

Talc in Europe

Optimistic views are prevailing

by Wilhelm Schober*

The talc business in Europe has become tighter although overcapacities exist. There is a continuity in production concentration. White talc has become short in Europe and has to be imported from overseas. Some traditional markets are declining but other new segments and applications provide considerable optimism.

There are many types of talc

The term "talc" does not express the diversity of this mineral in nature. On the one hand "talc" is a pure magnesium silicate to be found in Italy, India, China, Australia, USA etc. On the other hand it is a general term for a polyminerallic rock.

Talc is most frequently accompanied by "chlorite", where the magnesium-ion has been replaced by aluminium (France, Austria, etc). Chlorite has a lamellar structure as well, with similar properties to pure talc in most of the typical applications. Other by-products are:

| | |
|---------------------------|--------------------|
| * Carbonates – Magnesite: | Scandinavia, Italy |
| – Dolomite: | Austria |
| * Mica: | Austria |
| * Quartz: | widespread |

The heavy metal content frequently determines and narrows the usefulness of talc. Commercially talc cannot be qualified on the principle "the higher the purity – the better the quality". Each modification shows advantages in specific applications in practice. The aim for producer and user is to match the most suitable mineral to the application field.

Apart from the mineralogy, talc deposits are classified by brightness and platy structure (aspect ratio). The lamellar talc is the most common modification, the more compact structured talc is extremely rare in Europe (Germany, Spain).

Production in Europe – overcapacities exist

The total annual European talc production (USSR excluded) is estimated at 1,307,000 tonnes. Rise and fall in demand, further extensions of capacities at talc processing plants, and increased competition by other minerals has generated overcapacities.

| ('000s tonnes) | estimated | |
|----------------|--------------|----------------|
| | capacity | production '86 |
| Norway | 75 | 50 |
| Sweden | 50 | 32 |
| Finland | 660 | 340 |
| Belgium | 50 | 45 |
| France | 350 | 330 |
| Spain | 85 | 79 |
| Italy | 170 | 150 |
| Austria | 160 | 140 |
| Germany | 25 | 17 |
| Greece | 5 | 5 |
| CSSR | 15 | 12 |
| Bulgaria | 50 | 40 |
| Rumania | 65 | 55 |
| Yugoslavia | 12 | 12 |
| Total | 1,772 | 1,307 |

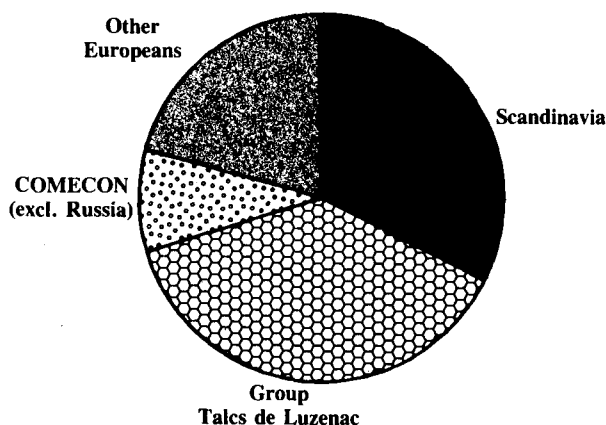


Figure 1. Talc production in Europe, 1986, . . . another view . . .

The Finns are paper orientated

In Finland, *Finnminerals Oy* dominates talc production. At its mines at Sotkamo and Polvijärvi and the processing plants in Sotkamo and Outokumpu the company has an annual output of 230–250,000 tonnes. The total capacity is near 360,000 tonnes; the gap represents an important part of European overcapacity in talc. The main outlets are for paper, pulp, paint, plastic, rubber and fertiliser industries.

* Dr Schober is now operating as an industrial minerals marketing consultant based in Graz, Austria.

Exports are estimated at 20–30% of production to worldwide destinations. Major destinations are, however, Sweden, Denmark, Germany, Great Britain and Benelux.

Myllykoski Oy has two open pit mines in Polvijärvi and Kaajaani and reported an output in 1986 of approximately 90,000 tonnes mainly for pulp and paper. The principle part of the production is employed at the company's own papermills. Less than 10% is exported (Sweden, W. Germany, USSR).

Output can be increased to 300,000 tpa. Talc content is high (>95%), and entirely white.

The special co-operation between Finland and the USSR as with many other Comecon-countries, has turned the Finnish talc producers into favoured suppliers with 6–11,000 tpa intended for eastern Europe; but fluctuations in demand are striking.

Talc-magnesite the typical products of Norway, Sweden and UK

Norwegian Talc A/S in Bergen, with subsidiaries in UK (*Nortalc Milling*) and Netherlands (*Norwegian Talc BV*) for dolomite grinding, has been specialised in micronised talc for many years. The magnesite-talc comes from the mines in Norway (Framfjord and Altemark), whereas the white grades are processed from imported talc (eg. India).

The markets are paint, paper, and bitumen industries and total production is estimated to be 40–45,000 tpa. Export has an important share (about 70%). The plant in Amsterdam acts as the distribution centre for central Europe.

A further Norwegian talc producer is *A/S Granit* with talc mines and processing plant at Barsted, near Otta in the central part of South Norway. It is reported to have a capacity of 25,000 tpa and a typical production of 6,000 tpa. The export rate to northern European countries (Sweden, Netherlands, Germany, Benelux, Great Britain) has amounted to 99%, chiefly for polyester putties, cattle food, roofing felt and compounds, cable and tyres. Competition in these market segments has become keen and challenging for the smaller producers.

A similar course of events can be found in Sweden. *Handöls Täljstens AB*, owned by the local council, is located at the Swedish/Norwegian border, not far from Trondheim. In the 1970s *Handöls* managed an output near 30,000 tpa but dropped to around 12,000 tonnes. Chief applications are animal feed, roofing felts (also platy granular talc), fertilisers. *Handöls* is engaged in trade with Benelux and Great Britain. Sweden's *Boliden Mineral AB*, mainly engaged in pyrites, has obtained an annual talc output of 15–20,000 tonnes for the national fertiliser-industry. Talc is a by-product of a complex ore deposit at Garpenberg worked chiefly for its copper, lead, zinc, and precious metals values.

The UK is a small producer of talc-magnesite with a single producer exploiting a deposit near Baltasound on Unst — the northernmost island in the Shetlands off the northeast coast of Scotland. *Alexander Sandison & Sons Ltd* began working the Quoys quarry in 1948 although operations are now centred on Crossgeo quarry where more economic reserves are being exploited. The company is able to produce up to 20,000 tpa of crude talc magnesite and recent production has been at this level. The crushed talc is shipped for processing by English China Clays' subsidiary, *Fordamin Ltd* mainly at its Yate Mills operation near Bristol but some is processed at the Stockton-on-Tees plant. EEC, which markets the milled product, has a 20-year supply agreement with *Alexander Sandison* which started in 1972. Three screened grades are produced — minus 300, minus 200, and minus 100 mesh for sale in bulk or bagged form. The principal market for Shetland talc is anti-caking applications in fertilisers in the UK although other markets are supplied and some is exported.

At Cunningsburgh, also in the Shetlands, evaluation is continuing on a deposit containing several million tonnes of talc-magnesite which contains 55–60% talc. *Shetland Talc Ltd*, a joint

venture between *Dalradia Mineral Ventures Ltd* and *Anglo European Minerals Ltd*, is testing the mineral in a commercial pilot plant and eventually plans to establish a 30–35,000 tpa plant for grades destined for use in paints, bitumen, plastics, and ceramics.

On the Republic of Ireland's northwest coast evaluation is being continued by *Tara Mines* on the Westport talc-magnesite deposit.

Experience from overseas for Belgium

Cyprus Industrial Minerals Corp. of Gent, a subsidiary of the US company's Talc Division, can be regarded as an important talc producer in Europe as well. The processing capacity at Gent is estimated at 50,000 tpa. Cyprus has no local mine. Crude talc had been imported from Spain, Australia, and USA. Main markets are central Europe, Scandinavia, UK for paper, pulp, paints, plastics, pharmaceutical and cosmetics uses. Some crude Australian talc goes to the electroceramics industry in western and eastern European countries. The export rate is estimated to be 90%.

The market leader in Europe

The group of *Talcs de Luzenac* is dominant in the European talc business. A continuous expansion policy has given the company a top ranking position in the world. *Talcs de Luzenac S.A.*, in the south of France, has a surface mine at Trimouns, Pyrenees, and a processing plant in Luzenac with a capacity of about 350,000 tpa. Production in 1986 is estimated at 330,000 tonnes.

Most of the national sales go to paper mills as a filler, and a smaller part as a coating pigment. The filler segment is a low price market. It will be determined in the near future, whether or not talc can compete with clay and calcite for paper applications. The export rate is about 33% mainly to central Europe, Great Britain, and Africa. Some crude talc goes to *American French Talc* in the USA (1–3%). *Luzenac talcs* range from cosmetic to lower industrial grades and is certainly a favoured resource in Europe in terms of quality, quantity and availability.

Talkumwerke Naintsch Ges.m.b., the Austrian subsidiary (*Talcs de Luzenac*: 80%), has three mines and plants, all located in Styria in the southeastern part of Austria. One talc operation is situated at Rabenwald where about 100,000 tpa is surface mined with processing carried out at Oberfeistritz. The deposit provides a lamellar but darker chlorite talc product. A white dolomite-talc is mined underground and processed at Lassing to give about 20,000 tpa. A polyminerallic product consisting of chlorite, quartz, and mica is mined underground near Weisskirchen where 20,000 tpa is produced.

White grades of talc have to be imported from India (Golcha) and nowadays also from Australia. *Naintsch*, specialises in micronised grades for the paper, pulp, and paint industries and is also market leader in granular talc for roofing felts in Europe. Chlorite-talc enables use for cordierite refractories, where Italy has developed into a dominating market.

The export rate is about 85%. Apart from the prominent position in many western European countries, the geographical situation favours a link for the group to Comecon-countries and the Near East.

Naintsch Mineralwerke Ges.m.bH and *Österreichische Talkumindustrie Ges.m.bH* (both 100% owned by *Talkumwerke Naintsch*) and *Dr Karl GOLLER GmbH* in Munich (*Naintsch Mineralwerke*: 50%) are the sales companies.

The Italian subsidiary of *Talcs de Luzenac*, *Mineraria Valle Spluga SrL* (*Talcs de Luzenac*: 77%), is to be reorganised in the near future. An association with other Italian talc producers was reported. The present sales volume of 20,000 tpa is expected to increase after restructuring to about 40,000 tpa. Talc contains magnesite and the product range varies from low industrial grades (60%) up to micronised grades (5%). Main markets are the paper and paint industries in addition to fertilisers, animal

feedstuffs, asphalt, and ceramics. The large scale Italian ceramic industry is likely to become an important outlet. The company's export rate is low.

Talcos Pyrenaicos, at Figueres near the French-Spanish border (Talcs de Luzenac: 49%) with shares in *Sdad Espanola des Talcos* (30%), has four mines near the processing plant. Annual output is 22,000 tonnes whilst capacity is about 27,000 tonnes for paper, animal feed, ceramics, fertiliser, asphalt, and paints. Spain is the main market, the export rate is low (3-4%). The mineral has carbonates as by-products.

Expansion to Far East

Talcs de Luzenac's subsidiaries in Canada (Luzcan, 50%), and USA (American French Talc, 100%) made the first step to overseas operations. Engagements in India (Golcha group) and the commencing co-operation with Australian talc mines show further expansion to the Far East.

The purest talc comes from Italy

One of the highest talc qualities can be found in Italy. *Talco e Grafite val Chisone Spa.*, has an underground mine and processing plant at Pinerolo, near Turin and an open pit mine at Orani, Sardinia, with new grinding facilities. Total capacity will be near 80,000 tonnes with a typical output of 65,000 tpa. Talc at Pinerolo displays high purity and brightness and represents one of the highest qualities available worldwide. Using special techniques talc is decontaminated for pharmaceutical and cosmetic applications. Other grades are for paints, paper, plastics, rubber and ceramics.

The company abandoned the graphite business in 1983 and all activities were focused on talc. It has been reported that a new mine near Pinerolo is being developed and micronising capacity is likely to be increased.

Industria Mineraria Italiana (IMI) srl has a mine and plant near Sondrio, in the north of Milan with an estimated annual output of 50,000 tonnes. The talc contains magnesite and is used for roofing, fertilisers, plastics, paints, and animal feed. The most important export countries are France, Netherlands, and Germany. Export rate is estimated at 30%. The company is running an ambitious modernisation programme to expand output to 100,000 tpa and to produce a range of micronised products.

Smaller producers in Austria and Germany

The smaller producers in central Europe feel the severe competition more directly. Comparisons with the smaller Scandinavians can be drawn.

Another Austrian talc producer, besides the Luzenac group, is *Talksteinwerke Reithofer* at Stubenberg/Rabenwald, close to the open pit mine of Talkumwerke Naintsch, with an annual production of 6-7,000 tonnes for ceramics, roofing-felts (screened, granular talc), rubber, plastics, etc, more or less for the whole range of standard talc applications. The chief export country is Germany (60-70%).

Germany — a large scale market

Hoechst CeramTec, took over *Rosenthal Technik AG*, at Wunsiedel in 1985 and acquired the talc and soapstone operation. The annual output was reported as 12,000 tonnes from a 15,000 tpa capacity unit. Some 20-30% is used in its own production, the principle part is sold in West Germany and East Germany. The special feature of this talc is its exceptional compact structure, suitable for refractories and electroceramics.

Production of high-tech ceramics is the main business. *Johannes Scheruhn GmbH & Co*, Talkum-Bergbau has a mine at Schwarzenbach, in the north of Bavaria, with an annual output of 4,000 tonnes. The material is rich in iron, which limits its application.

Spain — increased importance

A wide range of talcs can be found in Spain, starting from dark industrial talcs up to white cosmetic grades. Total production is about 80,000 tpa. In addition to the Luzenac-linked *Talcos Pyrenaicos*, *Sdad. Espanola de Talcos SA (SETALSA)* (30% Talcos Pyrenaicos, 33% Val Chisone) holds a prominent position with a capacity of 40,000, tpa, and an annual output of about 35,000 tpa. Talc is entirely white, and exhibits a favoured aptitude for cosmetics, plastics, and paints. A certain quantity of crude talc had been exported to Belgium as a raw material for another talc grinder. Val Chisone provides technical assistance and acts as an agent for overseas sales.

Distribuidora Malaguena de Talcos SA has numerous surface mines in the region of Malaga. The company's grinding capacity is 20,000 tpa although an additional 40,000 tpa of crude talc is exported. In addition to the national markets, some spanish talc goes to the Mediterranean countries, UK, and Portugal.

Greece — consumption exceeds production

The only Greek producer is *Alavanos Talc EPE*. The mine is located on Tinos Island, with an annual output of 5,000 tonnes, mainly intended for the Greek market, and that of Cyprus and Israel.

Turkey — interesting for Europe

Dyo Boya ve Mikronize Fabrikalari AS has a mine at Sivas, Kutahya and a plant at Izmir. It is reported to have a capacity of 50,000 tpa and a 1986 output of 2,000 tonnes. The export rate is high (50%) and the main markets are Libya, Lebanon, Iraq and Greece for paint, paper, and ceramics. The company is well located for the Mediterranean and Near East business.

Talc consumption increases

Roskill reported European consumption of talc to be 920-960,000 tpa in 1977. Current figures show a consumption level of 1.2m. tonnes. In spite of all the ups and downs talc shows an annual increase of about 2.5% in Europe.

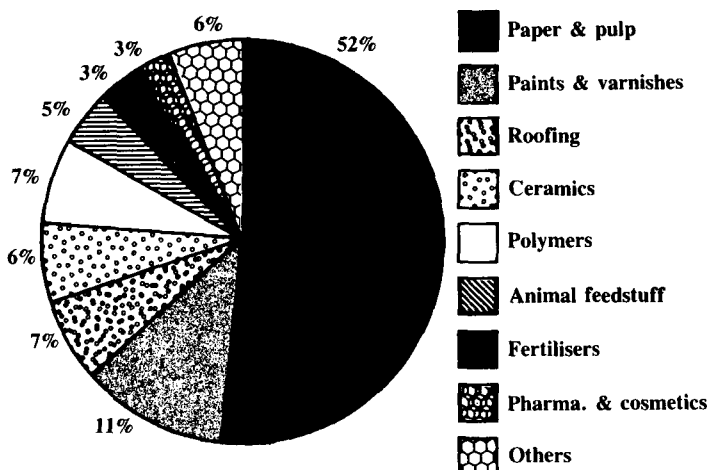


Figure 2. Talc consumption 1986, Europe, segments

A general statement about markets is irrelevant as declining and growing markets can be found in the European countries. It must be taken into account, however, that each country has to be viewed separately.

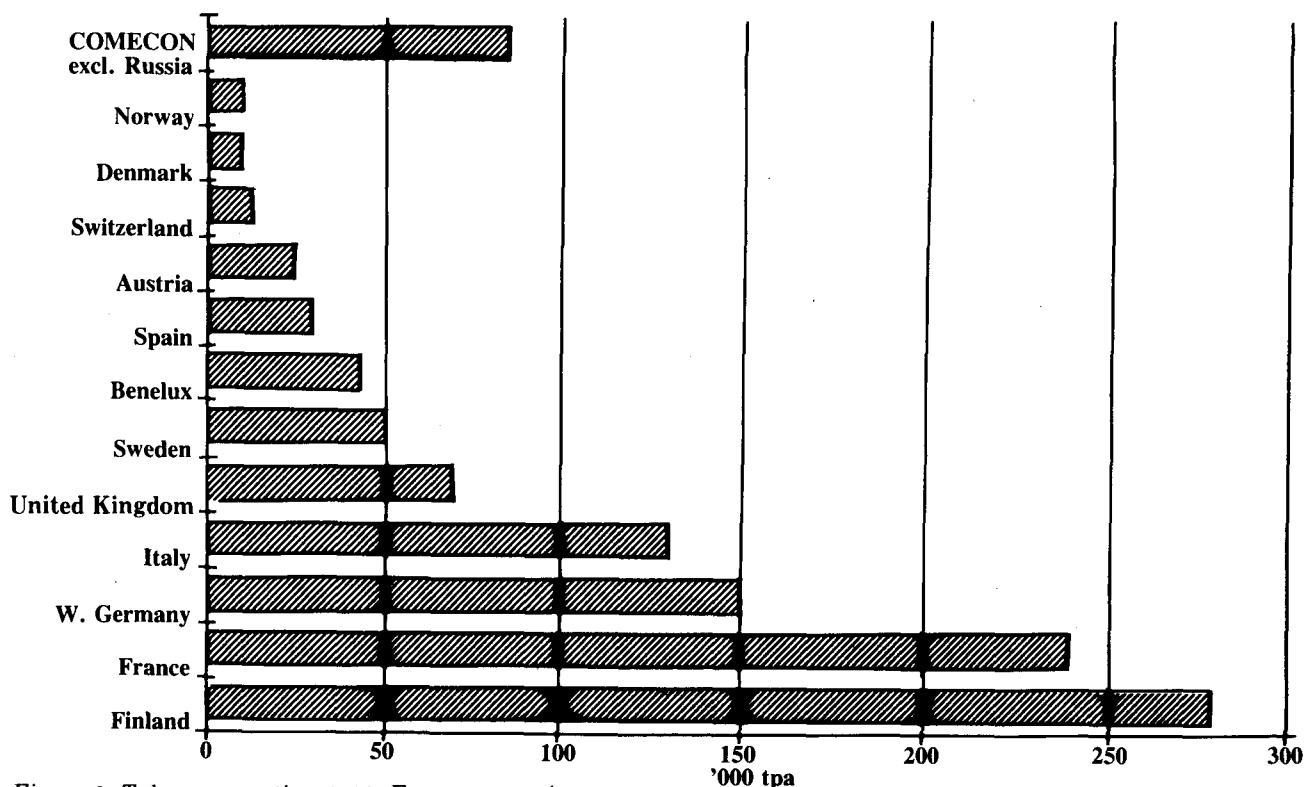


Figure 3. Talc consumption 1986, Europe countries

COMECON — a special market

Comecon countries normally have quite a constant demand for talc. The privileged suppliers are China and Korea and under special circumstances, India as well. Long term contracts and intentions have been established and clearing-payment gives a determining advantage.

Finland has a good economic relationship with most of these countries; they have regular sales to the USSR, but fluctuations in demand are significant (annual sales: 1–10,000 tonnes). Figures for talc production and demand in the USSR are not published.

In contrast, other western talc producers could gain a foothold in other Comecon countries. Locally available, mostly dark grades (Czechoslovakia, Bulgaria, Rumania, Yugoslavia) are used in roofing, ceramics, rubber, and fertilisers. Internal COMECON trade exists. The following figures are based on 1985, but there was no fundamental change in the last year.

All Comecon countries first seek trade possibilities with China and Korea. The difference between this supply and the typical demand can be fulfilled by western suppliers. Hard currencies have to be saved and are spent only on higher-value goods. Only specialities have continuous demand.

Hungary has a talc demand of 4,500–5,000 tpa. The main suppliers are China (approximately 2,000 tpa), Austria (1,200 tpa), and Finland (1,200 tpa). Italy supplies pharmaceutical talc.

Czechoslovakia buys some crude talc from China and has its own processing plants. The western imports (about 1,500 tpa) are specialities (for electroceramics, pulp & paper, and paints). The dominant western supplier is Austria. Czechoslovakian talc is exported to East Germany.

East Germany has important demand for talc. Besides the imports of crude talc from China (approximately 2,000 tpa) it also imports standard grades from North Korea (approximately 1,000 tpa). The western imports mainly come from Austria (approximately 1,000 tpa).

Poland buys talc from countries such as Korea and India.

Western talc comes from Austria (3,600 tpa), Finland (approximately 1,300 tpa), Norway and pharmaceutical grades from Italy. Total annual consumption of talc will be about 8,000 tonnes.

Bulgaria has low talc imports and buys only some tonnage for the pharmaceutical industry.

Yugoslavia uses its own talc for roofing, ceramics, refractories, etc. Talc imports are about 6,000 tonnes. The main supplier is Austria (25%), followed by Italy (13%), Belgium, and France.

Talc and the established markets

Paper & Pulp the leading outlet for talc

The paper industry is the most important market segment for talc in Western Europe. It accounts for nearly 50% of total talc consumption. Talc is used as a pitch-control agent, as a filler, and nowadays as a coating pigment. The following shows estimated talc consumption in paper industry in Western Europe (1986):

| | |
|----------------|----------------|
| Filler: | 450,000 tonnes |
| Pitch-control: | 115,000 tonnes |
| Coating: | 80,000 tonnes |

Whereas in Northern America talc for pitch control has a share of 80% used in the paper industry, in Western Europe we can find less than 20%. The most important countries, where talc is used in pitch control-applications are:

| | estimated tpa |
|--------------|---------------|
| West Germany | 25,000 |
| Sweden | 18,000 |
| Austria | 12,000 |
| Italy | 7,000 |
| Benelux | 6,000 |

Recently some Comecon countries have started using pitch talc in order to substitute chemical dispersants.

The efficiency of this application depends on mineralogy and the particle size distribution of the talc. The adsorption of sticky materials in pulp and paper production is the main object of the talc use. Therefore, the specific surface of the micronised talc and the content of lamellar, platy talc are the essential parameters. Non-lamellar by-products such as carbonates ($MgCO_3$, $CaCO_3$, etc.) show no efficiency in pitch adsorption. Between the mineralogically pure "talc" and the modification "chlorite" there is no observable difference in practice.

Normally a talc finer than 15 microns is used, with a specific surface of 10–13 m^2/g (BET). It seems essential for the effectiveness of talc that dispersing facilities in pulp and paper mills open the high specific surface of the micronised talc for the purpose of getting high adsorption values.

The most important producing and exporting countries for micronised talc for pitch control in Europe are Austria, Finland, and Belgium, whereby the first country mentioned seems to be the European market-leader.

Main pitch-talc producing/exporting countries

| | <i>estimated tpa</i> |
|-----------------|----------------------|
| Austria | 45,000 |
| Belgium | 28,000 |
| Finland | 30,000 |
| Other countries | 12,000 |

Surface treated talcs with anionic dispersants have been produced for many years and show high efficiency under defined conditions. Cationic treatments are new and have to demonstrate the technical and economic advantage. Prices vary from country to country as does quality which reflects a highly competitive market:

| | |
|------------------|--------------------|
| Scandinavia: | £205–250 per tonne |
| Benelux: | £130–225 per tonne |
| Germany: | £175–250 per tonne |
| South of Europe: | £150–250 per tonne |

An optimistic view may be taken on the future of talc in this market segment. The increasing restrictions for chemicals concerning environmental protection, new paper machines, and intensified waste paper recycling help and talc will play an increasingly active part in a short or mid-term period. A potential total European market of a further 50–80,000 tonnes seems realistic.

In filler and coating applications talc competes directly with kaolin and calcium carbonate. In France and Finland talc is less expensive than kaolin as well as carbonate. This segment is a typical commodity business. Both countries, however, show a different situation. The price of talc is lower in France — the absolute values for talc differ sometimes by more than 30%.

The future for talc as a filler is uncertain. Some actual changes in Finland show the sensitivity of this market, where important parts of talc have been substituted by carbonate. Additional modifications in quality definitions of copying-paper eliminated most of the talc immediately. The most optimistic outlook would be a stagnating market.

Quite different are the expectations for talc as a pigment. Finland was the pioneer for the use of talc for lightweight coated papers. The advantages are printability, smoothness, and good coverage. Many problems occurred at the beginning with talc, concerning:

- * dispersion of the pigment
- * solid content and stability of the slurry
- * rheological adaption to the coater
- * properties of the coated paper

Most of these, however, seem to have been solved and considerable tonnage is being used in Finland. Prices have to meet competitive minerals and are about £130 pds/tonne.

Compared with other paper pigments the approximately 80,000 tpa of coating talc in Europe are insignificant; but they are an important start for talc. The big question for talc remains whether the technical and logistical problems can be overcome, the price limits of the competitive minerals can be kept up, and whether or not technical benefits are convincing. Only then can its use as a coating pigment be increased and extended and successfully break through from a local to an international pigment.

Talc in roofing felts

A turnaround in technology has been caused by the classical function of talc as a material with:

- * hydrophobic properties
- * good anticaking properties
- * platy structure

Roofing felts are an old and traditional market segment for talc. Talc is used on the top surface and as a backing material with various functions:

- * protection against UV-rays
- * weight adding, to lower price per m²
- * prevention of oil penetration (migration)
- * increased fire resistance

According to the old European application technique in surface and underground engineering for asphalt roofings as multiply-built-up-roofing (BUR), 3-5 layers are built up to reach impermeability on roofs and in underground constructions. The first and upper sheet of roofs have normally a coarse grade of a platy mineral (dust free granules up to 3mm) for better protection at the top surface. This can be talc, but nowadays natural and coloured slate (Europe: approximately 100,000 tpa) is more frequently in use and gives an attractive product. For the inside layers of the BUR-system and mineral backing of top-sheets standard talc grades (325 mesh up to 0.5mm) are employed. Owing to economic reasons mixtures of talc with sand, sand alone, or local limestones are used as well.

Producers for coarse talc granules, which is a real speciality talc product, are mainly located in Austria, Sweden, and Norway. Standard grades with very low brightness are produced by most of the talc producers and prices are very low. Whereas coarse granular talc is in the range £65-150/tonne, standard grades are in the £25-50 range.

Estimated production of coarse talc granules for roofing felt-application in Western Europe:

| | |
|---------|------------------|
| Austria | 22-25,000 tonnes |
| Sweden | 7- 8,000 tonnes |
| Italy | 2- 3,000 tonnes |
| Norway | 2- 4,000 tonnes |

Estimated consumption of talc in roofing felt-production in some important European countries:

| | |
|---------------|---------------|
| West Germany | 11,000 tonnes |
| Italy | 6,000 tonnes |
| Benelux | 5,000 tonnes |
| Great Britain | 5,000 tonnes |
| Austria | 3,500 tonnes |
| Switzerland | 2,500 tonnes |

Czechoslovakian talc is used at national production levels and East Germany, Bulgaria, and Rumania are self-supporting. Yugoslavia has its own low grade talc and red slate. Total talc production in these countries for roofing-felts is about 35-40,000 tpa.

Technology transfer of European asphalt roofing producers to north Africa and the Near East has led to new roofing-felt-production in these countries and talc outlets for European talc.

New trends to single-ply systems — one thicker layer (-5mm) with higher mechanical and chemical resistance (APP or SBS-modified bitumen) has led to lower demand in backing minerals. In addition, a tendency to polyolefin-films as anti-sticking layers can be seen all over Europe.

Similar developments seem to be in the USA where talc and mica had an important role in the past. Sand and other local minerals became important competitors. Nowadays, talc consumption is estimated at 80-100,000 tpa. Polymer single-ply systems (rubber, EPDM, PVC etc.) are increasing very rapidly, where backing minerals have been excluded. In EPDM sheets only can we see an important outlet for surface-treated talc, more or less a chemically linked, reinforcing filler.

The future of talc in Europe? This is another segment, where stagnation of demand should be expected in future.

Talc in ceramics the versatile raw material with a future

The mineralogical composition of the various forms of talc determines its use. For ceramicists "talc" is a pure magnesium-silicate, suitable for electroceramic industry and glazes. These applications call for high purity (low iron content). Because of the technology used in electroceramics manufacture (high speed moulding) talc with a lamellar structure — a typical property which is advantageous in most other talc applications — should be avoided. For this purpose only non-lamellar, compact talc (steatite), free from chlorite, can be used. Europe is very poor in these qualities (eg. Spain, W. Germany). The greater part has to be imported from Australia, USA, and China. Estimated consumption in Eastern and Western Europe is 15,000 tpa.

Comecon's consumption (without USSR) for electroceramics is about 50%. Apart from the imports of Australian and German talc, direct imports from China have been established for decades. Quite different is the traditional refractories segment. The talc modification, chlorite, where the Mg-ion is substituted by the Al-ion, shows important advantages in this application: as a tri-functional mineral (Mg-Al-silicate) it is a raw material for cordieritic formulations with technical advantages and high cost performance.

The consumption rate of cordierite refractories has been dwindling for years — the tunnel-kiln technology changed the scene. Italy, for example, one of the most important European producers consumed more than 10,000 tonnes in 1979. The typical demand dropped down to 30-40%, and there are no prospects of a turnaround.

The very special chlorite-talc mainly comes from Austria and France, with exports all over the world. Typical FOB-values are £60-80/tonne.

Another new and favoured market is earthenware, where formulations with chlorite-talc promote the following properties:

- * uniform dilation
- * facilitates fast firing
- * good adhesion between glaze and body.

Talcs from France and Austria are well known in this market segment. Iron content should be moderate (<2%), prices are low at £40-60/tonne, and this segment shows real optimism for talc-suppliers.

A more recent development for talc can be observed in vitrified bodies (floor tiles and sanitary-ware). Advantages can be derived from talc in:

- * a single firing process
- * lower porosity
- * increased mechanical and thermal resistance

A few ceramic plants have been using talc for years, some have followed recently, but many others are watching the trend. Typical consumption in Europe is estimated at 25,000 tpa. Each type of talc can find space in this large market segment. Talc must be cheap and local availability will determine the scene. Price levels are and will be low at £30–45/tonne in order to compete with other minerals (eg. fluorspar, etc). The potential market in Western Europe should be more than 100,000 tpa.

Animal feedstuffs – the target for dark talc

The occurrence of dark talc is widespread in Europe, but apart from the traditional markets like ceramics and bitumenous segments, consumption has declined during the last decade. However, the advent of the animal feedstuffs market has gone some way to restoring the demand for dark talc.

Late in the 1970s Talcs de Luzenac pioneered the application of talc in animal feed. Free flowing properties should be increased by talc addition. Other products like dolomite and diatomite have been used as well. The increased use of oils in some feeds (cattle, calf, pig) has created the growing use of talc on the surface of pellets to facilitate handling.

Countries such as France, Benelux, Germany are the most important producers of these pellets. Talc shows the best advantage, where raw materials such as soya, tapioca, and manioc are the main components, besides molasses and fat. Areas with a dominant content of cereals in feed formulations fail to show the same talc potential.

At present some talc producers can offer suitable grades. After some years this business has attained commodity status and meets with strong competition. Prices started at £175/tonne and dropped to £60–90/tonne.

Raw material importers and soya-mills found talc properties interesting as well and now constitute an important segment. Increasing demand seems to be predictable. Total European talc market for animal feedstuff and raw materials is estimated at approximately 56,000 tonnes. Major consuming countries are:

| | |
|---------|---------------|
| Benelux | 22,000 tonnes |
| Germany | 18,000 tonnes |
| France | 7,000 tonnes |
| Spain | 5,000 tonnes |

The penetration of the market has not yet been terminated. An additional potential of a further 20–40,000 tonnes seems to be realistic.

Paints – bring colour to the game

Paints and varnishes represent an important outlet for talc. Total talc consumption is estimated at 130,000 tonnes in Western Europe and 8–10,000 tonnes in Comecon countries excluding the USSR. This industry is not uniform throughout Europe. The formulations and the odds given are quite different. Local availability of alternative minerals provides varying competition.

Estimated talc consumption in paint 1986 (tonnes)

| | |
|--------------|--------|
| West Germany | 45,000 |
| Italy | 18,000 |
| Scandinavia | 18,000 |
| France | 13,000 |
| UK | 12,000 |
| Benelux | 9,000 |

Talc is used in many segments, but remarkable tonnage is absorbed only by the emulsion and anti-corrosive paints sectors. Most talc producers can offer special grades for these applications. Whereas in emulsion paints, 325–mesh to 20 micron white talc accounts for the major part of the market, in anti-corrosive systems micronised grades, with low carbonate content, are preferred. The automotive industry is a very sensitive segment where high quality ground talc is indispensable.

The better the knowledge of how to formulate with talc the greater the advantage of micronised talc can be derived. The trend to finest types – top cut lower than 15 microns – is significant. Here only a few suppliers can compete in quality and price.

The competition for the commodity paint business, itself characterised by overcapacity due to the declining building industry, is due to excessive supply in minerals. The over capacity in standard ground talc is aggravating the situation.

Polyester-putties is a special segment of this market. These are made in Europe mainly by the paint producers and represent a big outlet for talc. Special properties of talc are required. Mineralogical composition and particle size distribution at low price levels are the important parameters.

The total market is estimated at 25–28,000 tonnes with emphasis in:

| | |
|--------------|--------------|
| UK | 7,500 tonnes |
| Italy | 7,000 tonnes |
| West Germany | 6,000 tonnes |

Polymers – the future linked with polypropylene

The platy structure of talc is used for its reinforcing properties. Many applications are known in rubber, phenolics, polyethylene, polypropylene, PVC, polyamide, and polyurethanes. The dominant segment is polypropylene, where talc imparts high temperature creep resistance and stiffness. Only a small percentage of polypropylene, is filled with minerals now. Talc filled polypropylene accounts only for 3–5%. In Comecon countries mineral-filled PP is quite new (eg. East Germany).

The greater part of the compound is black or grey (70–80%). Talc is added in masterbatches up to 75% and in compounds up to 40%. For engineering applications predominantly dark talc is used, and is a cheap filler material. The major consumer is the automotive industry for exterior and interior applications. In interior plastics talc and calcium carbonate are used in conjunction.

Early manufacturers of talc-filled polypropylene were restricted to particular grades of talc – abrasiveness and heavy metal contents had to be controlled. But nowadays, owing to stabilising systems and the durability of compounding machines most types of talc can now be applied. Prices are sometimes low, and differ widely from one country to another. As a typical example:

| | |
|-------------------------------|---------------|
| Italy | £35–70/tonne |
| West Germany, Benelux, France | £75–150/tonne |

A general movement to using higher quantities of plastics has become apparent in the automotive industry. Compound producers will have to meet with specific requirements, where the functional fillers can achieve the desired properties. Talc, mica, carbonates and other specialities, such as wollastonite, are expected to be of vital importance.

White compounds are used for garden furniture and domestic appliances, such as housings for washers, dryers, etc. The garden furniture market is particularly important, where talc is used alone as a filler or in conjunction with calcium carbonate.

White talc consumption in Europe is about 15–20,000 tonnes. Europe seems not to have enough resources in white talc. Important quantities of white talc have been imported for years from

China, India, Korea, and Australia — an essential proportion went to the plastics industry. Talc consumption has had a tremendous growth during the last ten years. Nowadays, consumption of talc in polypropylene is estimated at 65–70,000 tpa. A further growth of 7–10% per annum can be predicted.

Estimated 1986 talc consumption

| | <i>estimated tpa</i> |
|--------------|----------------------|
| Italy | 18,000 |
| West Germany | 12,000 |
| France | 11,000 |
| UK | 9,000 |
| Benelux | 3,000 |

Talc filled polypropylene does, however, have a great disadvantage: impact strengths are generally low and the scratch-resistance is also low. Quite new developments in the surface treatment of calcined talc show encouraging results in solving these weak parameters.

The use of talc in nylon did not bring desired results; at this segment surface-treated calcined clays and wollastonite met the requirements. EPDM, an important outlet for talc in the USA for various applications, does not show the same trend in Europe. A new surface treated talc for this very special segment exists.

Established applications in rubber, where talc is used as an anti-sticking agent, are declining. Europe's total demand is not higher than 6,000 tonnes, western Comecon countries included.

The polymer segment, especially thermoplastics, has become an important outlet for talc. The future will depend on the growth of the automotive industry and the creativity of talc producers. They are bound to increase their efforts in developing surface treated types, which are able to play an active part in polymers instead of being only an inert filler.

Competition within talc sources exists, but strong competition from other minerals also prevails.

Pharmaceutical and cosmetic markets — only the best is good enough

The brightest and purest qualities are used in these segments. For cosmetic applications, talc has the lion's share of all the industrial minerals. The main talc properties — softness, high absorption values, platy structure, and lubrication — are responsible for its popularity.

Being aware of the health and safety aspects, especially in connection with any possible associated asbestiform minerals, the cosmetics industry set up terms and regulations. Professional cosmetic bodies such as UK's CTPA and USA's CTFA have devised standards for talc which have become accepted all over the world. The CTPA standard 1977 gives an excellent definition for cosmetic talc: “. . . must be carefully distinguished from

material commonly or traditionally known as talc in other industries, which may contain high levels of minerals other than talc . . .”. Only a few talc grades can meet these specifications. Perhaps the most well known cosmetic talc grades come from Italy (Pinerolo) and Australia.

The major use for talc in cosmetics is body dusting powders. Total consumption in Europe is estimated at 25–30,000 tonnes. The UK shows the highest consumption rate at 15–16,000 tpa.

Similar high regulations are demanded for pharmaceutical applications, where quality is described in the European and British Pharmacopoeia. In addition to high purity, the industry calls for decontamination. Only a few talc suppliers are prepared for these speciality features and can offer grades with a content of less than the required standard of 100 organisms. The trend in demand shows that decontaminated talc will be the only accepted grade in future. The total European market for pharmaceutical grades is not more than 3–5,000 tpa but from the added value point of view it's an interesting segment.

Fertilisers — talc versus clay

Talc has been used as an anti-caking agent in fertilisers for many years in Sweden. Particularly in NPK formulations, where amine-components are added. In addition, with the possibility of utilising talc as such, amine-treated types are available as well. Some fertiliser plants have switched over to talc but a great many are sticking on clays or diatomaceous earth.

European talc consumption in this market segment is estimated at 35–40,000 tonnes in 1986, where Sweden (15,000), Holland (10,000), and the UK (11,000) are the main users.

Local availability is essential to meet with the competitive prices. Security in supply is another part of this game with a big mineral consuming industry.

Miscellaneous applications

Many other market segments exist such as the cable industry, welding rods, pencils, fire extinguishers, carriers for insecticides, food, etc. These markets usually have only local importance with small tonnages. But ultimately some thousand tonnes of talc for such uses can be found in Europe.

Other new trends

Besides the advanced talc applications in paper, ceramics, and plastics, some other new investigations are observed. Talc is a hydrophobic, platy material: other applications can be derived from these fundamental properties. Trials in oil-extraction and related processes indicate some possibilities. Surface treatment is only at the beginning and many other and quite new applications could be found with these grades of functional fillers. A trend to micronised talc is evident, but the consumption of larger tonnages will remain in standard talc ■

professional

a

d ● market strategy

v ● market research

i ● sales survey

c for industrial minerals & chemicals

e

schober

dr. wilhelm

a - 8 0 4 5 g r a z

nepomukgasse 21

a u s t r i a

a

s

s

i

s

t

a

n

c

e

tel: (316) 66 6 72 • tlx: 116443 box a (telebox: schoconsult)