies. Korea's production of machine tools recorded a brisk performance for the past three years. In particular, Korea's production of numerically controlled (NC) machine tools grew constantly at a 2% annual rate from 1989 through 2000, accounting for 45% of total production. This is because Korean manufacturing industries have expanded factory automation facilities and exports to overseas markets. The Korean machine tools industry aims at increasing NC production ratio up to 70%. In 2001, Korean exports of NC machine tools were valued at US\$ 276 million in 2000, and US\$ 272 million in 2001. (Korean exports of total machine tools were valued at US\$ 459 million in 2000 and US\$ 411 million in 2001). Most of the Korean NC machine manufacturers have made technical licensing agreements with foreign companies that include Ingersol Milling, Haas Automation, Simmons Machine Tools, and CADD/CAM Tools from the US.

In Korea, Daewoo Heavy Industries & Machinery, Hyundai Motor Company, WIA (formerly known as Kia Heavy Industries), Hwacheon Machinery, Doosan Mecatec, SIMPAC, Tongil Heavy Industries, Hanwha Machinery, and Hankook Metal & Machine are leading manufacturers that collectively share about 50% of the total domestic production. Korea-made machine/cutting tools are more price-competitive since they are still labour-intensive products. Koreans also recently developed a new product, an innovative offset link press, the first in the world. However, it should be noted that Korea's machine tools industry is still seriously confronted with such problems as a lack of qualified design engineers and insufficient financial support for research and development (R&D).

### Imports

The current size of the Korean market of imported machine tools is valued at US\$ 1 billion, accounting for 40-50% of total market share. In 2001, total imports decreased to US\$ 931 million, a decrease of 20% over the previous year due to sluggish facility investment and devaluation of the Korean currency. In particular, demand for imported machine tools for semiconductor facilities that accounted for 34% of the total import market share declined drastically in 2001. Japan is the largest import source of the Korean machine tools market. Japanese products enjoyed over 60% of total import market share until 1994, when most of the imported products were large-sized, high-end precision machines

that could not be produced in Korea. However, the number of Japanese products in the Korean market has decreased substantially, dropping Japan's import market share to its current level of 45% while Korean imports from the US rose to over 35% of the total import market share. Though US products have gained an increasingly competitive edge in the Korean market, the positive reputation of Japan's products is both long-standing and well-affected to the extent that Japanese manufacturers continue to hold an average 45% share of the total import market. Brand image is the most important factor for this market segment in determining the performance of the suppliers.

### C. End-User Analysis

The Korean machine tools market consists of the following end-user sectors :

- Metal working equipment (25%)
- Automobile & rolling stocks (24%)
- General machinery (22%)
- Electrical & electronic equipment (11%)
- Precision machinery (10%)
- Shipbuilding (5%)
- Others (4%)

\*Percentages represent a share of the contract value of the Korean machine tools market.

Major end-user clients of machine tools in Korea, as noted above, are private manufacturing companies engaged in high technology industries, and machine tool suppliers' technical capability is usually the key determinant to these major end-user groups. Demand for machine tools has greatly expanded across major high technology industries and has also rapidly increased among medium-sized manufacturing companies as major end-user clients expand their investment in production facilities on a large-scale. Machine tools suppliers are requested to provide constant updating in the latest techniques, product developments, and current market trends. Most large foreign and local suppliers provide training to keep their customers informed of these factors.

### D. Market Access

There are no non-tariff barriers imposed to imports of machine tools in Korea. Tariff rates are 8%. Korea's market for machine tools is highly receptive to US products since most of the industrial machinery and equipment for high technology industries were established according to American standards.

Korea is a challenging market for new suppliers of machine tools and cutting tools, and local competition to launch new products to key end-users is heavy. In order to generate better business relationships with leading end-users, establishing branch offices in Korea or establishing alliances with leading end-users is recommended. Hiring a well-qualified local agent also is one of the most effective ways for foreign suppliers to sell their products

in Korea. New companies with less brand recognition among local end-users will need to spend much time and efforts in marketing their products. They will also be requested to provide a high level of technical and educational services to end-users, and to maintain a comprehensive stock of all the common parts for a prolonged period.

Since foreign suppliers sell their products through local distributors, financial plans to cope with the long lead-time of investment returns for distributors is essential for new entries to the Korean machine tools market, particularly for sales of high-end products. Korean end-users typically require an assortment of core parts and components in their in-house inventories on consignment. In addition, local end-users pay suppliers with a promissory note for cashing in a few months later, which is a normal commercial practice unique to Korea. Foreign suppliers should take into consideration such a long lead-time of investment returns for their Korean clients.

### Economy

The economy of the Republic of Korea (South Korea) has grown in the last 35 years. Per capita gross national product, only US\$ 100 in 1963, exceeded US\$ 20,000 in 2005. South Korea is now one of the world's largest economies (as of 2006, it is 14th in the world according to GDP measured in PPP, tenth when measured nominally).

The core of the South Korean economy has changed substantially over the country's six-decade existence. In the 1940s, the country was predominantly agricultural, with little industry.[1] The emphasis shifted to light industry and consumer products in the following decades, and then to heavy industry in the 1970s and 1980s. As in other developed countries, the service sector has become increasingly dominant since the 1990s; it now comprises about two-thirds of the GDP.

In the early 1960s, the government of Park Chunghee instituted sweeping economic reforms emphasizing exports and labour-intensive light industries. The government carried out a currency reform, strengthened financial institutions, introduced flexible economic planning, and arrested competing leaders of industries it was trying to control. In the 1970s South Korea began directing fiscal and financial policies toward promoting heavy and chemical industries, as well as consumer electronics and automobiles. Manufacturing continued to grow rapidly in the 1980s and early 1990s. During the late 1990s and the 21st century, Korean high-tech industries became very competitive in global market, especially in comparison with that of Japan and Taiwan, and dominated in various international semi-conductor chip production.

In recent years South Korea's economy moved away from the centrally planned, government-directed investment model toward a more market-oriented one. South Korea bounced back from the 1997-98 crisis with International Monetary Fund assistance, and carried out extensive financial reforms that restored stability to markets. These economic reforms pushed by President Kim Dae-jung, helped Korea maintain one of Asia's few expanding economies,

with growth rates of 10% in 1999 and 9% in 2000. The slowing global economy and falling exports account for the drop in growth rates in 2001 to 3.3%, but in 2002 Korea pulled out a very respectable 6.0% growth rate. Restructuring of Korean conglomerates (chaebols), bank privatization, and creating a more liberalized economy with a mechanism for bankrupt firms to exit the market remain Korea's most important unfinished reform tasks. As of 2004 the economic situation looks less promising than in the years before. Increasing trade with the People's Republic of China, however, is expected to boost Korea to a leading position among Asia's developed economies. It is also expected to lead the world in penetrating Japan's trade barriers.

South Korea relies largely upon exports to fuel the impressive growth of its economy, with finished products such as electronics, textiles, ships, automobiles, and steel being some of its most important exports. Although the import market has liberalized in recent years, the agricultural market has remained largely protectionist due to serious disparities in the price of domestic agricultural products such as rice with the international market. As of 2005, the price of rice in South Korea is about four times that of the average price of rice on the international market, and it was generally feared that opening the agricultural market would have disastrous effects upon the South Korean agricultural sector. In late 2004, however, an agreement was reached through the WTO by which South Korean rice imports will gradually increase from 4% of consumption to 8% of consumption by 2014. In addition, up to 30% of imported rice will be made available directly to consumers by 2010, where previously imported rice was only used for processed foods. Following 2014, the South Korean rice market will be fully opened.

### North-South Trade

Since 1988, two-way trade between the two Korean countries has increased from \$ 18.8 million in 1989 to \$ 647.1 million in 2002. In 2002, South Korea imported \$ 271.57 million worth of goods from North Korea, mostly agro-fisheries and metal products, while shipping \$ 371.55 million worth of goods, mostly humanitarian aid commodities including fertilizer and textiles as inputs for North Korean garment manufacturers. South Korea is now North Korea's third-largest trading partner, after China and Japan. Numerous ventures by the Hyundai Group have contributed to North Korea's economy, including the Kumgang-san (Diamond Mountain) tourist site. Last year alone, 84,347 visitors travelled by Hyundai-operated passenger ships, and most recently via land routes, as part of this tourism initiative, raising the total number of South Korean visitors to over half a million (see Kumgang-san Tourist Region). A mere 1,141 North Koreans travelled to South Korea, mainly for joint sporting events. Hyundai Asan is also lined up to be the South Korean party that will help develop an 800 acre (3.2 km<sup>2</sup>) industrial complex in Kaesong, located near the Demilitarized Zone (DMZ), subject to final

agreements, including between Seoul and Pyongyang. The year 2002 witnessed significant progress on the Seoul-Shinuiju railroad, on both reconstructing road and rail links across the DMZ (as of early 2004 this process was stalled). However, the constructiveness of these efforts is still on question, as North Korea still declines to abandon its Stalinist style of government and is hardly showing any reliable economic growth.

**Macro-Economic Trend**

This is a chart of trend of gross domestic product of South Korea at market prices estimated by the International Monetary Fund with figures in millions of South Korean Won.

Year	Gross Domestic Product	US Dollar Exchange	Inflation Index (2000=100)
1980	38,774,900	605.85	Won 33
1985	84,061,000	869.51	Won 46
1990	186,690,900	707.59	Won 60
1995	398,837,700	771.27	Won 82
2000	578,664,500	1,130.95	Won 100
2005	812,196,561	1,024.11	Won 117

For purchasing power parity comparisons, the US Dollar is exchanged at 841.39 Won only. This implies that for 2006, with exchange rates of 945 per dollar, and nominal GDP over 850 trillion won, the GDP will reach over US\$ 900 Billion.

**Other Economic Indicators**

Industrial production growth rate : 10.1% (2004 est.)

**Electricity**

- production : 322.5 TWh (2003)
- consumption : 293.6 TWh (2003)
- exports : 0 kWh (2003)
- imports : 0 kWh (2003)

**Electricity - production by source**

- fossil fuel : 62.4%
- hydro : 0.8%
- other : 0.2% (2001)
- nuclear : 36.6%

**Oil**

- production : 0 barrel/day (2004 est.)
- consumption : 2.07 million barrel/day (2004 est.)
- exports : 0.63 million barrel/day (2003)
- imports : 2.263 million barrel/day (2003)

**Natural Gas**

- production : 0 cu m (2003 est.)
- consumption : 20.92 billion cu m (2003 est.)
- exports : 0 cu m (2003 est.)
- imports : 21.11 billion cu m (2003 est.)

Agriculture - products : rice, root crops, barley, vegetables, fruit; cattle, pigs, chickens, milk, eggs; fish

Exports - commodities : electronics (5000 of Export - 2004 estatictics) - semi-conductors, LCD panel, mobile phone, computers related, television, and others, motor vehicle, steel, ships, petrochemicals

Imports - commodities : machinery, electronics and electronic equipment, oil, steel, transport equipment, organic chemicals, plastics

**Exchange Rates**

South Korean Won (W) per US\$ 1 - 945.3 (May 2006), 1,143.7 (2004), 1,191.61 (2003), 1,251.09 (2002), 1,290.99 (2001), 1,130.32 (January 2000), 1,188.82 (1999), 1,401.44 (1998), 951.29 (1997), 804.45 (1996), 771.27 (1995)

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