4 The relevant markets and the effects of the merger

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Introduction

4.1. In this chapter, we consider the product and geographic markets that are relevant to the merger between Alanod and Ano-Coil (the UK subsidiary of Metalloxyd GmbH: see Chapter 3). As explained in the previous chapter, the merger was completed in March 1999, but for the purposes of our analysis we treat the two main parties here as independent corporate entities, and distinguish as necessary between the pre- and post-merger market circumstances.

4.2. We start by describing the main products of both main parties (anodized aluminium coil/strip material), the production processes involved, what the material is used for and potential substitutes, who produces it and how it is distributed to downstream users. A technical assessment which we commissioned from outside consultants (W S Atkins) forms an important part of our evaluation of these matters, and is included in full at Appendix 4.3.

4.3. We then set out data on the size of UK and wider geographic markets, on suppliers' market shares, and on the pricing of anodized aluminium products. The chapter ends with a consideration of competition in these markets prior to the merger, and an assessment of conditions of entry.

4.4. A financial appraisal of the main parties is given in Chapter 3, together with details of the background to the merger, the terms of the merger arrangement, and the claimed efficiency benefits. The views of third parties are summarized in Chapter 5, and those of the main parties in Chapter 6.

Anodized aluminium products

4.5. Both main parties produce and supply a range of surface-treated (anodized) aluminium coil and strip products, including both highly reflective grades (with a mirror-like or specular finish; see glossary, Appendix 4.1 and Appendix 4.3) and various products with less reflective, ridged and matt finishes. By far the most significant use of this material is in the manufacture of reflective louvres and reflectors for use in luminaires (light fittings; see paragraphs 4.25 to 4.29). It is therefore an intermediate or semi-manufactured product and is typically supplied to downstream manufacturers either in coil form (up to 1,250 mm in width and 3 tonnes by weight, but more usually in narrower slit coil) or as flat sheets cut to size: the downstream manufacturers/customers specify order volumes and coil/sheet sizes to meet their own requirements.

4.6. Different grades of anodized aluminium offer different combinations of physical properties, including most particularly the nature and extent of light reflectivity, diffusion characteristics, surface hardness and the degree of iridescence (colouring effect; see Appendix 4.3). Specular grades of this material typically reflect between 84 and 87 per cent of light and offer a controlled level of iridescence. While there are no UK or EC standards for different grades, suppliers specify the various properties of each of their products in their sales literature. Although different suppliers often offer similar or at least broadly comparable products, they each use their own product coding systems: the main anodized materials available from suppliers to the UK market are given in Appendix 4.1.

4.7. As regards very highly specular products, Alanod supplies a product range called MIRO which offers 95 per cent reflectance and no iridescence. This is produced by a vacuum deposition process using anodized aluminium as a substrate (see paragraphs 4.13 to 4.16) and is more expensive than the nearest equivalent, conventionally anodized grades. The only other aluminium-based product available which offers greater than 84 to 87 per cent reflectance properties is SATMA's HELIA product, which achieves 92 per cent reflectance (though there were no sales of this product range in the UK in 1998).

4.8. In summary, the main commercially useful properties of these anodized aluminium materials—particularly those for use as luminaire louvres—are as follows (properties of substitute materials are considered in paragraphs 4.39 to 4.49):

(a) high reflectance of light, and low glare and iridescence;

(b) durability of surface finish due to the resistance to corrosion; and that they can be readily cleaned without damaging the surface (untreated aluminium dulls and corrodes over time, and cannot easily be cleaned); and

(c) good formability: they can be cut relatively easily and shaped (ie post-formed) without damaging the reflective surface.

Manufacture and processing

4.9. The anodized aluminium production process is described in detail in Appendix 4.2. In summary, the process starts with a large coil (typically 3 to 7 tonnes in the case of Ano-Coil's UK plant) of raw (non-anodized) aluminium strip, which is usually about 0.3 to 0.8 mm in thickness (gauge) and up to 1,250 mm in width. The coil is loaded on to the production line and the strip is then fed along the line by a series of rollers and undergoes a number of automated processes. The strip is first chemically cleaned/degreased and then dried. It subsequently enters a 'brightening' bath, which is an electrochemical process that enhances the reflectiveness of the raw aluminium (to 84–87 per cent) by reducing surface imperfections. After further cleaning/drying, the strip passes through an anodizing bath (again an electrochemical process) which creates a thin hard film of transparent oxide (normally 1 to 2 microns thick), which serves to protect the aluminium substrate from atmospheric oxidization. This porous film is then sealed and dried before the anodized strip is recoiled and unloaded from the main production line.

4.10. Secondary processing involves cutting (or slitting) the anodized coils to the order requirements of downstream customers, applying protective plastic film to the surface, and packaging the material ready for dispatch.

4.11. The anodizing production line itself is often 150 to 200 metres in length and is fully automated, using computer-controlled equipment to monitor the processes and to vary the processing parameters (speed of line, electric current applied and amount/type of chemicals used) which determine the final product properties. Aside from downtime for repairs and maintenance, the line is operated continuously 24 hours a day. A separate plant is also required for the treatment and recycling of chemical wastes.

4.12. Overall, conventional anodized aluminium production facilities are capital intensive. In the case of Ano-Coil's UK facility—the only such plant in the UK, which has a throughput capacity of around [✄] tonnes a year—the total capital cost was £8 million in 1992, of which £1 million was accounted for by the waste treatment plant. Average variable costs are dominated by the cost of the raw aluminium used, which accounts for nearly [✄] per cent of the total, as explained in more detail in paragraph 4.78.

4.13. Vacuum deposition technology, as used for the production of MIRO, is also capital intensive. Alanod operates the only two continuous operation facilities in the world (see Appendices 4.2 and 4.3). Both of its production lines (with a total capacity of about [✄] tonnes a year) were developed in conjunction with and built by Von Ardenne (see paragraphs 4.98 and 4.99), a German-based company which has no ownership links with Alanod.

4.14. The current MIRO process and products use anodized aluminium as a substrate. Alanod told us that it was developing a new product (MIRO L) which would use a cheaper aluminium substrate (or possibly steel or plastic), but that this material was not as yet commercially available.

4.15. As regards anodizing plant throughput capacity, this is dependent largely on the width of material processed and the speed of line (metres per minute), as well as the gauge of material and product grade. Older, conventional anodizing plant, handling a coil width of 600 mm or so, typically had a capacity of around 3,000 tonnes a year. In contrast, Ano-Coil's UK facility (built in 1992) handles a coil width of 1,250 mm, and has a capacity of around [✄] tonnes a year. These capacity figures are only approximate, however, since using thinner gauge material (for example, 0.4 mm rather than 0.5 mm) would result in a lower tonnage output for any given rate of operation. Similarly, the higher specular grades require the line to be operated at a lower speed, implying a lower tonnage throughput for a given duration of operation. Cost efficiency, we were told, is achieved at relatively high rates of capacity utilization, though how that is measured is obviously dependent on the gauge of material used and the specularity of the grades produced.

4.16. Similar considerations apply to Alanod's MIRO production plant. Its first plant, installed in 1994/95, has a design capacity of around [✄] tonnes a year, while its second is capable of producing [✄]. We note that Alanod's expected sales of MIRO of up to [✄] tonnes this year imply an overall rate of capacity utilization of about [✄] per cent.

Suppliers

4.17. There are currently six separate producers that supply to the UK lighting market the anodized aluminium material described above. The only other producer that we are aware of, ANOFOL SRL, (ANOFOL; see below) operates predominantly in the Italian market. These suppliers, their output capacities and product ranges are briefly described below (distribution arrangements are considered separately in paragraphs 4.18 to 4.24), starting with the two main parties to the merger:

(a) *Alanod* (based in Germany, privately owned). Alanod operates three conventional anodizing lines, with a total capacity of around [✄] tonnes a year, and also has two MIRO production lines, with a total capacity of [✄] tonnes (see paragraph 4.16). It sells worldwide a full product range of anodized aluminium, including specular, semi-specular and highly specular grades (including MIRO), matt and patterned finishes. Pre-merger, it was by far the largest supplier in the German market (and is now even larger); and it is the largest producer of this material in the EC. Thorn told us that Alanod was probably the most innovative of the suppliers to the UK (albeit followed closely by Ano-Coil), in terms of developing new product grades.

(b) *Ano-Coil* (UK-based)/*Metalloxyd GmbH* (German parent, family-owned). Pre-merger, Ano-Coil's UK capacity was around [✄] tonnes a year at Milton Keynes, plus [✄]

tonnes at Bletchley (the latter was closed following the merger; see Chapter 3). Metalloxyd GmbH's German capacity was [✄] tonnes a year, but its two lines there were closed down at the end of 1998, as part of its restructuring strategy. Pre-merger, the Metalloxyd group was a full-range supplier, though it did not have a MIRO-equivalent product); it sold worldwide; and it was also the largest supplier in the UK market in 1998 (see paragraph 4.60).

(c) *SACALL* (based in Italy, family-owned). Its current output capacity is around 6,000 tonnes a year, though we were told (by Thyssen and SACALL) that SACALL was considering the installation of a new line in the next year or so to increase its effective capacity to about 9,000 tonnes. In 1998, SACALL was the third largest supplier in the UK market of specular grade material (see Table 4.1), but sold to only a single customer here (Interlux, a louvre manufacturer). SACALL told us that its product range covered 90 to 95 per cent of Alanod's, essentially everything except MIRO. Alanod told us that SACALL was an aggressive competitor on price, [*Details omitted. See note on page iv.*]. Thorn told us that SACALL was not as innovative as either of the main parties; it could not offer a comprehensive product range; and did not have a MIRO-equivalent product.

(d) *SATMA* (based in France, a subsidiary of the state-owned Pechiney group). Alanod told us that SATMA had a capacity of around 3,000 tonnes a year of product suitable for the lighting sector (though SATMA told us that it was far higher), and that it was a full range supplier, albeit that it did not have a MIRO-equivalent product. Thorn told us, however, that SATMA's reputation for product quality was not of the highest, adding that SATMA was not able to supply the full range of specular grade material which Thorn used in its louvre/luminaire products. It does, however, offer a product range called HELIA, a conventionally anodized material produced under specially controlled conditions, which achieves about 92 per cent specular reflectance (as compared with 95 per cent for MIRO). Cashmores, SATMA's UK distributor, informed us, however, that it had made no sales of HELIA in the UK in 1998, in part because it was about twice as costly as the nearest equivalent grade of specular aluminium. Thyssen told us that it did not consider SATMA to be a serious competitor in the UK market.

(e) *Lorin* (based in the USA, a publicly-quoted company). Lorin is believed to be the largest manufacturer of coil anodized aluminium in the world, with a total capacity of around 40,000 tonnes a year. Alanod told us that only about 30 per cent of this is currently used for supplying the lighting industry, though it believed that more capacity could be switched to producing material for lighting applications if it became attractive to do so. Moreover, Lorin has no EC-based production plant, and does not produce significant quantities of the highly specular grades. As with ACA (see below), when it buys raw material in the USA it faces a 7.5 per cent import tariff on products made from these supplies which are shipped over to EC markets. For the specular grade end-products, it sources its raw material from EC producers. When it ships the finished products made from this material to the EC, it pays the 7.5 per cent tariff only on the difference between the purchase price of the raw material and the landed price of the finished product (an effective tariff of about 3.5 to 4.0 per cent)

(f) *ACA* (based in the USA, a publicly-quoted company). Thorn told us that ACA offered a similar range of product grades to those of Lorin and faced the same difficulties in supplying the UK and EC markets. ACA declined to offer any evidence to us, or give its views on the merger.

(g) *ANOFOL* (based in Italy). Alanod told us that ANOFOL accounted for about 35 per cent of the Italian market for lighting grade anodized aluminium, but that it does not currently supply to the UK market. ANOFOL was previously linked to Metalloxyd via a common shareholder, though Alanod said that it believed this was no longer the case. Metalloxyd, however, continues to own the ANOFOL trademark.

Distribution

4.18. In this sector, distribution functions include (wholly or partly, depending on supplier/distributor arrangements):

(a) price determination and individual customer negotiations;

(b) stockholding, marketing and sales administration;

(c) cutting/slitting wide coil to individual customer requirements;

(d) applying protective plastic film and packaging ready for dispatch;

(e) delivery of the product to customers; and

(f) some elements of technical and customer support (though the producers of the anodized aluminium usually undertake most of the more detailed technical support).

4.19. Ano-Coil undertook all of these functions itself for sales in the UK market prior to the merger, in part from its two production facilities but also from a service centre in the West Midlands at Aldridge. Some of its sales outside the EC were handled through its own subsidiaries (for example, in Hong Kong, South Africa and Australia) and exclusive agents (for example, in India). Sales and service to EC markets other than the UK and to North and South America were all handled through Metalloxyd GmbH and its service centre in Cologne, Germany.

4.20. Alanod, on the other hand, operated in the UK until 31 July 1999 primarily through Thyssen, with which it had a long-established exclusive supply agreement, whereby Thyssen acted as a principal. That is, Thyssen purchased all of its anodized aluminium supplies from Alanod; resold them to customers in the UK; and carried out all the functions listed above, though Alanod also provided technical support. As permitted by the agreement, Alanod sold direct to two UK end-users, Jordan (which has ownership links with Alanod—see Chapter 3) and LCL. Outside the UK, Alanod sold either direct or through its own exclusive agents.

4.21. Alanod told us that a significant part of its rationale for the takeover of Ano-Coil had been that it had become dissatisfied with Thyssen in recent years (because of disagreements over Thyssen's profit margins); that it therefore wished to terminate the distribution agreement; and that it viewed the takeover as a means of securing distribution in the UK for Alanod products. Thyssen confirmed to us that there had been disagreements over various matters, and that Thyssen had expressed concern to Alanod about:

(a) its staff contacting Thyssen's customers directly and unilaterally amending their price terms (for example, by offering consignment stocks, easy credit terms etc). In response, Alanod commented that it had contacted customers, but only with the co-operation of Thyssen; and that where Alanod contacted customers (other than Jordan and LCL) without Thyssen, this was only because Thyssen did not have the necessary staff to deal with that customer, and even then it had consulted with Thyssen;

(b) what Thyssen saw as Alanod's mismanagement of the price negotiations with Thorn, concerning its pan-European price tender (which resulted in Thyssen losing the business of its largest single customer);

(c) Thyssen's profit margins or mark-ups [*Details omitted. See note on page iv.*]; and

(d) Alanod structuring the prices it charged to Thyssen for slit coil relative to unslit coil, which resulted in different prices being charged for the same material to different customers. In response, Alanod commented that the price differentials charged merely reflected the cost of slitting and scrap; and that about three-quarters of the material supplied to Thyssen was unslit.

4.22. Thyssen also told us that when Alanod had first indicated that it wished to terminate the distribution agreement in late 1998, Alanod had made it clear that it wished to do so because it was planning to take over Ano-Coil; and that following the merger, a continuing distribution relationship with Thyssen would be inappropriate.

4.23. In the event, the agreement was formally terminated at the end of July 1999, by which time Thyssen had agreed with SACALL to become its exclusive distributor in the UK. [*Details omitted. See note on page iv.*] By the beginning of November, however, it had secured only a limited volume of sales, though some customers had taken small amounts for product testing purposes.

4.24. As regards other suppliers, SACALL had in the past sold direct to its single customer in the UK, but as from August 1999, Thyssen has become its UK distributor, acting as a principal. SATMA sells through Cashmores (a metals stockholder), which also acts as a principal. Both Lorin and ACA, on the other hand, each have their own subsidiaries in the UK, which undertake sales of their respective products to the UK lighting sector.

Demand and usage applications

4.25. By far the major use of this material is the manufacture of light-fitting reflectors, and particularly reflective louvres (other uses include a variety of decorative applications, for example parts of sports trophies). These are typically curved strips of specular material fitted into a luminaire (commonly a 600 mm by 600 mm unit, either ceiling-recessed or surface-mounted, using 4×18W standard 25 mm diameter fluorescent tubes as the lighting source), which direct light downwards in a controlled manner. Thorn told us that demand for such lighting in both the UK and the wider EC market had grown substantially since the mid-1980s. In the 1990s, demand had been further driven by new building and health and safety regulations concerning VDU (computer screen) usage, mainly in offices, but also in retail outlets; and also in order to reduce energy consumption (see Appendix 4.3). As a result, the proportion of newly installed office/retail lighting (in both new and existing buildings) using categorized reflective louvres (see Appendix 4.3) has grown from about 25 per cent in 1989 to over 75 per cent now.

4.26. Typically, the specular grades of this material are used for the reflective louvres themselves, but these are also often used in combination with semi-specular, matt finish or ridged (the tannenbaum grade) sections for aesthetic/design reasons, and to 'soften' the lighting effect. According to Thyssen, the bulk of the market is in the lower and medium specular grades, because they offer reasonable lighting performance at lowest cost. Higher specular grades are nonetheless essential to achieve higher standards of light control, with minimal glare and iridescence, for example for Category 1 and 2 lighting (see Appendix 4.3).

4.27. At the very high-quality end, Alanod's MIRO products may be the preferred material, and may indeed be specified by the lighting designer/contractor in preference to conventional anodized aluminium. Alanod told us that it expected sales of MIRO to grow and that, as a result, the sales of highly specular aluminium would fall to zero; it added that the only UK lighting manufacturer still buying significant quantities of the highest specular grades was Thorn. We note, however, that MIRO products accounted for less than 5 per cent by tonnage in 1998 of the total UK sales of anodized aluminium material (including MIRO).

4.28. Thyssen told us that MIRO was relatively expensive and that notwithstanding its attractive physical properties, it was likely to remain a small part of the market, with its usage limited to the very high-performance, high-value luminaires.

4.29. With regard to aggregate sales (nearly £16 million in 1998 for all grades—see paragraph 4.58), we note that Ano-Coil's sales in the UK grew steadily throughout the mid to late 1990s, though they were slightly down by value in 1998. Sales by Alanod, on the other hand, fell sharply in 1995, rose again in 1996 and 1997, but then declined sharply (25 per cent by value) in 1998. Alanod commented that the two falls in sales were caused by currency fluctuations, and possibly also a deterioration in Thyssen's performance during 1998. Worldwide sales by value by Ano-Coil were fairly stable during the mid to late 1990s, except for the slump in Far Eastern markets in 1998 (see paragraph 4.54 and Chapter 3). Alanod, on the other hand, achieved an increase in every year from 1994 to 1998 (see Table 3.1).

4.30. As regards end-users of these materials (the customers of the material suppliers), they include both luminaire manufacturers which make their own louvres (such as Thorn, which fabricates almost all of its own) and specialist louvre manufacturers (which sell their products to luminaire manufacturers, usually under contract). The information given below is based on data on customers' sales by Alanod, Ano-Coil and SACALL: comparable information was not available from either Lorin or ACA.

4.31. Among the luminaire makers, significant users include Thorn, which accounted for around 21 per cent of UK demand by volume for these materials in 1998; Crompton (just over 7 per cent); and Fitzgerald Lighting Limited and Tamlite Lighting Limited (each accounting for about 3 per cent). Other smaller users of this material—each with 1 per cent or less of material usage—include Alight Holdings (Group) Ltd, F W Thorpe plc, Whitecroft plc, Kestron Units Ltd (now owned by Crompton), KAG

Luminaire Ltd, Dextra and Key (see also paragraphs 4.43 to 4.45). According to Alanod, luminaire manufacturers taken together account for around 70 per cent of the total UK sales of anodized aluminium material.

4.32. The specialist louvre producers together account for the remainder of total UK demand. Jordan (which has ownership links with Alanod—see paragraph 4.20 and Chapter 3) is the largest in terms of the volume of material usage; and accounts for nearly 8 per cent of the total. We note also that Jordan accounted for:

(a) some 24 per cent of Alanod's total sales by value in the UK in 1998; and

(b) about one-third of the total tonnage of MIRO used in the UK in 1998, ie nearly 50 tonnes, compared with Thorn's current use of less than [✂] tonnes, notwithstanding Thorn's greater size and overall demand for specular material: Thorn told us, however, that its use of MIRO was increasing because it was the preferred material for use with high-output light sources.

Jordan also bought small amounts of material from Ano-Coil ([✂] tonnes in 1998, equivalent to [✂] per cent of Jordan's total usage).

4.33. The next largest louvre maker in the UK is LCL, which accounted for around [✂] per cent of total material usage and [✂] per cent of Alanod's total sales by value in the UK in 1998. Both Jordan and LCL have long been supplied directly by Alanod, as specified exceptions under the distribution agreement with Thyssen (see paragraph 4.20). LCL also bought nearly [✂] tonnes of MIRO in 1998—about [✂] per cent of the total: LCL and Jordan taken together, therefore, accounted for nearly [✂] per cent of Alanod's total sales of MIRO in the UK. In the past, LCL sourced the major part of its anodized aluminium needs from Alanod. But in 1997 it bought the assets of Ano-Coil's louvre-making subsidiary (Metaprint), which had been making losses (see Chapter 3). Under the purchase arrangement, LCL agreed to take [✂] tonnes a year of material from Ano-Coil for a period of three years.

4.34. The third largest louvre maker is Interlux, which accounts for [✂] per cent or so of total material usage. Interlux (which is now in voluntary administration) had been Ano-Coil's largest customer in 1996, accounting for about 13 per cent by value of its total sales. But it then switched in 1997 to using SACALL material. [

Details omitted. See note on page iv.

]

It also told us that both Jordan and LCL operated in the medium- to high-quality end of the louvre market, while Interlux and Precision Louvre Company (Precision Louvre) (see below) were more in the low- to medium-quality sectors.

4.35. Precision Louvre is the fourth largest louvre maker, accounting for about 2 per cent of total material usage, and sources exclusively from Ano-Coil (other than for MIRO). These four louvre makers taken together (Jordan, LCL, Interlux and Precision Louvre) accounted for around 20 per cent of lighting aluminium used in the UK in 1998.

4.36. For the specialist louvre makers, the aluminium material used clearly constitutes a major part (about 75 per cent) of both their production costs and, therefore, their final product prices. Even for the luminaire makers, the cost of the aluminium used in the louvres represents a significant element of their total costs, though the proportion varies with the quality/grades of material used and value of the luminaire. Across [✂] full range of louvre-using luminaires, the aluminium used accounts, it told us, for about [✂] per cent of total ex-works cost. This is an average figure, however: for the higher-value luminaires it may be less, but for low-value luminaires it can be [✂] per cent.

4.37. On the question of louvre makers' willingness or ability to switch from one supplier of anodized aluminium material to another in response to price differentials (or other factors), Alanod suggested to us that dual or multi-sourcing was a feature of this market and that end-users readily switch to alternative suppliers in response to cheaper prices. Thorn, on the other hand, told us that because of the wide range of products it sells, its quality image and its 'bespoke trade' (which accounted for around [✂] per cent of its total sales), it faced significant costs in multi-sourcing and short-term switching between different suppliers. It nonetheless did decide to switch in 1996 from Alanod to Ano-Coil (see paragraph 4.77). Smaller louvre/luminaire makers—especially those using fewer grades and/or perhaps operating in the medium- and lower-quality market segments—may have greater flexibility with respect to switching between alternative suppliers. We note that Interlux switched from Ano-Coil to SACALL;

and that prior to the merger, both Tamlite Lighting Ltd and Fitzgerald Lighting Limited multi-sourced product from both Ano-Coil and Alanod (though part of this may have been in order to obtain MIRO products).

4.38. Against that, we note that Thorn phased in its switch-over from Alanod to Ano-Coil over a two-year period. We note also that factors other than price alone are likely to be important in louvre makers' choice of lighting aluminium supplier. For example, their reputation (and performance) for customer service and delivery is important, as is the provision of good and consistent product quality. Indeed, Lorin told us that customers in the lighting sector do not readily switch between suppliers of lighting sheet, because there is considerable supplier loyalty; and that switching generally occurs only when a supplier has consistently failed to perform to the customer's expectations. [*Details omitted. See note on page iv.*]

Substitutes for anodized aluminium

4.39. From the outset of this inquiry, Alanod has maintained to us that there are several alternative materials to anodized aluminium. That is, these other materials are close economic substitutes, which customers in the lighting sector are readily able to switch to using should relative prices change in their favour; and that these materials therefore provide an effective constraint on the pricing behaviour of the producers of reflective aluminium. As a result, we have sought information on these alternative materials from various sources (mainly end-users in the lighting sector); and a technical/commercial assessment was also provided in the report commissioned from outside consultants (see Appendix 4.3).

4.40. The alternative materials referred to by Alanod include raw (non-anodized) aluminium, coated or laminated steel or aluminium (with a reflective surface), coated plastic (with a reflective surface), and white painted material.

4.41. Raw (non-anodized) aluminium is perhaps the most obvious possible substitute, because *(a)* its cost (per unit weight for a given gauge or by equivalent surface area) can be up to 50 per cent less than that of the lower grades of specular anodized material; and *(b)* it has most of the same physical properties. Indeed, the substrate material used by anodizers such as Alanod and Ano-Coil is 'pre-brightened' and therefore reflective (85 per cent total reflectivity) in its non-anodized form. In addition, the fabricators of louvres/luminaires are in principle—and should they wish to do so—able to use their existing forming and processing equipment equally well with non-anodized as with anodized material. Alanod estimated that 750 to 800 tonnes a year of non-anodized aluminium was currently used in the UK for diffusion lighting (though Alanod added that it did not believe that raw aluminium was adequate for some of the applications for which it was being used). Indeed, both Alanod and Ano-Coil have supplied quantities of this material to the lighting sector in the past, though, as Alanod told us, the anodizers have a strong commercial incentive to dissuade end-users from taking non-anodized material, because it undermines their business in anodized products.

4.42. However, notwithstanding its apparent attractions as a cheaper alternative, raw aluminium appears to be a poor technical substitute for anodized material (as explained in Appendix 4.3), because:

(a) it has a soft surface which is easily damaged during the louvre manufacturing process;

(b) its natural oxide layer is 'milky' or discoloured;

(c) it tends to dull further in service, and may easily become marked (for example, when light sources are periodically changed); and

(d) the surface cannot easily or satisfactorily be cleaned.

4.43. As mentioned (but not quantified) in Appendix 4.3, raw aluminium is used in at least some cases for the manufacture of lighting louvres/reflectors. In order to gauge how widely and for what applications it was being used, we sought evidence directly from UK louvre and luminaire manufacturers. We asked them how much raw aluminium they use a year; whether that usage was increasing or decreasing; from whom they purchased it; and what was the price paid per kilo. Their responses indicated that at present the largest users of anodized material (see paragraph 4.31) and those operating in the higher-quality end of the luminaire market either do not also use raw aluminium for louvre manufacture or do not use it to any significant extent. But several others do so and these manufacturers generally indicated that usage was probably increasing. Total usage of raw aluminium appears on our data to have been around 500 to 550 tonnes in 1998, the greater part of which was accounted for by three particular end-users, namely Dextra, which used [✄] tonnes, Key (100 tonnes) and Interlux (40 tonnes).

4.44. Dextra (a luminaire manufacturer which makes almost all of its own louvres) told us that it used about [✄] tonnes of raw aluminium last year (specular grades, purchased from [*Details omitted. See note on page iv.*]); that this was likely to be substantially higher this year (possibly [✄] tonnes); and that it buys only limited amounts of anodized material (accounting for perhaps [✄] per cent of its louvre material requirements). It added that it did not consider raw aluminium to be a technically inferior substitute for anodized material; and that it had always preferred to use raw aluminium. Dextra sells mainly low- to medium-value luminaires, a large proportion of which are sold to electrical wholesalers, often using their own brand name and destined for refurbishment/short-term letting applications: the balance of its output goes to export markets.

4.45. Similarly, Key (a luminaire manufacturer) uses mainly raw aluminium, with anodized material accounting for only about 5 per cent of its total material usage. As with Dextra, it sells low- to medium-value lighting products, mostly to electrical wholesalers. End-users, it told us, include hospitals, factories, shops and contractors undertaking office refurbishment

4.46. The prices paid by users of raw aluminium appeared mainly to be about £2.50 to £3.00 per kilo, compared with £5.50 per kilo for anodized material. This would suggest that the value of sales of raw aluminium for lighting applications was around £1.5 million in 1998; this year it might be nearer £1.9 million.

4.47. As regards alternative reflective materials using steel (or aluminium) as a substrate, these typically use a plastic film, which is first coated (using a vacuum deposition process) with a suitably reflective material (silver or aluminium); and then laminated on to the substrate. The total reflectivity of this material can be as high as 95 per cent, with no iridescence. However, the resultant product is more expensive than specular anodized aluminium; steel products are more difficult to handle safely; and the combination of quality and durability is less attractive to the UK lighting sector than for anodized aluminium products. None of the louvre/luminiare manufacturers listed in paragraphs 4.31 to 4.35 currently uses steel laminated products.

4.48. Plastic louvre-type products, we understand, are popular in the US market (see Appendix 4.3), though their design and application differ markedly from the types of aluminium louvre used in the UK and the wider EC lighting markets. That is, the US-style plastic 'louvre' is typically a single 'eggbox' moulding, which has been metallized to give a highly reflective surface, and which is suspended below the light source. The aluminium louvres used in the UK and other EC markets are designed to wrap around the light source, and thereby give (other things being equal) both a higher degree of light control and a higher standard of lighting. Thorn told us that it had considered using metallized plastic products—because of their potentially high reflectivity and low cost relative to anodized aluminium—but had found the material unsatisfactory for the types of louvre design used in its luminaire products; and we are not aware of any other UK louvre maker which uses metallized plastic.

4.49. Alanod also cited white coated materials as economic substitutes to anodized aluminium. Such materials undoubtedly offer high total reflectivity, but also high diffusion, with the effect that the degree of light control is inherently limited. Whatever the substrate used or the material cost involved, these materials cannot offer the same lighting performance as specular anodized aluminium.

Market definition

4.50. In considering the likely effects of the merger, we have sought to identify the relevant product and geographic market (or markets) where the two main parties operate, and where competition might be affected. In general terms, the relevant market is usually defined as comprising that group of products for which there are no close economic substitutes (actual or perceived) on either the demand side or on the supply side. This substitutability test is usually construed in terms of the most narrowly defined group of products for which a hypothetical monopoly supplier would be able to raise its prices materially and for a reasonable time period, without suffering a reduction in profitability due to lower sales. We have also considered both the geographic scope of the relevant product markets, and in particular, whether the market is limited to the UK or the EC, or whether indeed it is effectively worldwide in operation.

4.51. Our natural starting point has been to consider anodized aluminium coil/strip, since both main parties are specialized producers of this material, and the downstream manufacturing applications for which it is used. As explained earlier, although this material is used for a variety of purposes, by far the major application is in the manufacture of louvres and luminaires. But most suppliers offer 20 or more different product types or grades of anodized aluminium (all or most of which are used by the lighting sector), each with its own specified properties (surface finish, reflectance, diffusion characteristics, iridescence etc). Where product types or grades offer similar properties, they are likely to be direct substitutes on the demand side, in that they are both technical and economic alternatives for a given application. Indeed, Alanod told us that in recent years demand had shifted from the higher specular grades to the medium and lower specular grades.

4.52. But some of the different finishes available—matt, ridged and reflective, for example—may not be direct substitutes in this sense, and are more likely to be used in different ways (and sometimes together as complementary materials). However, as in the case of Ano-Coil's product range, they are all capable of being produced on the same production line (using different parameter settings and/or grades of raw material substrate), and may therefore be regarded as close economic substitutes on the supply side. That is, existing producers of anodized material are generally able to switch production from one grade to another in response to market signals, whether these be changes in the pattern of demand for different grades or shifts in relative prices between different grades.

4.53. We considered also the extent to which Alanod's vacuum deposition (MIRO) products can be regarded as substitutes on the demand side for conventional anodized lighting sheet (accepting that MIRO products cannot be made on the same production lines because of the different technology required). MIRO products offer especially high reflectance properties (95 per cent compared with 84 to 87 per cent for most other reflective types), and may as a result be the preferred material for certain types of lighting (for use in up-market luminaires and/or with smaller tubes (16 mm) or higher-powered light sources). But for most uses, other types of anodized aluminium appear to provide an alternative to MIRO products. Nonetheless, Alanod maintained throughout our inquiry that MIRO was a quite different product to anodized aluminium and should not therefore be regarded as being in the same market (see also paragraph 4.27).

4.54. With regard to the question of relevant geographic markets, around 60 per cent of the anodized aluminium sold in the UK in 1998 was imported (see paragraph 4.59), mainly from other countries in the EC. Moreover, a significant proportion (75 to 80 per cent) of production in the UK (at Ano-Coil's two plants) was exported prior to the merger, much of it going initially to Ano-Coil's parent company in Germany (Metalloxyd GmbH) for onward sale; but significant quantities of exports from the UK were also made direct to the Far East and other world markets (for example, South Africa and Australia). (In this context, we note that 1998 was a bad year for Ano-Coil's exports to non-EC countries—the value of such exports fell some 40 per cent, from £13.4 million to £7.9 million. Alanod said that it was not able to break down these figures by individual market, but that most of the fall in sales had been in Far Eastern markets. We note also that demand in these markets has at least partially recovered in 1999: Alanod told us that demand was up by 10 to 15 per cent this year compared with last, albeit that this was still well below 1997 levels.)

4.55. At first sight, these circumstances might be taken as indicating that the relevant market is far wider than the UK alone; and might indeed, as Alanod also suggested to us, imply a worldwide market. But against that, the UK market appears to exhibit some distinctive characteristics. The demand for this material in the UK, for example, is closely linked to the demand for particular types of lighting and particular louvre/luminaire designs, which are themselves related to, and partly driven by, UK regulations concerning both health and safety at work and building/construction. Similar considerations apply in other EC markets, however: Alanod (and also SACALL) claimed that there was nothing particularly exceptional about the UK market, though Alanod said that the UK nonetheless accepts the use of raw aluminium for lighting applications, which is not the case in the other main EC markets.

4.56. More important is that, while material production may in some cases be overseas, most of the distribution functions (marketing, stockholding, slitting to size, physical delivery etc—see paragraph 4.18) are undertaken within the UK. This was confirmed by Alanod (which said that the UK market was very service oriented, and that suppliers must therefore be able to supply material in one, two or three days' time, which it was not readily able to do directly from Germany), and reflects the need for readily available, UK-based customer service and for just-in-time delivery (of appropriate material grades and sizes) to the UK-based louvre and luminaire manufacturers. As a consequence, all the suppliers of aluminium lighting sheet to the UK have established a presence here, either by appointing exclusive distributors (such as Thyssen and Cashmores) or by using their own UK-based agents/subsidiaries (such as with Lorin and ACA).

4.57. Moreover, this structure of distribution means that there are no independent wholesalers in either the UK or any other EC countries selling products from more than one anodized aluminium supplier (in contrast to the market for steel products, for example). As explained in paragraph 4.66, there is also a marked lack of price transparency in this market. It follows that there is limited scope for intra-brand price competition either within individual EC countries, or between the UK and other EC markets.

Sales and market shares

4.58. Sales of anodized aluminium (including MIRO) for louvres/luminaires have grown in both the UK and the EC as a whole throughout the 1990s, largely reflecting the expanding demand for appropriately controlled lighting in offices and retail outlets (see paragraph 4.25). Table 4.1 gives details of sales of this material in the UK in 1998. As shown in the table, the total value of sales for all grades was close to £16 million (approximately 3,250 tonnes, by volume), of which about 56 per cent by value or close to £9 million (approximately 1,500 tonnes by volume) was for the specular and highly specular grades (see paragraph 4.5), including vacuum deposition material (MIRO). We note Alanod's comment that for some grades of aluminium material the distinction between specular and non-specular is not always clear.

TABLE 4.1 **Sales of anodized aluminium* and suppliers' market shares in the UK in 1998**

	All grades		*Specular grades*	
	£m	*%*	*£m*	*%*
Alanod:†				
Direct	✄		✄	
Indirect‡				
Total	5.50	35.0	3.57	40.3
Ano-Coil	6.37	40.5	4.14	46.7
Total	11.87	75.4	7.71	86.9
Other suppliers:§				
SACALL	0.80	5.1	0.75	8.5
SATMA	0.06	0.4	0.06	0.7
Lorin	1.50	9.5	0.12	1.4
ACA¶	1.50	9.5	0.23	2.6
Total	3.86	24.6	1.16	13.1
Total¤	15.73	100	8.87	100
Tonnage#	3,250		1,500	

Source: CC based on information provided by suppliers.

*Including vacuum deposition material (MIRO range).

†We have taken the sales of specular material by Alanod and Ano-Coil to be 65 per cent by value of their sales of all grades, in accord with the information from Alanod. It has also been necessary to convert Alanod's sales from DMs into £ sterling: we have used an exchange rate of 2.91, this being the average rate for 1998 based on Bank of England data.

‡In 1998, these sales were entirely through Alanod's distributor at that time, Thyssen. That arrangement has now been terminated; see paragraphs 4.20 to 4.23.

§Sales by manufacturers include sales by their subsidiaries.

¶As estimated by the CC on the information available. ACA declined to confirm, deny or offer comment on these estimates.

¤Percentage figures may not sum to 100, because of rounding.

#Tonnage figures are approximate only.

4.59. Prior to the merger, Ano-Coil was the only domestic producer of anodized material for lighting use. All other supplies—accounting for nearly 60 per cent of the total for all grades—were imported, either from other parts of the EC (40 per cent of the total, mainly from Alanod in Germany) or from the USA (20 per cent). For specular grade material, about 47 per cent was nominally from domestic supply (Ano-Coil sourced particular grades from its German parent, Metalloxyd GmbH); around 50 per cent was imported from other parts of the EC; and less than 5 per cent came from the USA.

4.60. The market shares of the six suppliers to the UK market are also shown in Table 4.1. We have taken the value of sales as the appropriate basis for measuring market shares, largely because of the wide disparity in prices per unit weight between different grades of material, reflecting differences in raw material quality and gauge, processing costs and other factors. In general, we took the value of sales to end-users, though Alanod's sales through Thyssen have been valued on the basis of Alanod's realized prices rather than final prices to customers. Since the latter would include Thyssen's profit margin of around [✄] per cent (see paragraph 4.21), the figures in Table 4.1 tend to understate Alanod's sales and market share. As indicated in the table, Ano-Coil and Alanod were by far the largest suppliers in the UK market in 1998, both for all grades of this material and also for the specular grades. Taking all grades together, Ano-Coil was the largest supplier with a market share by value of 40 per cent, followed by Alanod with 35 per cent. Together, therefore, they accounted for 75 per cent of the total. The next largest suppliers were Lorin and ACA, each with nearly 10 per cent; SACALL's share was 5 per cent and that of SATMA was less than 1 per cent.

4.61. For the specular grades, the market shares for Ano-Coil and Alanod were 47 per cent and 40 per cent respectively. Together, then, they accounted for 87 per cent of sales by value, as measured. SACALL, with 9 per cent, accounted for most of the remaining share.

4.62. Alanod argued to us that these market shares overstate the likely position that will apply in the future, because it expects Thyssen to capture (or retain, in Alanod's view) at least some market share, supplying material from SACALL. Alanod told us that following the merger in March 1999, many of its customers had been seeking alternative price quotes from Thyssen/SACALL. We considered the Thyssen/SACALL distribution arrangement and their sales expectations in paragraph 4.23.

4.63. Turning to EC and worldwide markets, Table 4.2 gives Alanod's estimates of sales of specular grade material and suppliers' market shares in these markets. We were not able to verify these estimates. The figures provided suggest that the effect of the merger would be to increase Alanod's share of the EC market for the specular grade material to 69 per cent (an increment of 31 per cent); and that in the world market its share would rise to just over 47 per cent (an increment of 16 per cent).

TABLE 4.2 **Sales of specular grade anodized aluminium* and suppliers' market shares in the EC and world markets in 1998**

	EC market		*World market*	
	£m	*%*	*£m*	*%*
Alanod:				
Direct	✄		✄	
Indirect†				
Total	16.80	37.4	35.64	31.3
Ano-Coil	14.07	31.3	18.36	16.1
Total	30.87	68.7	54.00	47.4
Other suppliers:				
SACALL	9.08	20.2	24.00	21.1
SATMA	2.72	6.1	12.00	10.5
Lorin	0.91	2.0	12.00	10.5
ACA	1.36	3.0	12.00	10.5
Total	14.07	31.3	60.00	52.6
Total	44.94	100	114.00	100
Tonnage‡	7,000		19,000	

Source: Alanod's estimates.

*Including vacuum deposition material (MIRO).
†In 1998, these sales—in the UK only—were entirely through Alanod's distributor at that time, Thyssen. That arrangement has now been terminated; see paragraphs 4.20 to 4.23.
‡Tonnage figures are approximate.

Pricing analysis

4.64. Our appraisal of pricing in this sector begins by examining the role of suppliers in setting prices to customers (predominantly reflective louvre and luminaire manufacturers). As explained earlier (see paragraphs 4.18 to 4.24), producers supplying anodized aluminium to the UK lighting industry sell either directly to end-users or through a single appointed distributor. No independent wholesalers as such operate in either the UK or EC markets. As a result, suppliers generally have both knowledge of their customers/end-users and either complete control or considerable influence over the level of prices and other terms of sale.

4.65. Prior to the merger, Alanod sold both directly and through its UK distributor Thyssen, with which it had an exclusive supply agreement. Around [✂] of Alanod's sales were direct to end-users (Jordan and LCL only), and it therefore had complete control over the prices quoted to them. Under the terms of its distribution agreement with Alanod, Thyssen acted as a principal in relation to other end-users, setting the prices to them for the Alanod material it supplied. However, Thyssen told us that Alanod maintained continual contact with end-users supplied by Thyssen, ostensibly in order to provide technical support. It added that Alanod used these contacts as an opportunity to influence the terms of supply which had been set by Thyssen. Indeed, it said that this had been a source of conflict between Alanod and itself. In response, Alanod rejected these suggestions (see paragraph 4.21), but agreed that it had indeed negotiated prices directly with Thorn, both during and after the period in which it was the main supplier to Thorn's UK operations through Thyssen.

Price competition

4.66. Price lists are not issued by any of the six producers supplying anodized aluminium material to the UK lighting market. Prices for the great majority of sales are arrived at through direct negotiations between suppliers and end-users, having regard to the specific grades of material and quantities to be purchased; slitting, packaging and delivery arrangements; as well as payment terms and any individually negotiated discounts. As a result, there is a marked lack of price transparency in the market: end-users do not know the prices paid by their competitors, even where they are using the same supplier, though Alanod suggested to us that louvre makers do from time to time discuss between themselves the material prices they pay or have been quoted.

4.67. As regards the question of whether customers are able to distinguish between similar qualities and grades of material, [*Details omitted. See note on page iv.*]. Alanod informed us that since the merger it had in some instances provided material under an Alanod product code to established Alanod customers, and the same material under an Ano-Coil product code to former Ano-Coil customers, from whom no objections had been received. In addition, Thyssen told us that when changing prices, it was Alanod's practice to introduce a new grade which was very similar (or even identical) to an existing grade, but with a different product code and at a different price, in order to avoid openly changing the price of the existing grade. In response, Alanod commented that it had introduced variants on existing grades in the past (as had other suppliers), but only as a result of pressure from customers for a comparable product at a lower price.

4.68. This lack of price transparency, and the control that suppliers have over prices quoted to customers, affords considerable scope for price discrimination in this market. Suppliers are able—in principle at least—to set different terms to different customers for material of the same grade, and for orders of comparable quantity and processing cost. As mentioned earlier (see paragraph 4.21), Thyssen told us that price discrimination by Alanod (as between different customers of Thyssen) was commonplace during the time that it had been Alanod's UK distributor. In response, Alanod commented that different prices paid by different customers reflect, among other things, the relative bargaining ability and buyer power of its customers; and that it would not expect there to be a huge variation in price between different customers.

4.69. As regards examples of actual price differences, sales and price data provided to us by Alanod show that in 1998, [✂] appears to have paid at least as much as, and in some cases considerably more than, [✂] for a number of the same grades of aluminium material, even though [✂] bought (across all grades) almost three times as much. More specifically, [✂] purchased [✂] tonnes of Alanod grade 318G2 (0.4 mm gauge) at a price of £[✂] per kilo; while [✂] purchased [✂] tonnes of the same material at £[✂] per kilo. Another example is Alanod's MIRO grade (4400GP, 0.4 mm gauge), of which [✂] again purchased [✂] tonnes (in 1998), [✂] purchased only [✂] tonnes, yet both paid around £[✂] per kilo. Alanod commented that these price differentials may have at least partly reflected *(a)* the fact that [✂] is able to undertake its own slitting whereas [✂] does not have that capability, and that [✂] might therefore have been buying wider coil material; and *(b)* aggressive price bargaining by [✂].

4.70. Ano-Coil's sales data also include examples of apparent price discrimination, such as the higher prices paid by [✂] for Ano-Coil's 715.30 grade (and also other grades), as compared with

[✂]. [✂] purchased around [✂] tonnes of anodized material from Ano-Coil in 1998, while [✂] bought around [✂] tonnes. Within these totals, [✂] purchases of grade 715.30 (0.4 mm gauge) were over four times the size of [✂]. Yet [✂] paid £[✂] per kilo for this material, while [✂] paid £[✂].

4.71. As mentioned in paragraph 4.66, the volume of expected purchases is often used as a bargaining element in price negotiations: suppliers of anodized aluminium do not operate a formalized or published structure of quantity discounts. Larger orders may well give rise to lower prices (but, as indicated above, not in all circumstances), and particularly for larger customers, various forms of discounts, price incentives, or other favourable terms of supply may also be available. These may include aggregated rebates, discounts against minimum order sizes, or the provision of consignment stocks (stocks held by suppliers at the premises of end-users, for which no charge is made unless the material is used). Only the two largest EC end-users—Thorn and Philips—have negotiated formal supply agreements with anodizers which specify prices and expected purchase quantities for the year ahead.

4.72. As the largest UK end-user of this material, Thorn has been able to negotiate special terms with suppliers (see paragraph 4.77). [

Details omitted. See note on page iv.

]

4.73. Alanod—through Thyssen until recently—also had a retrospective, aggregated rebate arrangement with [*Details omitted. See note on page iv.*], which was terminated in July of this year. This agreement enabled [✂] to earn a rebate of up to [✂] per cent on purchases of Alanod material of up to £[✂] million. In 1998 [✂] purchased material to the value of around £[✂] from Ano-Coil, and a further £[✂] of Alanod material, on which it earned a [✂] per cent aggregated rebate. Alanod told us that it did not operate any other retrospective rebates with its UK customers.

4.74. As regards minimum orders, Alanod's price/supply agreement with [*Details omitted. See note on page iv.*] includes a minimum order for the [✂] grade ([✂] mm gauge). In respect of this, Alanod told us that it was merely passing on a minimum order level imposed on it by the raw material supplier concerned. Similarly, [*Details omitted. See note on page iv.*]. Aside from these two examples, however, minimum order levels do not appear to be widely used in this market.

4.75. On consignment stocks, Alanod told us that around [✂] per cent of Alanod and Ano-Coil's UK sales (including those to [✂]) was based on providing such stocks.

4.76. Another aspect of price setting is the potential for linking sales of one product with those of another. Alanod told us that this was not a general feature of the market, albeit that in one instance it quoted a price for MIRO to [✂] which was based on the condition that [✂] would also buy a specified quantity of its conventional anodized aluminium.

4.77. We also considered the extent to which customers compare prices between alternative suppliers, and use price quotes in price negotiations with their existing supplier(s). Alanod told us that this was common practice among UK end-users, and it provided us with evidence of price quotations by Thyssen (for SACALL's material and for its retained stocks of Alanod material) to several Alanod customers which had been made since the end of the distribution agreement between Alanod and Thyssen. Another example concerns the switching of Thorn from Alanod to Ano-Coil supplies between 1995 and 1996. Up to 1995, Thorn's UK plant at Spennymoor purchased almost exclusively from Alanod. In that year, Thorn put together a pan-European tender for a preferred supplier, for which Ano-Coil made a successful bid. The business of Thorn throughout Europe was then gradually transferred to Ano-Coil. By switching from an Alanod product (grade 410G) to its Ano-Coil equivalent (grade 930.31), Thorn's Spennymoor plant was able to achieve a price reduction of around [✂] per cent. Since the merger in March of this year, Thorn has also switched some of its purchases of anodized material (for use by its French plant for the manufacture of outdoor lighting) from Alanod/Ano-Coil to SATMA.

Inter-product/grade price comparisons

4.78. The production cost of anodized aluminium depends in part on the grade of end-product material. Table 4.3 gives a breakdown of what Alanod described as typical prices for anodized aluminium (Alanod 320G low specular slit coil, gauge 0.4 mm); and for a typical, very highly specular MIRO product (MIRO 27, slit coil, gauge 0.4 mm). Highly specular grades of anodized aluminium require raw material of higher purity. As Table 4.3 shows, raw material costs average around £[✂] per kilo for low specular aluminium (nearly [✂] per cent of the price), but around £[✂] per kilo for a MIRO product of the same gauge (ie [✂] per cent more, and just under [✂] per cent of its higher price), because of the higher purity of the raw aluminium needed to make MIRO (aluminium used as the substrate for MIRO is generally of 99.5 to 99.9 per cent purity). Alanod told us that Ano-Coil paid an average of around £[✂] per kilo for all grades of raw aluminium in 1998, but around £[✂] per kilo for the higher purity raw aluminium required to produce its highly specular (Ano-Coil grade 930.31) anodized aluminium.

4.79. We understand, from Alanod and others, that only three major suppliers produce raw aluminium of the purity needed to produce highly specular anodized aluminium, all of them located in the EC: Alusuisse Singen GmbH (Alusuisse Singen), Aluminium Ranshofen GmbH and Alcoa/Inespal (the outcome of the acquisition of the main sectors of the aluminium businesses of Inespal SA by Alcoa Inc). We understand that anodizers buy from these suppliers on the basis of term agreements, under which prices are agreed for the year ahead.

4.80. Alanod told us that the cost of anodizing is also greater for highly specular than for low specular material (for example, because of the need to slow down the production line). Processing costs are greater still for vacuum deposition material such as MIRO. Table 4.3 shows that anodizing and vacuum coating together account for around [✂] per cent of the price of MIRO, whereas anodizing accounts for only [✂] per cent of the price of low specular aluminium.

TABLE 4.3 **Breakdown of Alanod's typical net selling prices for MIRO and non-MIRO products**

	Alanod 320G		*MIRO 27*	
	£	*%*	*£*	*%*
Raw aluminium				
Anodizing cost				
Vacuum coating				
Protective film				
Slitting				
Scrap	*Figures omitted. See note on page iv.*			
Packing				
Transport				
Profit margin, commissions or discounts				
Delivered price per kilogram (excluding VAT)				

Source: CC based on information provided by Alanod.

Note: Costs were derived from percentages of a total price (in DMs), provided by Alanod. Conversion into sterling was based on the average of monthly exchange rates for the first six months of 1999 (£1:DM2.91) (source: Bank of England).

4.81. The gauge of the material also influences raw material input costs, production costs and final product prices—a tonne of anodized aluminium which is of 0.4 mm gauge is more expensive for anodizers to produce than a tonne of 0.5 mm gauge material, because the surface area per unit weight of material is greater. As a result, there is an increase in both raw material and processing costs per unit weight, and also therefore in prices. For example, in the 1998 price agreement between Alanod and Philips, a difference in gauge of 0.1 mm commanded a premium of [✂] per cent for the lower-gauge material in the case of non-MIRO products, and [✂] per cent for MIRO products.

Levels of anodized aluminium prices

4.82. Table 4.4 gives details of 1998 prices to Thorn, Crompton, LCL and Jordan (the four largest UK end-users) for different grades of anodized aluminium supplied by Ano-Coil, and for MIRO material supplied by Alanod, together with the average prices paid by both Alanod and Ano-Coil for raw aluminium substrate. As regards the latter, Alanod paid £[✄] per kilo for the raw aluminium used for one of its low specular anodized products (grade 320G); while Ano-Coil paid £[✄] per kilo for the aluminium substrate used for its highly specular anodized product (grade 930.31). The least expensive grades of anodized aluminium are (generally but not always) the non-specular grades. Hence, these four customers paid between £[✄] and £[✄] per kilo for non-specular anodized aluminium (Ano-Coil grade 010.00), compared with £[✄] for low-grade specular material (Ano-Coil grade 760.33); and from £[✄] to £[✄] per kilo for highly specular material (Ano-Coil grade 715.30). This suggests that prices for highly specular, conventional anodized aluminium were up to [✄]per cent higher than for the cheapest non-specular grade. For MIRO, Alanod's prices to [✄] and [✄] ranged from £[✄] to £[✄] per kilo, depending on the quantity demanded.

TABLE 4.4 **Prices of raw and anodized aluminium in 1998**

*Material (grade coding)**	*Gauge (mm)*	*£ per kilo*
Raw aluminium†	Not specified	
White/non-specular (010.00)‡	0.46	
Low specular grade (760.33)‡	0.4	✄
Highly specular (715.30)‡	0.4	
MIRO 4§	0.4	
MIRO 27§	0.4	

Source: CC, based on data from Alanod.

*Alanod grades (for MIRO) and Ano-Coil grades (all others).
†Cost to Alanod and Ano-Coil of raw aluminium coil.
‡Prices charged by Ano-Coil to Thorn, Crompton, LCL and Jordan in 1998. Prices are for annual requirements of more than 1 tonne and for the most-used gauge.
§1998 prices charged by Alanod to Jordan and LCL for annual requirements of more than 1 tonne, and for the most-used gauge.

4.83. Alanod also provided estimates of its average UK selling prices in 1998, and also those of Ano-Coil. Across all its customers and grades, the average net delivered price charged by Ano-Coil was £5.33 per kilo; Table 4.5 gives Alanod's average realized prices for the three UK customers which it supplied directly (Thyssen, Jordan and LCL). Average prices in this market are not easily comparable, because they depend on a wide variety of factors, including the relative quantities of different grades of material purchased by each customer, slitting requirements, packaging delivery and other commercial influences (see paragraph 4.66).

TABLE 4.5 **Average prices of Alanod's anodized aluminium in the UK in 1998**

Customer	*Anodized* *£*	*MIRO* *£*
Jordan		
LCL	✄	
Thyssen		

Source: CC, based on information from Alanod.

Note: Prices from Alanod were provided in DMs. The average of monthly exchange rates in 1998 was used to convert to sterling (£1:DM2.91).

4.84. The prices for MIRO given in Table 4.5 appear to be lower than those paid by Thorn, which paid £[✄] per kilo for MIRO 27, and £[✄] per kilo for MIRO 2. However, the prices of MIRO shown in Table 4.5 are relatively close to the figure of £[✄] for MIRO 27, which Alanod quotes as a typical price for a MIRO product (see Table 4.3). In addition, the price agreement between Philips and Alanod quotes prices of £[✄] and £[✄] for MIRO 27 (depending on gauge of material). These prices are based on an approximate requirement of [✄] tonnes of MIRO 27 (whereas Thorn purchased only [✄] tonnes), and a total of [✄] tonnes of MIRO. In summary, the prices of MIRO products range from around £[✄] to around £[✄] per kilo, depending on the specific grades and quantity bought and the customer concerned. Additionally, Cashmores told us that the HELIA product produced by SATMA (anodized aluminium with 92 per cent total reflectance, and therefore a possible competitor to MIRO) is about twice as expensive as other anodized aluminium from SATMA.

4.85. On price trends over time, Alanod and others told us that prices on average in the UK market had generally fallen in recent years. Between 1994 and 1997, the average price of conventional anodized aluminium from Ano-Coil varied from about £5.70 to £5.80 per kilo, but then fell to just over £5.30 per kilo in 1998. The average price charged by Alanod to Jordan and LCL fell from a peak of over £[✄] per kilo in 1995 to just over £[✄] in 1998—[*Details omitted. See note on page iv.*]. Similarly, the average price charged to Thyssen varied between £[✄] and £[✄] from 1994 to 1996, before falling to £[✄] in 1997 and under £[✄] in 1998 (although this fall was largely due to the increase in the strength of sterling against the DM). In DM terms, the prices charged by Alanod to Jordan and LCL fell [✄] per cent from DM[✄] in 1994 to DM[✄] in 1996, then rose [✄] per cent to DM[✄] in 1997 and remained at a similar level in 1998. There was less variation in prices charged to Thyssen, which ranged from slightly below DM[✄] to slightly above DM[✄].

4.86. Alanod further told us that prices in the UK had been driven down even more since the merger between Alanod and Ano-Coil in March of this year because of intensified competition, particularly from SACALL and Thyssen, but also Lorin and ACA. It provided evidence to us of Alanod needing to respond to competitive price quotes from these other anodizers in order to retain sales and market share. We note that the £ sterling has appreciated against the DM/euro by 9 per cent between January and October 1999.

Competition

4.87. Prior to the merger taking place, the UK market for lighting aluminium had been essentially duopolistic in nature, with Ano-Coil and Alanod being by far the largest suppliers. Of the other suppliers, Lorin and ACA were both fairly new to the UK market and not well established in terms of market share, most particularly with respect to the specular grades of material. Import duty and transportation costs (see paragraph 4.101) also restricted the ability of US producers to set competitive prices. Indeed, Lorin told us that it was not profitable at present, and had chosen not to compete on price against Ano-Coil prior to the merger, when the latter had been offering highly competitive prices and terms to customers. SACALL had become somewhat more firmly established, but was supplying only a single customer (Interlux); while SATMA appears to have had only limited commitment to expanding its presence in the UK market.

4.88. That said, the two main suppliers appear to us to have behaved as genuinely competitive (rather than co-operative) rivals, with both offering a full and comparable range of material grades (excepting MIRO) and good customer service. With regard to price competition, we note the absence of formal price lists and the associated—and marked—lack of price transparency in this market; and also the absence of intra-brand price competition (see paragraph 4.57). In the previous section, we have set out the evidence available on various pricing practices adopted by the main parties. Notwithstanding these factors, the UK end-users of reflective aluminium were fully able—prior to the merger—to obtain price quotations from genuinely alternative suppliers; and they would have had every incentive to do so, at least on a periodic basis.

4.89. As regards future developments, Ano-Coil, and more especially its German parent (Metalloxyd GmbH), had been financially weakened by a number of factors, including in particular the losses it had incurred from its Metaprint subsidiary and the collapse of its sales in Far Eastern markets. Metalloxyd GmbH had also not been successful in developing an equivalent product to that of Alanod's MIRO. Against that, it had completed its restructuring to rid itself of uneconomic activities, and shifted production to the UK (with plants at Milton Keynes and Bletchley, and a service centre at Aldridge) where costs were said to be 30 per cent less than at its German facilities. During 1999, demand in all the main Far Eastern markets appears to have recovered reasonably well (see paragraph 4.54).

Entry conditions

4.90. In assessing the possible effects on competition of the merger, we considered the costs and difficulties faced by potential new entrants to the market for coil anodized aluminium, and particularly for the specular and highly specular grades which are used almost exclusively by the lighting industry. A completely new entrant, with no existing (or prior) involvement with the supply of this material, would be likely to face the greatest costs and difficulties, most but not all of which are likely to be associated with establishing a suitable production plant. As explained earlier, production of this material is relatively capital intensive and economies of scale exist up to an output capacity of around 6,000 tonnes a year. This is large in comparison with the size of both the UK market (3,000 to 3,500 tonnes a year for all grades—see paragraph 4.58) and the corresponding EC-wide market of 10,000 to 12,000 tonnes. Moreover, efficient operation of such plants requires high levels of capacity utilization. As a result, such an entrant might well find that there was excess capacity in the market following his entry, and that market prices would consequently be driven down below the pre-entry level (thereby reducing profitability). More generally, there would clearly be greater than normal commercial risks associated with such relatively large-scale entry.

4.91. Such risks would be compounded in this sector because of the high capital and sunk (irrecoverable) cost nature of the production plant. We estimate that the cost of a new plant equivalent to that at Milton Keynes would be at least £10 million at current prices (excluding land, which could be leased rather than purchased, but including buildings, an effluent treatment plant and coil cutting/packaging facilities); working capital requirements would also be substantial. This compares with the total value of the UK market (all grades) in 1998 of nearly £16 million and the EC-wide market for specular grades of around £45 million (see Table 4.2). Much of the necessary capital expenditure would be sunk cost because of the specialized nature of the plant.

4.92. To build an anodizing plant, the new entrant would also require the necessary know-how for the design work: both main parties (and other anodizers, we understand) designed their own production plants, albeit that the hardware and control systems were supplied by other specialist contractors. Although anodizing technology is both long established and not protected by patents, acquiring (by such an entrant) the know-how necessary both to design a suitable plant and subsequently to operate it efficiently would necessitate incurring additional costs (though these are not readily quantifiable).

4.93. Other possible difficulties that may be faced by such an entrant concern consumer resistance and the relatively high level of post-merger market concentration. On the former, luminaire manufacturers understandably require—as explained earlier—that their anodized aluminium supplies (particularly the specular grades) are of a high and consistent quality with respect to their performance characteristics (ie with minimal variances); and supplies are often provided on a ‘just-in-time’ basis in order to minimize stockholding costs. As a consequence, new entrants might face reluctance on the part of customers to switch from their established supplier without strong reason. As indicated by Thorn’s evidence (see Chapter 5), such switching, particularly at short notice, may also involve costs in retooling and product redesign.

4.94. As regards market structure, the level of post-merger concentration is high, with the combined Alanod/Ano-Coil having market shares in excess of 65 per cent in both the UK and EC markets (see paragraphs 4.60 to 4.63). Whatever the actual responses to entry by the combined group, new entrants might reasonably expect the incumbent supplier to react strongly in order to protect its sales and market share.

4.95. We note that, as Alanod told us, there has been no new entry into this market over the past ten years; and also that most of the six suppliers to the UK market have been established for 20 years or more. Indeed, Alanod also suggested to us that there is excess capacity worldwide, and that this, together with low profit margins, constitutes the real barriers to entry.

4.96. But entry from other sources might nonetheless be more feasible. Alanod, for example, has suggested to us that existing coil anodizers not currently producing the specular grades used for luminaires (such as Coil SA/NV of Belgium and OCM SRL of Italy) might choose to do so if product prices were to rise, and that entry would be both relatively easy and low cost. Such an entrant would certainly face fewer difficulties with respect to the required know-how and engineering resources; and established suppliers might also benefit from their existing reputation for supplying high-quality anodized aluminium products for applications other than lighting.

4.97. Coil SA/NV and OCM SRL appear to be the only EC-based suppliers in this category. They would also face some of the same barriers outlined above. Coil SA/NV told us that it considered itself to be a pure subcontractor (rather than producing product for its own on-sale), and that it does not supply the luminaire market directly (though it does supply Alanod with some material). It added that its production facilities are not currently used in producing materials for the lighting market. As a result, it would need to undertake further investment, it told us, in order to produce suitable material for luminaires. While having the technical ability to enter the lighting market, it said, it had decided not to make the necessary investment for various reasons (see Chapter 5), including the perceived need to develop a full product range. This would of itself necessitate substantial investment in developing vacuum deposition technology in order to produce the very highly specular grades (MIRO quality). OCM SRL did not provide any views or evidence to us.

4.98. As mentioned earlier, the development of the very highly specular grades (MIRO quality, 95 per cent specular reflectance) is of importance to this market in a number of ways. To the extent that potential entrants perceive there to be a need to supply these grades, the development costs and other possible difficulties represent an additional general element of entry deterrence. Alanod told us that its research and development costs for MIRO had been DM[✂] million (£[✂] million) and that its capital investment in its first production plant [✂] tonnes a year capacity) had been DM[✂] million (£[✂] million), plus DM[✂] million (£[✂] million) for additional buildings. Its second line (at least [✂] tonnes capacity a year) cost DM[✂] million (£[✂] million), plus DM[✂] million on additional buildings and DM[✂] million on start-up and development costs. Hence, Alanod’s total direct research and development/start-up costs relating to MIRO and MIRO L were about DM[✂] million.

4.99. Although the MIRO production process is not of itself, according to Alanod, protected by any patents, Alanod, together with Alusuisse Singen, has applied for a patent relating to MIRO-like products which have been enhanced with a non-metallic protective layer; see Appendix 4.3. Additionally, much of the technical know-how associated with the manufacturing process is embodied in the plant itself. Alanod told us that in principle other companies could purchase similar plant from the German manufacturer of its plant (Von Ardenne); or indeed from a number of other manufacturers which would be technically capable of developing such a plant. It also told us, however, that under an agreement with Alanod, Von Ardenne was obliged to pay Alanod DM3 million should it install a further MIRO-type plant to any other company before 1 May 2001, this sum being the agreed value of Alanod’s know-how contribution to the development of the process. Alanod told us that it did not know how much Von Ardenne and Alusuisse Singen had spent on the development work concerning MIRO.

4.100. Both Metalloxyd GmbH and SACALL told us that they had considered developing their own vacuum deposition processes, but that had been deterred by the high costs, which Metalloxyd estimated at DM30 million.

4.101. There may also be possibilities for ‘quasi-entry’ in the form of expansion in supply/capacity by existing producers of the specular grades used for luminaires. As regards EC suppliers, both SATMA and SACALL are both well-established suppliers, though they appear in practice to have concentrated, in the past at least, mainly on their own national markets. In the UK market, they have not been especially successful thus far in challenging the more highly regarded Ano-Coil and Alanod. SACALL, we understand, is considering an expansion of its capacity from around 6,000 tonnes a year to 9,000 tonnes over the next year or so. Neither produces the very highly specular vacuum deposition material, though SATMA’s HELIA product (conventional anodized) offers about 92 per cent specular reflectance. While the two US-based suppliers (Lorin and ACA) both have adequate capacity to increase sales in the UK, both face a tariff barrier of 7.5 per cent on imports into the EC; transatlantic transport costs of about 2.5 per cent; and also the logistical requirement of distributing their products within this country. Lorin also told us that to manufacture the specular grades, US producers need to import the high-purity raw material substrate from EC mills, which further increases their transportation costs, though a tariff rebate is available on this material which reduces the effective tariff barrier to 3.5 to 4 per cent.