

Analysis for EMM production cost and the development trend

by Chen Degeng – Chairman of Hunan Xiangxi Autonomous Prefecture Manganese Industry Association in IMnI EPD Seminar in Sanya, China on May 17, 2008

I am pleased to attend the Fifth IMnI EPD seminar in China. Required by the meeting organizers and today I will analyze for EMM production cost and development trend. The participants today are representatives of industry experts, so welcome the correction if there is anything wrong in my speech.

1. The cost of production of EMM

There are many factors to impact EMM production costs and it is complicated. So I break down them into two categories: The first category is the impact of raw material market. The second category is the production and technical management of the impact on production cost. On the current situation in terms of the impact of raw materials market is the most important factor that we can see from the table below:

Unit: yuan

Material	Grade	Consumption	Unit price	Cost	Cost percentage
MnCo ₃	17%	7.5	1100	8250	48.34%
H ₂ SO ₄	93%	2	2000	4000	23.44%
MnO ₂	18%	0.7	700	490	2.9%
NH ₄		0.1	3500	350	2%
SeO ₂		1.7kg	500	850	5%
Electricity		6800kwh	0.46	3128	18.3%
Total				17068	

The major materials in the six affect the cost of production are the ore, acid, electricity and Se. The table shows the case in general but varies greatly around the situation. On some parts of the ore grade only 11% so the acid consumption as high as 4.5-5.0 tons. Although these parts of the ore prices are low, the current prices of sulphuric acid in terms of their production cost also higher.

The second to impact the cost of production is the production and technology management. Although EMM production technology has embarked on a very advanced stage, in the more than 160 EMM manufacturers the production and technology management are still in a great difference, especially in some new enterprises. Some manufacturers have the advantages in raw materials so they have higher profits. It results the managers had not mainly focus on production and management of technology. My collection data shows some of enterprises the DC consumption reaches about 6000kwh and in some companies it is still around 7000kwh. In some enterprises the manganese content in the residue is less than 3% but some enterprises it is over 5%. All those show the big gap in the different enterprises.

2. Analysis the factors and trends to impact EMM production cost

Above I have analyzed the cost of production and now I will talk about the current trend of

EMM production cost.

We understand the main factors to affect EMM production cost are the ore, sulfuric acid, MnO₂, SeO₂, NH₄ and electricity. In the six raw materials only NH₄ market is stable and it accounts for 21% of the total cost. Other four raw materials of the ore, sulfuric acid, MnO₂ and SeO₂ impact EMM production cost greatly. Therefore, I am going to analyze those four raw materials:

(1), MnCO₃ and MnO₂ ore, which are the most major factors to impact the production cost in EMM processing. Now some EMM manufacturers in Guangxi and Hubei have their own mines, most of EMM manufacturers have to purchase the ore in the market. Other industries like ferroalloy and EMD manufacturers are using import ore as raw material, especially ferroalloy industry almost all rely on import high-grade manganese ore as raw material. So the price of import manganese ore has risen since 2008. It has a direct impact on the domestic manganese ore price rise. In the year of 2008 it will impact the price of the EMM and it is expected the manganese ore price may also rise. Because the whole world and in particular China's steel production will have relatively large increase, especially with as much as 12-14% manganese content 200-series stainless steel production growth rate higher. The 200-series stainless steel products have been accepted by the market. Its quality and application scope have been improved. So the ore price will be the mainstream trend to impact the current EMM cost of production increase.

(2). Sulphuric acid: The sulphuric acid price has risen rapidly since March 2008. The main reason dues to the electrolytic zinc price going down in 2008. So many manufacturers have cut-off. Therefore, sulphuric acid production significantly decreased. 2008 is Chinese Olympic year and all levels of governments pay attention to the waste management specially. They put energy-saving and waste treatment in the first place. So many factories were closed because they did not pass the examination. Therefore, sulphuric acid price soared all the way and brought the prices of imports of sulfuric acid are also soared. Under the current situation the price of sulfuric acid can not fall down in a certain period. So the sulphuric acid will be the important factor to support EMM production cost at a higher level.

(3). Se: Selenium is a very important raw material to impact EMM production cost for years. It was down in the early of 2007 but soon rose again. In the past year SeO₂ was basically stable at rmb500,000/mt. Therefore, in near future selenium will not have too many impact for EMM production cost.

I think the main market of selenium is in China. That means China can regulate the market price of selenium. However, due to the rapid development of EMM production in China, the selenium manufacturers drive the price higher and higher. It impacts the foreign manufacturers to continue raising the price. Now the price is 15-30 times comparing the price before. This is caused by human factors. So this is an uncertain factor in EMM cost of production.

3. Analysis the factors change for EMM production cost

From the perspective of the market price I think EMM cost of production is expected to drop to rmb12,000/mt in near future. The reasons are:

(1). Along with the wet smelting technology and the low-grade manganese ore processing technology constantly improvement, the low-grade manganese ore can be fully used to against the increase for the current high-grade manganese ore price. So it may achieve lower EMM production cost.

(2). The reduction technology for low –grade MnO₂ has been improved continuously. It will not only impact high-grade manganese ore price falling down, but also reduce the cost of production for EMM.

(3). Due to the success of reduction technology for MnO₂, it will not only reduce the current 60% of the amount of sulfuric acid which is fundamental to be inhibited from sulphuric acid prices, but also drive the price of sulfuric acid going down which will be the key factor to reduce EMM cost of production.

(4). With the current EMM cost continue to rise will force enterprises to improve their management level and technical level, like the SeO₂ consumption will be reduced or be replaced by other additives. That will be a very important factor to impact the reduction for the production cost. In fact, I can tell you the so-called 99.9 EMM is Se-free EMM actually. The key production technology is to improve solution purification. China National Mn Industry & Technology Committee will organize a conference to discuss the issue in May or June this year.

I believe EMM production cost will have a great change in 2-3 years along with the improvement of the processing technology, MnO₂ reduction technology, Se-free production technology, energy-saving technology and production management. Then EMM products will be lower. EMM application in the future will be wider. Therefore, our future is bright, and we will have a better tomorrow!