

Mining



In 1989, production of crystallized salt in the EC stood at 20.2 million tonnes. Consumption (sales) amounted to almost 17 million tonnes. Overcapacity remains one of the chief characteristics of the salt sector, along with a pattern of demand which fluctuates according to economic and climatic conditions.

Description of the sector

The production of salt involves the use of mining (rock salt, salt in brine), farming (solar salt, sea salt) and industrial techniques (vacuum salt). The following analysis deals purely with crystallized salt (NACE 233) unless otherwise indicated.

Current situation

World production of salt, including salt in brine, has increased steadily since 1984 and reached a record level in 1989 with 186 million tonnes. Salt occurs in virtually limitless amounts. The oceans contain an inexhaustible supply of salt, as do rock salt deposits (which correspond to geological seas). Practically every country in the world has salt (rock salt, vacuum salt) or crude potash deposits (solar salt, sea salt), in greater or lesser amounts. According to the US Bureau of Mines, world production capacity is 251 million tonnes. Geographically, this quantity can be broken down as follows:

- ❖ North America.....25.8%;
- ❖ Latin America.....10%;

- ❖ Europe.....38.2%;
- ❖ Africa..... 2.2%
- ❖ Asia.....20.5%;
- ❖ Oceania.....3.3%;
- ❖ Total.....100%.

As can be seen from table 1, the leading producers are currently the United States (which accounts for over 20% of the total capacity), the USSR (16%) and China (12%). The main European producers are the FRG, followed by France and the United Kingdom.

Worldwide, consumption is put at 180 million tonnes. Approximately 56% is used as a raw material in the chemical industry: i.e. 38% for chloralkali and caustic soda consumption, and 18% for soda ash.

Food grade salt accounts for 19% of total consumption. Consumption of road salt, which is characterised by marked annual fluctuations and confined to certain geographical regions, accounts for around 11% of the total.

Finally, the remainder corresponds to various applications.

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Table 1
Crystallized salt
The main salt producers (including salt in brine)

(millions of tonnes)	1987	1988	1989
United States	36.9	39.2	39.4
USRR	25.0	26.0	29.0
China	18.0	22.0	22.7
BR Deutschland	13.3	12.6	12.1
Canada	10.1	11.7	11.8
India	9.9	8.4	8.3
France	6.6	6.7	7.5
United Kingdom	7.1	6.9	6.7
Mexico	6.2	7.0	7.0
Australia	6.3	6.9	7.7
Poland	6.2	6.2	5.7
Rumania	5.4	5.4	5.2
Brazil	4.6	4.6	4.6
Italia	4.5	4.9	4.6
Nederland	4.0	3.9	3.8
España	3.1	3.3	2.7
WORLD TOTAL	178.7	184.9	186.1

Source: World Mineral Studies (British Geological Survey) Industrial Minerals, Bureau of Mines

Production and consumption

Production In 1989, the EC produced 20.2 million tonnes, 1% down on 1988. The decline observed over the past ten years is due to the effect of climatic conditions on demand for sea salt and rock salt. The production of salt via solar evaporation depends on a certain degree of sunshine and wind while demand for rock salt is chiefly determined by bad weather (snow, black ice) in winter because this type of salt is mainly used for treating roads (except in the Federal Republic of Germany).

The de-icing market is a constant source of concern for salt producers because demand fluctuates considerably depending on the severity and length of the winter. Generally speaking, sales of road salt

amount to 5 million tonnes per campaign on average. Consumption over the past four years clearly proves that the actual figures can deviate markedly from the average. Such variations in demand obviously have a major impact on mining production.

Consumption EC consumption reached 16.6 million tonnes in 1989 as against 17.8 million the previous year.

Food grade salt Within the EC, sales of food grade salt amounted to 2,286 thousand tonnes in 1989 compared with 2,325 in 1988, i.e. a drop of around 2%. These results do not relate solely to the dietary use of this type of salt. Although sales of food grade salt represent around 19 to 20 grammes daily per capita, dietary use now only represents 13 to 14 grammes daily per capita while actual dietary salt intake is

only around 6 to 7 grammes.

The food industry is characterised by strong demand, but in the long term, household requirements for cooking salt look set to decline. Regulatory provisions inspired by a recent directive on the nutritional labelling of food products could well lead to a further shrinkage of demand.

Chemical industry In the EC, sales of crystallised salt stood at 9,919 thousand tonnes in 1989 as against 9,749 in 1988, i.e. an increase of around 2%.

Chloralkali manufacture by electrolysis is by far the largest market for salt. In 1989 it reached approximately 8,950 thousand tonnes within the EC. Three technologies are used at present:

- ♦ mercury-cells - 70%;
- ♦ diaphragma - 24%;
- ♦ membrane cells - 6%.

Diaphragma are fed with salt in the form of brine; the others require crystallized salt. Demand for chloralkali continues to grow, together with demand for caustic soda, sustained by the aluminum industry. In the medium term, demand for caustic soda seems to be more clearly oriented than demand for chloralkali. Outlets for the latter, particularly the bleaching of paper pulp and the manufacture of PVC, could well suffer from tighter regulations regarding the environment.

Overall consumption of PVC is around 5 million tonnes in Europe as a whole.

Table 2
Crystallized salt
Main indicators 1980 - 1990

(million tonnes)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Visible consumption	19.8	18.6	17.4	16.3	17.1	21.1	20.2	20.9	17.8	16.6	16.5
Output	24.7	25.5	23.3	21.4	22.3	24.6	23.8	23.2	20.0	20.2	19.0
Net exports	4.9	6.9	5.9	5.1	5.2	3.5	3.6	2.3	2.2	3.6	2.5

Source: European Committee for the Study of Salt.

The annual average growth rate is not expected to exceed 2% between now and 1992. There is increasing talk of PVC and glass recycling, particularly in the packaging sector. Were this trend to become popular in Europe, it would reduce demand for soda ash.

Road salt Road salt is the most unstable of all the sectors. For the past three years, a series of exceptionally mild winters has caused a slump in sales of road salt.

Whereas in 1985 they exceeded 6,000 thousand tonnes, in 1988 sales were halved, only to slump by a further 50% in 1989, reaching 1,402 thousand tonnes. On average, they represent 5,000 thousand tonnes. The results for 1990 are expected to show a further decline.

Even though salt does have a corrosive effect on vehicles (which can be reduced with special resins and plastics), in-depth studies have revealed the excellent cost effective ratio of salt spreading and have highlighted the reduced number of accidents on roads which have been serviced with salt.

Table 3
Crystallized salt
Output of crystallized salt in the EC

(Thousand tonnes)	Rock salt	Sea salt	Vacuum salt	Total
1980	12 156	3 832	8 665	24 653
1981	12 330	4 360	8 811	25 501
1982	10 536	4 145	8 604	23 285
1983	9 367	3 896	8 152	21 415
1984	10 060	3 901	8 313	22 274
1985	12 049	3 697	8 814	24 560
1986	11 806	3 728	8 284	23 818
1987	11 176	3 725	8 332	23 233
1988	8 657	4 081	8 119	20 857
1989	7 759	3 711	8 738	20 208
Capacity used	49 %	76 %	74 %	60 %

Source: European Committee for the Study of Salt

Miscellaneous industries Sales in this sector, which includes agriculture, water softening and other outlets, amounted to 3,000 thousand tonnes in the EC in 1989, i.e. the same tonnage as the previous year. While the water softening market appears to have rallied, the other sectors, particularly agriculture, are less clearly oriented. In most EC countries, the water is of a high quality, apart from the fact that it tends to be hard. Hard water, however, causes scaling and increases energy consumption and the amount of washing agents used. Demand for water softening

products should therefore continue to grow in the years ahead.

External trade

Intra-EC trade in salt which accounts for the majority of trade, 90 million Ecu, has suffered from a fall-off in demand over the past three years, linked to sales of de-icing salt.

Extra-EC exports, on the other hand, have staged a slight recovery. Northern markets (Finland, Sweden, Norway) which provide the main outlet for EC exports, have recorded a high level of activity in the chemical industry. In addition, there has been a

Table 4
Crystallized salt
Salt consumption in the EC
and comparison with the United States

(Million Tonnes)	Food grade	Miscellaneous industries	Chemical industry	Sub-total	Road salt	Total
1980	2.4	2.9	9.7	15.0	4.8	19.8
1981	2.5	2.6	8.3	13.4	5.2	18.6
1982	2.5	2.6	7.9	13.0	4.4	17.4
1983	2.5	2.7	8.3	13.5	2.7	16.2
1984	2.1	2.8	8.6	13.5	3.6	17.1
1985	2.2	3.2	9.3	14.7	6.4	21.1
1986	2.2	3.2	9.2	14.6	5.6	20.2
1987	2.4	3.0	9.7	15.1	5.8	20.9
1988	2.3	3.0	9.7	15.0	2.8	17.8
1989	2.3	3.0	9.9	15.2	1.4	16.6
United States (1)						
1987	1.0	8.7	3.3	13.0	9.6	22.6
1988	1.0	9.1	3.4	13.5	11.2	24.7
1989	1.1	9.8	3.9	14.8	11.2	26.0

(1) Approximately 80% of US consumption is made up of brine.
Source: European Committee for the Study of Salt and SI.

Table 5
Crystallized salt
External trade

(Million ECU)	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Extra-EC exports	66.6	80.6	89.9	83.4	65.6	60.3	59.2	65.4	49.6	53.4	57.4
Index (1)	58.0	66.9	71.7	81.5	92.3	100.0	88.5	85.9	91.6	103.8	111.6
Extra-EC imports	7.0	5.8	7.8	7.3	11.2	14.6	12.9	13.4	11.0	14.9	13.9
Index (1)	60.9	64.1	71.3	80.8	96.7	100.0	92.3	98.9	112.4	130.4	121.6
X/M	9.5	13.9	11.5	11.4	5.9	4.1	4.3	4.9	4.5	3.6	4.13
Intra-EC trade	60.1	69.2	77.7	86.7	134.1	174.8	155.9	151.9	88.1	90.1	N/A
Index (1)	34.4	39.6	44.5	49.6	76.7	100.0	89.2	86.9	50.4	51.5	N/A
Share of total (%)	47.4	46.2	46.4	51.0	67.1	74.3	74.5	69.8	44.9	44.1	N/A

(1) Including new EC members
Source: Eurostat (Comext).

new flow of trade towards the United States. In spite of its substantial output, the United States is the second-largest importer after Japan.

In 1990, EC imports from third countries amounted to 13.9 million Ecu while EC exports to third countries stood at 57.4 million Ecu.

Structure of the industry

The structure of the salt industry within the EC is characterised by a high degree of concentration. The most powerful operators are chemical companies which have departments specialising in salt. One such company is the Dutch group AKZO, the largest producer of salt in the world. The Belgian group Solvay has reinforced its position as the world's second-largest producer by taking over the Union Salinera de España. Other major players include the British company ICI and Kali und Salz (Germany) which belongs to the BASF group.

Elsewhere one finds a number of private specialist companies such as Compagnie des Salins du Midi (France), British Salt (United Kingdom) or semi-public companies, particularly in the Federal Republic of Germany, Greece and Italy.

The Winsford salt works in Great Britain,

where ICI used to produce dendritic salt, was recently closed down along with the ancient Cardona mine in Spain.

In the Federal Republic of Germany measures have been taken to streamline production in three salt mines belonging to Kali und Salz. These measures, currently in progress, should strengthen the firm's competitiveness. As part of its effort to redeploy its industrial interests in this country, Solvay and Cie has founded Solvay Deutschland GmbH which, on 1st January 1990, took over all of the group's assets in the Federal Republic of Germany. Plans are afoot to reorganise the various sectors, with the result that as of 1st January 1991, division S (salt) has been replaced by Solvay Salz GMBH (Solingen).

Faced with the prospect of the single European market, the AKZO group has introduced new structures. The "salt and basic chemical products" division is now composed of two units. The Hengelo installations are being modernised in line with plans announced earlier. Still the world's leading producer of salt, AKZO has also reinforced its position on the American market.

Number of employees

In the 1989 edition of Panorama, the section on salt featured a study of the various types of firms which produce crystallized salt. As can be seen from this brief classification, the profession has no statistics on the number of people employed. Among the major producers are firms for which salt is merely a raw material in the chemical composition of chloralkali. Even when the firms are present on the market, salt production is difficult to isolate.

In addition, in the few instances where salt production is featured on its own, the available statistics are actually fairly meaningless. Denmark and Portugal, for example, produce more or less equal quantities of salt. The number of people employed is twenty times higher in Portugal where the industry tends to be highly dispersed and dominated by salt marsh workers operating in the form of family businesses. In Denmark, by contrast, salt is produced by a single firm. A similar situation exists in France where a single firm can harvest up to 1,900,000 t of salt along the Mediterranean coast whereas even under optimum conditions, the salt marsh workers who inhabit the Atlantic

coast and represent some 300 families, produce a maximum of 30,000 t.

Outlook

Eastern Europe Recent events in Eastern Europe are bound to affect the salt industry within the EC, in the medium term. Firstly, the newly unified Federal Republic of Germany is reaffirming its position as the leading EC producer by taking on an approximate extra 3 million tonnes. Secondly, some of these countries include major producers of crystallized salt, most notably the USSR (18.5 million tonnes), Rumania (5.2 million tonnes), Poland (2.6 million tonnes) which could well pose a threat to EC exporters. A sizeable portion of this output is already exported and one can reasonably assume that the markets of Northern Europe will prove a prime target for the future development of these exports. For EC producers, meanwhile, Eastern European markets may offer a number of interesting opportunities, particularly as regards iodinated and fluorinated salt which do not exist in these countries except for Hungary.

Food grade salt The decline in consumption of food grade salt is a continuing source of concern for salt producers.

The chemical industry As we have already seen, the chemical industry is the main outlet for crystallized salt where it has to compete with salt in brine, depending on the type of cell used in production units. Plants fitted with mercury cells have been closed down. New units based on membrane technology have been slow to take off and only account for 6% in Europe, compared with a world average of 16%. In Japan 80% of chloralkali and soda production relies on membrane technology.

In Europe, chloralkali production has re-

cently shown a slight increase but this trend could well be reversed. Between now and the year 2000, for example, the paper industry will probably consume a third of the chloralkali used at the beginning of the 1980's. As far as water treatment is concerned, a similar shrinkage of demand seems likely. PVC is the only major outlet for chloralkali to show steady growth. Conversely, only 10% of outlets for soda are on the decline, with 65% on the increase. Supply is expected to grow until the restructuring of the entire sector is complete. It is important to note that products other than soda could be used in those sectors where sodium ions are required.

Environment The second phase of the plan to clean up the Rhine was adopted on 1st December 1989, by the ministers for the environment of the Federal Republic of Germany, France, Holland and Switzerland. 82.5 billion Francs will be set aside between now and 1995, three quarters of which will go towards financing purification stations and the rest towards restricting toxic industrial waste.

0.5 billion Francs will be spent on reducing saline waste (0.4 billion for potash mines and 0.1 billion for investments in the Netherlands). The expenditure will be divided up between the Netherlands (34%), France (30%), the Federal Republic of Germany (30%) and Switzerland (6%).

The authorities in charge of the environment in the Federal Republic of Germany and Czechoslovakia entered into negotiations in 1990 with a view to forming a joint commission on the protection of the Elba. A similar agreement to that on the Rhine is about to be signed.

Discussions are continuing between the

German authorities on the reduction of saline pollution in the Werra. According to certain estimates, some 12 million tonnes of saline residue are dumped in this river every year, 10 million of it on the eastern bank, in connection with potash production. Kali und Salz has agreed to produce 100,000 tonnes of potash on behalf of its Eastern counterpart. Its dry electrostatic process enables the two chlorides to be separated without any threat to the environment. In this way, saline waste could be reduced by around 1 million tonnes per year.

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