

FLUORSPAR

*By Peter L Huxtable
Minerals Industry Consultant*

World fluorspar production in 2001 is estimated at 4.25 Mt - unchanged from 2000 but showing a modest growth in acid-grade fluorspar (acidspars) use at the expense of metallurgical grade (metspar). Output of acidspars was 2.74 Mt (2.61) and destined mainly for the fluorochemical and aluminium industries; metspar output was 1.51 Mt (1.64 Mt) and the predominant use was the steel industry. World fluorspar production reached a record high of 5.48 Mt in 1989, ahead of the impact from the Montreal Protocol on CFCs; the low-point in production, of 3.74 Mt, was reached in 1994 following the subsequent phase-out of CFC manufacture.

The market last year continued to be dominated by China with an output estimated at 2.2 Mt (52% of the world total) of which 1.1 Mt was reportedly exported. The other major producers with outputs in excess of 100,000 t and accounting for a further 38% of the total were: Mexico (629,600 t - 14.8%), South Africa (286,400 t - 6.7%), Mongolia (4.7%), Russia (3.9%), Spain (3.0%), France and Kenya (2.5% each).

Supply and demand continued well-balanced with low stocks. Output increased significantly from Africa - particularly South Africa, Namibia and Kenya. The principle consumers taking nearly 90% of world output remained China (1.1 Mt), Western Europe (1.0 Mt), US and Canada (0.7 Mt), Japan (0.5 Mt), and Russia/CIS (0.4 Mt).

Acidspars prices hardened during the year as reflected by the increase in both the average import price cif US (US\$136/t against US\$128/t in 2000 and US\$124/t in 1999) and the spot price ranges for Europe cif quoted by Industrial Minerals magazine. This in part was due to the higher Chinese export licence price which averaged US\$52.5/t in 2001 against US\$39/t in 2000 but generally lower ocean freight rates. There was some reported softening on price in purchases negotiated late in 2001 for shipment in early 2002, partly due to a slight stock build following the events of September 11. This was reflected in Industrial Minerals' spot quotations, cif Western Europe, slipping by some US\$3-5/t to US\$132-136/t from February 2002. There are

Fluorspar Production ('000 t)

	1999 ^r	2000 ^r	2001 ^p	Estimated Consumption
Asia - China	2,230	2,240	2,200	1,100
- Other	53	70	72	650
N America & Mexico	557	635	630	950
S America	79	72	54	100
Western Europe	405	381	381	1,000
CIS and Mongolia	342	387	375	350
Africa	468	461	543	100
Total	4,134	4,246	4,255	4,250

r revised

p provisional

indications that there has been some upward correction later in the first half of 2002. The bids for the initial tranche of 500,000 t of the Chinese quota in December for 2002 realised a similar average licence price as for 2001.

Fluorspar Prices (US\$/t)

	1999	2000	2001
US imports - acid grade	124	128	136
cif - metspar	88	84	82

Industrial Minerals' quotation

Chinese acidspar	127-138	130-135	136-141
filtercake cif Rotterdam, December			

The former Buffalo mine in South Africa purchased by International Metals Processing (Pty) Ltd (IMP) commenced sales of re-processed old dumps at an annual rate of 40,000-50,000 t. There were no other reports of new mine operations starting, apart from a very small output by Milford Mining Co. in southern Utah in the US. There were indications of possible future developments by Tiberon Minerals Ltd in Vietnam, 80km north of Hanoi, and by Ivernia West Inc. in Kentucky, US.

In the downstream market, Solvay SA announced the US\$1,173 million purchase of the Italian fluorine specialty producer Ausimont SpA from Montedison Group, thereby doubling the size of Solvay's fluorinated specialties sector. This transaction was completed in May 2002 following approval by the European Commission and the US Federal Trade Commission. With the imminent phase-out of the foam-blowing agent HCFC141b in the US and Europe from January 2003, there were several new plants announced for replacement HFCs, notably of 365mfc by Solvay in Tavaux, France, and by Honeywell in Geismar, US, for 245a/125. Both were scheduled to commence production in the second half of 2002.

There were also several investments in the pipeline for fluorochemicals production

increases: by Daikin in Lyon, France to supply fluoroelastomers to Europe, Asia and US from February 2003 - in Osaka, Japan for PTFE and other fluorinated resins, and also for a plant in Jiangsu, China in 2003; by Asahi Glass for PTFE in New Jersey, US by mid-2003; and by Atofina in US, Spain and France. Pechiney continued to pursue a new 450,000 - 500,000 t/y US\$1.6 billion aluminium smelter with the current preferred location near Port Elizabeth, South Africa.

Anti-dumping measures against Chinese acidspar continue in Europe, Mexico and Russia.

North America

Mexico remained the only fluorspar producer in the region. Overall, output was effectively unchanged at 629,600 t (635,200 t) but a higher proportion 353,000 t was acidspar (335,000 t). Output was primarily from Las Cuevas, with a significant acidspar output also from Fluorita de Mexico, and smaller quantities from Minera Muzquiz and Minerales y Productos Metalurgicos (MPM) in Zacatecas and Durango.

Much of the acidspar was converted domestically to hydrofluoric acid and aluminium fluoride. Exports included 110,500 t to Japan (109,100 t), 65,400 t (73,100 t) to Canada and 54,200 t (60,400 t) to the US. There was also significant export of mainly metspar to Europe, South America and Asia; and an increasing tonnage for use in cement clinker manufacture both domestically and in South America.

US imports were effectively unchanged at 522,000 t (522,700 t in 2000) of which 495,000 t (484,000 t) was acidspar for the hydrofluoric acid and aluminium industry. Re-processing of previously sold materials from the National Defense Stockpile continues to feed the market - at end-September there was a reported 130,000 t of acidspar and 51,000 t of metspar "sold pending shipment" and some 112,000 t unsold material (9,000 t acidspar) overhanging the market. Some synthetic fluorspar continued to supplement

domestic consumption of the order of 5,000 - 10,000 t. There were US stockpile exports of 16,400 t (20,700 t) to Canada.

Canadian demand continued to be totally met by imports which decreased to 164,200 t (180,100 t) of which 149,400 t was acidspar (160,800 t). Imports were 40% from Mexico, 24% from China, 21% from Morocco, 10% from the US stockpile and 5% from Spain. The plans by Burin Minerals to reopen the Newfoundland mine and mill made no further progress.

South America

The only reported output from the region was 43,000 t from Brazil (72,000 t) and 11,000 t from Argentina (zero production in 2000). All South American production was consumed domestically, supplemented by imports mainly from Mexico and also from Europe estimated at around 50,000 t.

Western Europe

Production output remained unchanged at 381,000 t (381,000 t). A reduction in output from Sardinia matched an increase from the Glebe Mines operation in the UK.

Most production was consumed within Europe apart from 14,800 t (13,800 t) of the continuing shipments from France to the Tunisian aluminium industry and smaller quantities of acidspar for speciality applications.

Imports continued to supplement the estimated 1 Mt consumption requirement, with some 296,000 t from China (295,000 t), an estimated 209,000 t from Africa (220,000 t) and a significant tonnage from Mexico. German imports continued strong at 266,700 t (270,400 t) and also by Italy, at 209,600 t (209,700 t). The other significant importer continued to be Norway with an estimated requirement of 45,000 - 48,000 t for the Noralf aluminium fluoride operation.

CIS and Mongolia

Output decreased to 375,000 t (387,000 t). Some 97% of this production is attributed to the Yaroslavsky Mining Complex near

Vladivostok in Russia, and to the Mongolian-Russian joint enterprise Mongolrostsvetmet in Bor-Undur, Mongolia. JSC Yaroslavsky GOK is now the only Russian producer. Tests were reported in mid 2002 of its new briquette plant with an anticipated eventual capacity of 100,000 t/y.

The only other production is reported in Tajikistan and Kyrgyzstan. The previous operations in Uzbekistan have apparently not been in production since 1998 and possibly earlier.

Production has been entirely for domestic consumption and the region is essentially self-sufficient.

Asia and Australasia

Total production fell slightly, to 2.27 Mt (2.31 Mt). Output was almost entirely from China with the Democratic Republic of Korea and Hadavi Corp. in Iran contributing some 65,000 t together. Small quantities were reported from Thailand and Pakistan.

Of the assessed Chinese total production of 2.2 Mt (2.24 Mt) published exports were reported down again at 1.11 Mt (1.2 Mt in 2000 and 1.22Mt in 1999) and were slightly under the official 1.15 Mt export quota. Domestic consumption is estimated at 1.1 Mt comprising - 380,000 t of acidspar, 320,000 t of metspar and 400,000 t as sub-metallurgical grade for the construction industry. This reflects a rising increase in acidspar use of 5-10% annually in the past three years. Current installed HF (hydrofluoric acid) capacity is in excess of 170,000 t/y and China has also been developing a small but growing export market in HF during the past 5-7 years.

Further rapid domestic growth is considered potentially restricted by the limitations of the current mining operations and an increase in the manufacture of inorganic fluorides using waste fluosilicic acid.

The licence fee for exports increased to a US\$52.54/t average, up from the 2000 level of

US\$39/t throughout that year. Bidding for the first 500,000 t of the 2002 total of 1 Mt was held in December, and 325,000 t were released under agreement bids at US\$39/t and 175,000 t under open bid at about US\$79/t; the average of US\$53/t was more or less in line with the 2001 level. Results from the bidding for the remaining 500,000 t is expected in July 2002.

Information on individual operations is sparse and often conflicting. Production is dominated by Zhejiang province (around 50%), with significant output from Fujian and Jiangxi. In recent years closures and consolidations have seen the number of flotation mills reduce from some 125 in 1997 to some 78 in 2002. Half of these operations have only come on stream since 1997. Some 10% of the total remain state-owned, compared to 100% in 1990. Environmental issues and the conditions to be met in the five-year transition to WTO membership are increasing domestic production costs, with particularly adverse impact on the smaller mines.

Export destinations were primarily Japan, 401,000 t (360,000 t), the US, 353,000 t (320,000 t), Western Europe 296,000 t (295,000 t) and elsewhere in Asia 80,000 t (130,000 t), with smaller shipments to Canada, Tunisia and Australia.

Japan's imports fell to 515,200 t (554,200 t) but included a much increased 301,300 t of acidspar (282,900 t). Of the total, 79% (78%) came from China (100% of the acidspar and 48% of the metspar), with the metspar balance of 110,500 t coming from Mexico.

Africa

Total production showed a dramatic increase to 543,000 t from 461,000 t in 2000. Over half of this increase was from the re-opened Buffalo retreatment operation in South Africa but there was also increased activity by the two South African mines as well as from Namibia and Kenya. South Africa continued as the dominant player with an output of 286,400 t (212,400 t) followed by Kenya with

output around 100,000 t, and Morocco and Namibia 70,000 - 75,000 t each; and a very small metspar output from Egypt. Solvay's Okorusu mine in Namibia continued to increase its output steadily and all production was exported to the parent fluorochemical business in Germany.

In South Africa, the Vergenoeg operation completed two capital projects that are already significantly improving acidspar recovery and quality. The first involved installing two thickeners for use in the milling circuit and the second completed in October extended the concentrator building with two new banks of cleaner cells. Additional magnetic separators and flotation plant is scheduled for 2002. IMP's re-opened Buffalo operation report sufficient stocks of dump and stockpiled material to produce for a few years before the possibility of resuming mining operations.

Apart from servicing a small domestic fluorspar need in South Africa (officially reported at 54,700t for 2001), all African output was exported to world markets except the 30,000 t/y aluminium fluoride operation in Tunisia which continued to import all its requirements from France, China and Mexico. South African exports were primarily to the US and Europe, Moroccan exports to Canada and Europe, and Kenyan exports to Europe.

Outlook

There are again continued indications that the fluorspar market has stabilised. Stocks remain tight and prices have generally hardened giving some encouragement and optimism to producers. The Chinese continue to set more realistic export quotas and licence fees.

Consumption has stabilised but this masks the steady increase in acidspar use offset by continued reduction in use of metspar for steelmaking due to technical innovations and more efficient furnaces in both western countries and the developing world. The smaller use of metspar in the ceramic and fibreglass industry remains steady and there is growth in the use in the cement industry,

with a reported future potential 200,000 t/y market in North America.

There continues growth in the aluminium industry and overall in the fluorochemicals business. Whilst the HCFC market will shrink dramatically due to phase-outs (some in not-in-kind replacements), there is a 10-15% world annual growth in HFC demand and there is commensurate confidence and investment, although margins have reportedly been squeezed. The fluoropolymer industry is actually booming and this trend is expected to continue.

The potential threat from the new FSA (fluosilicic acid conversion) process from Kvaerner has not developed and is generally considered unlikely in the medium term.

Acidspar output is running at around 80% of installed capacity so there is little incentive for

new plants. The supply shortfall in the market of some 100,000 t to 150,000 t/y following the completion of US stockpile sales should continue to be met by increased output from current operations.

There is growing environmental pressures in China and elsewhere in the developing world which may in due course affect supply patterns. This, coupled with some strategic rethinking on resource sourcing in America and Europe following the terrorist attacks in 2001, may influence attitudes in the developed world towards less reliance on imports.

Despite the current world recessionary phase, which may well continue into 2003, prices and volumes for fluorspar in 2002 are likely to be held overall around 2001 levels - and the outlook is for modest growth in both from 2004.