# Pre-merger competition between Ineos Chlor and BOC

1. In this appendix, to determine the extent of competition between BOC and Ineos Chlor in the markets for the distribution of packaged chlorine, we analyse the evidence on:

   *(a)* price competition between distributors;

   *(b)* the role of non-price competition;

   *(c)* the ability of customers to switch distributors;

   *(d)* the extent of such switching; and

   *(e)* which firms the various distributors monitor.

## Price competition between distributors

2. Depending on the customer and size of the contract, delivered prices are set either via a public tender process or by individual negotiation. Different customers have different requirements in terms of the volume of packaged chlorine purchased and delivery locations, as well as other factors such as the type of additional services demanded. Therefore, delivered prices vary between different customers. As a result, it is important to consider the range of prices customers pay when comparing estimates of average delivered price.

3. Water companies account for the majority of packaged chlorine sales (by volume)[1] and generally award contracts by public tender, with many contracts falling within EU public procurement rules.[2] These contracts are typically framework agreements with supply terms varying between customers. The typical length of these agreements is between three and five years with prices typically reviewed annually (although terms of supply differ between contracts and so in some cases prices may be fixed for part or all of the contact period). Customers may have multiple contracts for the supply of packaged chlorine, especially if they dual source.

4. BOC told us that a number of the smaller water companies used annual contracts which did not always go through the public tender process and so were subject to normal commercial negotiations.

5. Industrial customers use individual negotiation and are not required to follow EU public procurement rules.[3] Ineos Chlor told us that larger industrial customers often used a tender process, but smaller customers typically just sought quotes from a number of sources. BOC told us that their industrial customers generally purchased on an ad-hoc basis, with no fixed supply contracts. They also tended to require delivery to single sites.

[1]The sales mix of each distributor varies.
[2]The water companies are regulated utilities for the purposes of the EU public procurement regime and so, when purchasing packaged chlorine, must comply with certain requirements of the Utilities Contracts Regulations 2006. Provided that the appropriate threshold is reached, a water company must either place a notice in the Official Journal of the European Union or advertise the tender through a recognized qualification system such as Achilles http://www.achilles.com/en/. The current threshold is £279,785 for each contract for the purchase of goods, and the threshold is adjusted every two years to ensure that it maintains a stable value.
[3]BOC also told us that some industrial customers do tender for packaged chlorine.

6. BOC told us that its quoted prices depended on the specific costs of serving each customer, which was largely driven by differences in transport costs, and also the volume of chlorine purchased. BOC also told us that part of its price setting process involved considering competitors' past behaviour with respect to similar customers.

### *Estimates of delivered price*

7. There is no single delivered price in the market. We therefore consider both the average price per tonne of supply in the relevant markets, and the extent to which this average varies between individual customers.

8. Using transaction-level sales revenue and volume data (where available) we estimated the weighted average revenue per tonne of chlorine supply (WART) for each customer. We use WART as a proxy for the average delivered selling price per tonne each customer pays.

9. Table 1 shows estimates of WART from sales of cylinders to customers in Great Britain in 2007. [✂]

TABLE 1 **Weighted average revenue per tonne of cylinder supply, 2007**

| *Distributor* | *Average revenue per tonne of supply* | *Standard deviation* | *Min* | *Max* | *Number of customers* |
|---|---|---|---|---|---|
| BOC | [✂] | [✂] | [✂] | [✂] | [✂] |
| Ineos Chlor | [✂] | [✂] | [✂] | [✂] | [✂] |
| Air Products | [✂] | [✂] | [✂] | [✂] | [✂] |
| All distributors | [✂] | [✂] | [✂] | [✂] | [✂] |

*Source:* CC estimates based on BOC, Ineos Chlor and Air Products data.

*Notes:*
1. Number of customers refers to the number of different customers making purchases of 33kg and 71kg cylinders in 2007—we exclude non-standard cylinders. We note that the same customer may have made multiple purchases of different sized cylinders, or made multiple transactions of the same type of cylinder, in 2007.
2. Air Products has not provided customer-level data.

10. Table 2 shows estimates of WART from sales of drums to customers in Great Britain. [✂][4] There is less variation in delivered prices between customers than in the case of cylinders. Albion told us that it wished to maintain overall volumes and revenue. It said that if it were to lose either or both of the existing customers then it would seek to replace these sales with other customers.

TABLE 2 **Weighted average revenue per tonne of drum supply, 2007**

| *Distributor* | *Average revenue per tonne of supply* | *Standard deviation* | *Min* | *Max* | *Number of customers* |
|---|---|---|---|---|---|
| BOC | [✂] | [✂] | [✂] | [✂] | [✂] |
| Ineos Chlor | [✂] | [✂] | [✂] | [✂] | [✂] |
| Albion | [✂] | [✂] | [✂] | [✂] | [✂] |
| All distributors | [✂] | [✂] | [✂] | [✂] | [✂] |

*Source:* CC estimates based on BOC, Ineos Chlor, Albion and Air Products data.

*Note:* Number of customers refers to the number of different customers in 2007 making purchases of drums in 2007. We note that the same customer may have made multiple purchases of different sized drums, or made multiple transactions of the same type of drum, in 2007.

[4][✂]

11. Figure 1 shows the distribution of WART generated from different customers per tonne of cylinder and drum supply. The horizontal line represents the WART at the centre of the distribution (median) and the box represents the middle 50 per cent of customers' WART (inter-quartile range), by supplier.

12. We found that BOC and Ineos Chlor offered [✄] to many of their customers for both the supply of cylinders and drums, but noted that BOC had [✄] drum customers. Air Products did not provide customer-level data and so the horizontal line represents a single data point which is actually the WART its customers receive.

FIGURE 1

**Weighted average revenue per tonne of supply, 2007**

[✄]

*Source:* CC estimates based on BOC, Ineos Chlor, Albion and Air Products data.
*Notes:*
1. We exclude non-standard cylinders from the analysis.
2. Air Products does not provide customer-level data and so the median line for both cylinders and drums is the mean WART.

13. Figure 2 shows the WART of supply over the period 2001 to 2007 (subject to data availability and sales in each year). For cylinders, despite significant increases in price since 2004 the relative price 'position' of each distributor has remained fairly stable. Average drum prices have remained more stable, [✄].

FIGURE 2

**Weighted average revenue per tonne of supply, 2001 to 2007**

[✄]

*Source:* CC estimates based on BOC, Ineos Chlor, Albion and Air Products data.
*Notes:*
1. Air Products data from 2004 onwards.
2. Albion data from 2003 onwards.

## Non-price competition

### *Product range and packaging characteristics*

14. Table 3 summarizes the different drum and cylinder sizes supplied by Great-Britain-based distributors over the period 2001 to 2007. Although distributors supply a range of different sizes, these appear comparable.

TABLE 3 **Sizes of cylinders and drums supplied by Great-Britain-based distributors**

| *Distributor* | *Cylinder size supplied* | *Drum size supplied* |
|---|---|---|
| BOC | [✄] | [✄] |
| Ineos Chlor | [✄] | [✄] |
| Albion | [✄] | [✄] |
| Air Products | [✄] | [✄] |

*Source:* CC estimates based on BOC, Ineos Chlor, Albion and Air Products data.

15. BOC told us that its cylinders and drums were newer than comparable packages supplied by Ineos Chlor. In particular, BOC explained that its packages could hold

more chlorine and used the same valve technology as used in Continental Europe. BOC told us that these features made the packaging easier to operate and required fewer manual changeovers at the customer's sites. Ineos Chlor told us that its packages used a valve system that met UK standards.

16. We are aware that some customers use automatic shut-off systems, such as Chlorguard, on their packages. These safety systems are not a feature of the packaging itself, although we noted that differences in the valves used by different distributors might require these systems to be altered in the event of switching distributors.[5]

### *Delivery and lead times*

17. BOC delivers cylinders direct to customers using dedicated vehicles from a network of distribution depots. Customer order-to-delivery lead times can be as short as 24 hours. BOC delivers drums to customers direct from a single depot within three days to customers in central UK and five days to customers in the rest of the UK and Ireland.

18. Ineos Chlor delivers drums and cylinders direct to customers [✂]. Cylinders and drums are delivered on a 'milk-round' basis from a single depot, with customers located in different geographic areas served on different days. [✂][6]

19. Albion delivers packaged chlorine to its two customers mainly using dedicated vehicles, although it has also subcontracted some deliveries to third-party hauliers. Albion delivers to United Utilities on a 'milk-round' basis from a single depot, delivering within specific geographic areas on the same day. Albion delivers the majority of drums to a single site for Thames Water direct from source.[7] Albion also delivers direct to other Thames sites as requested by Thames.

20. Air Products delivers cylinders from a network of depots within the UK. Drums are delivered for its one customer from Sandbach. Delivery is within 48 to 72 hours of ordering unless they are in very remote areas.

### *Other services*

21. We noted that there were a number of different business models for the distribution of packaged chlorine, which was one of the reasons why distributors were able to offer a range of different services to customers in addition to the distribution of packages. These business models included:

*(a)* distribution of packaged chlorine as part of a wider chlorine-focused business (Ineos Chlor);

*(b)* distribution of packaged chlorine alongside a portfolio of other gas products (BOC, Air Products); and

*(c)* distribution of packaged chlorine alongside a portfolio of other bulk and packaged chemicals (Albion, which, for example, offers a range of water treatment chemicals through its Water Treatment Solutions (WTS) marketing operation).

[5] The main parties told us that the costs of changing were not high.
[6] Ineos Chlor told us that because [✂].
[7] Albion told us that Thames mainly redistributed drums within its water supply region itself.

22. BOC told us that it was able to supply other chemicals and industrial gases to customers within a single delivery. BOC also told us that it dual sourced and had supply arrangements in place with Continental chlorine packagers, could make emergency deliveries at any time and provided services such as training on handling chlorine, the collection of empty packages and an emergency response capability.

23. Ineos Chlor told us that it offered a collection service for empty packages, risk management assessments (known as pre-delivery inspections), health and safety audit of customers' sites and the provision of technical training.

24. Air Products told us that it offloaded cylinders and collected empties. There was also an emergency number available 24 hours a day. Air Products has also in the past offered safety training to customers and undertook a Basic Safety Process assessment before agreeing to supply a chlorine site. Customers also needed to complete a toxic questionnaire.

## Customers' ability to switch distributors

25. We considered evidence on the ability of customers to switch between distributors of drums and cylinders, and the extent of such switching. An analysis of switching provides further evidence on the extent to which distributors are competing for marginal customers. However, this evidence is asymmetric, as a lack of switching does not by itself indicate a lack of competition between firms, as firms might be constraining the behaviour of each other to such an extent that customers do not need to switch.

26. We discuss the ability of distributors to expand to accommodate new business in the section of the report on entry and expansion.

### *Switching costs*

27. We first assessed the ability of customers to switch between distributors. This will be lower if the costs associated with switching are high relative to the potential gains from switching. However, the impact of switching costs on the degree of intra-market rivalry is mixed. On the one hand, switching costs may reduce the intensity of competition between distributors, as distributors can charge high prices to 'captive' customers, whereas on the other, switching costs may intensify the competition for new customers, particularly as there is scope for distributors to charge different prices to new as opposed to existing customers given the nature of supply terms.

28. The principal barrier to switching appeared to be technical, in that some of the cylinders and drums supplied by different distributors used non-compatible valves and were of slightly different size. As a result, existing fittings may require work (eg a new adaptor and pipework) before supply from another distributor can commence[8] and there are likely to be time and cost implications, particularly given the length of contracts with water companies, the requirement for any work to be undertaken whilst facilities remain operational and the potential lag in changeover at low usage sites.

[8]BOC told us that some customers, particularly water companies, had automatic shut-off systems such as Chlorguard on cylinders and drums. When switching between suppliers, these may need to be altered with the cost being borne by the customer or incoming supplier, depending on individual contract negotiations. Customers without such systems would not incur these costs.

29. The evidence we received indicated that whilst there were barriers to switching (time, technical and cost), they were not insurmountable. The evidence on tendering history below indicated that customers did consider that switching was possible.

### *Evidence of customers considering switching*

30. Table 4 summarizes customers' responses when asked whom they have approached to provide them with tenders, proposals or quotations for packaged chlorine and how they rated the supply terms offered. We found that almost every customer who responded approached both BOC and Ineos Chlor. Air Products and Albion were also approached, but to a lesser extent.

TABLE 4 **Distributors approached for tenders, proposals or quotations for packaged chlorine**

[✂]

*Source:* CC analysis of questionnaire responses.

*Note:* Other includes Gerling Holz and Ashland.

31. Table 5 summarizes evidence on recent tendering behaviour by the water companies, including information on which distributors were invited to tender for supply contracts, which were selected as the top two bidders and which won the supply agreement. It shows that in almost each case that we reviewed, BOC and Ineos Chlor were identified as the top bidders for the supply agreement.

TABLE 5 **Recent tendering history by the water companies**

[✂]

*Source:* CC analysis of questionnaire responses.

### *Evidence of actual customer switching*

32. We now consider evidence on the degree of actual switching. BOC told us that it bid for all water tenders and any other contract for which it was either invited to bid or which it identified as a potential opportunity using its market knowledge. During the past five years, BOC told us that it had bid in [✂] water company tenders and to date had won (at least partially) [✂] of these, with [✂] being retained business.

33. BOC stated that it had won [✂] water company contracts from Ineos Chlor between 2005 and 2007: [✂]. The combined volume of these contracts was [✂] tonnes a year of cylinders, and [✂] tonnes a year of drums; set against Ineos Chlor's total sales of around [✂] tonnes of cylinders, and [✂] tonnes of drums in 2007, this represents particularly significant switching with respect to cylinders. [✂]

34. Ineos Chlor told us that [✂]. Of those bids that Ineos Chlor detailed over period 2003 to 2007, we found that Ineos Chlor had [✂]. It had retained [✂] contracts, and in addition to the [✂] contracts [✂] to [✂].

35. Albion stated that it had not targeted customers outside its existing portfolio, and that it had successfully retained those customers to date. Albion told us that it wished to maintain overall volumes and revenue and said that if it were to lose either or both of the existing customers then it would seek to replace these sales at other customers. From customer feedback Albion was aware that Ineos Chlor and BOC competed for these retained contracts.

36. Air Products told us that while it only had records of its bids since 2005, there was a higher level of switching five years ago than was currently the case, with water companies tending to order chlorine from their existing suppliers.

37. The evidence above mainly refers to switching by the water companies. We have also analysed the extent to which industrial customers switch by examining customer-level sales data from BOC, Ineos Chlor and Albion.[9] Purchases by industrial users are typically much smaller than those by water companies. We found no evidence of industrial customers switching drum volumes between [✄] over the period 2001 to 2007. We also found very limited evidence of industrial customers completely switching cylinder volumes in any given year, rather we found evidence that in some years they dual-sourced from [✄].

38. In addition to this evidence, BOC told us that it lost the [✄] supply contract (an industrial customer purchasing [✄] tonnes of cylinders per year) to Air Products.

39. We have also considered year-on-year sales volumes changes over the period 2001 to 2007. This provides an indication of the extent of volume 'churn' between distributors.[10] We noted that these estimates tended to underestimate the extent of switching since they represented net changes, capturing both positive and negative volume changes.

40. Figure 3 shows the sales change by distributor for the supply of cylinders. Despite a stable market for cylinders, we found evidence of year-on-year volume changes as distributors won and lost business.

FIGURE 3

**Changes in cylinder sales volumes 2001 to 2007**

[✄]

*Source:* CC estimates based on BOC, Ineos Chlor, Air Products, Gerling Holz and Rhodia data.
*Note:* Figure 3 does not include Rhodia's cylinder sales volumes. [✄]

41. Figure 4 shows the sales change by distributor for the supply of drums. Despite a relatively stable market for drums, we found evidence of year-on-year volume changes as distributors won and lost business.

FIGURE 4

**Changes in drum sales volumes 2001 to 2007**

[✄]

*Source:* CC estimates based on BOC, Ineos Chlor, Air Products, Albion, Gerling Holz and Rhodia data.
*Notes:*
1. Figure 4 does not include Rhodia's drum sales volumes. [✄]
2. We do not include Gerling Holz drum sales because they are of chlorine of a chemical composition not available from UK sources.

42. In summary, we found evidence that BOC and Ineos Chlor frequently competed for the same customers and were often identified as the top two bidders.

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[9] Air Products has not provided customer-level sales data.
[10] Air Products did not provide data prior to 2004.

43. We noted that BOC had recently [✂] from Ineos Chlor, particularly for the supply of cylinders, but that it had [✂]. Ineos Chlor had also lost a water customer to [✂]. We found little evidence of industrial customers switching their entire supply of chlorine between [✂], rather we found evidence consistent with dual-sourcing. We noted that Albion wished to maintain its overall volumes and revenues. It had not targeted new customers outside its existing portfolio and had retained these to date despite competition from BOC and Ineos Chlor.[11] This switching as a result of competition has led to considerable sales volume 'churn' as distributors win and lose business over time.

## Monitoring

44. There was evidence that BOC, Ineos Chlor and Albion monitor each other via feedback from customers.

45. BOC told us that because the supply of packaged chlorine was a standard distribution service to customers, there was relatively limited intelligence that could be and was monitored. However, BOC also told us that it sought feedback from customers at the end of the tender process to establish why it was or was not selected and that customers might also provide ad-hoc information, such as when they were approached by other suppliers.

46. [✂]

47. Albion told us that it received feedback about other distribution companies from customers, sometimes discussing the outcome of tenders and customers' interest in contingency and security of supply issues.

48. Air Products told us that it did not monitor the prices of competitors.

[11] Albion told us that if it were to lose either or both existing customers it would seek to replace these sales.