

Factors determining the alternatives to new large steel drums for certain uses

1. This appendix describes the availability of alternative packaging for products which are currently packed in new large steel drums. A detailed description of the various different types of industrial packaging products and typical uses appears in Appendix B.
2. We summarize below the evidence we received from Greif and third parties regarding the availability of alternative industrial packaging products as well as the results of the customer survey and a brief description of the rules which govern the transport of dangerous goods.
3. The range of industrial packaging products available to customers for packaging a particular product will depend on the nature of the product to be packaged and its intended use. For the purposes of this report we have called this 'compatibility'.
4. In addition to compatibility issues, for some products there are detailed safety regulations on the types of packaging which may be used for transporting and storing hazardous products.

Compatibility of packaging

5. Broadly 'compatibility' falls into three categories:
 - chemical compatibility of the material used for the container with the substance being packaged, because of the risk that the substance would damage the integrity of the container;
 - the risk of contamination of the packaged substance by the container; and
 - the ability of the container to withstand the temperature at which the packaged substance must be filled or emptied (eg plastic drums are unsuitable for temperatures significantly above 65°C).

Reconditioned drums

6. The evidence we received suggests that reconditioned drums are a potential alternative for all new steel drum uses, except that:
 - the large majority of reconditioned drums are not suitable for packing substances in UN Packing Group I;¹ and
 - many reconditioned drums are not suitable for packing products where tolerance of any risk of contamination is very low, eg fragrances and flavourings, pharmaceutical products and other products entering the human food chain.

¹The rules allow for the possibility that drums which were originally certified for use with Packing Group I substances can be reconditioned and certified again to the same level. However, to date, only one UK reconditioner has obtained such certification.

7. Greif estimated that [X] per cent of its 2006 UK sales of new large steel drums could not be packaged in reconditioned drums. It estimated that around [X] of the drums it sold were used for Packing Group I certified products, and a further [X] were sold to customers packaging essential oils, alcohols and flavours. Together these amounted to [X] per cent of its sales.

Large plastic drums

8. Greif told us that, for most customers, large plastic drums were a close substitute for new large steel drums. Greif also said that, due to advances in technology, most substances could now be transported in plastic drums.
9. The evidence that we received from customers and plastic drum manufacturers suggested that plastic drums (and composite IBCs) were not suitable for:
- many solvents or other aggressive chemicals which would attack the plastic;
 - products that needed to be heated to high temperatures (>65°C) to be filled or emptied;
 - some food flavourings and fragrances which could permeate or be tainted by plastic;
 - export to markets where transport and storage required superior stacking strengths or resistance to hot or cold temperatures; and
 - products with low flash points where static electricity was a risk.
10. Recent developments in multi-layer plastic extrusion and coatings technologies could allow an increasing number of these products to be packed in plastic containers. These technologies have been developed only recently. We understand that at least one producer has commenced production of some of these technologies in the UK (in this case three-layered drums with the potential for a conductive layer that would reduce the risk associated with static electricity). It is not clear whether all such technologies will be made available in the UK, or by all producers. One producer stated that it did not intend to make the significant investments necessary in the UK to produce multi-layered large plastic drums.

IBCs

11. In terms of chemical compatibility, IBCs have broadly the same characteristics as plastic drums, although IBCs are less suitable for Packing Group I products due to the larger volumes packed. IBCs with metal frames have a reduced risk of build-up of static compared with plain plastic drums and, in some cases, can overcome the problems of filling at higher temperatures. In addition, new developments in three- and six-layer plastic technology could allow an increasing number of products to be packed in plastic IBCs. In particular, three-layer IBCs allow the inclusion of a conductive layer which would reduce the risk associated with static electricity; and six-layer IBCs allow the inclusion of a permeation barrier. These technologies have only recently been developed and are not currently used in production in the UK, although they may be used in imported products. Only one manufacturer told us that it was able to use six-layer technology.

Other packaging

12. We received little evidence from customers that suggested that consideration of other types of alternative packaging would further affect the identification of the core of substances that needed to be packaged in steel containers. For example, we understand that fibre drums are generally not suitable for packaging liquids.

Quantification of customers without alternatives

13. Of the customers and manufacturers we interviewed, or who made submissions, many gave us estimates of the extent to which alternative packaging was available to them and/or to current purchasers of new large steel drums. Those estimates varied greatly: some customers said that they could not switch any of their current purchases of steel drums, and other customers said that there were possible alternatives for all their purchases. This is consistent with the fact that steel drum purchasers have a wide diversity of activities.
14. The parties also provided estimates.

Blagden

15. Blagden estimated that no more than [X] to [X] per cent of its sales would be 'captive' to steel—implying that [X] to [X] per cent of its sales were for products which could be packaged in other types of packaging. Blagden gave the information shown in Table 1 on the percentage of its sales accounted for by different customer types.

TABLE 1 Percentage of Blagden's sales accounted for by different customer types

	<i>per cent</i>	
	2005 sales	2006 sales
Petroleum	(X)	X
Chemicals		
Paint		
Liquid food and dairy		
Pharmaceuticals		
Not specified		

Source: CC, based on Blagden evidence.

16. Of these, Blagden said that all petroleum and paint customers would have alternative types of packaging available to them. The substances that those customers packed were likely to be suitable for plastic drums, IBCs and reconditioned drums. We understand that the liquid food and dairy customers and pharmaceutical customers, some of whose products may be unsuitable for materials other than new steel, account together for only [X] per cent of sales. A proportion of the chemicals customers account for the rest of those who would be unable to switch.

Greif

17. Greif initially estimated that at least [X] per cent of its sales of steel drums were for substances which could be packed in plastic drums.

18. Greif later provided us with a more detailed analysis of the potential for its 40 largest customers (accounting for [X] per cent of Greif's sales) to use alternatives to large steel drums.² According to its analysis:
- (a) [X] per cent of Greif's top 40 customers can use³ plastic for packaging some (typically at least [X] per cent of their total purchase order), if not all, of their products.
 - (b) Only around [X] per cent of Greif's top 40 customers are not able to use plastic for any of their products. Greif told us that these were in effect [X] large customers.
 - (c) [X] per cent of orders by the top 40 customers could in principle be packed in alternative materials, the remainder being limited by regulation, chemical compatibility and production processes.

Customer survey

19. We also asked a number of questions in the customer survey to assess the extent of any limitation on alternatives. The responses showed that significant numbers of customers considered that they must use steel drums.
20. The results of the customer survey suggested that around one-third of users could not realistically use any alternatives to new large steel drums.
21. We asked customers whether they had to use the particular types of drum⁴ they currently used. Over 85 per cent of respondents who used a particular type of drum reported that they had to use that particular drum. It may be the case that those who must use a type of steel drum may be obliged to use that type of drum only for some requirements. We asked those customers who had said that they must use particular types of new steel drum to explain why they had to use particular types of drum. We asked in turn why they had to use: drums of that size; open or closed drums; plain or lacquered drums; a particular thickness; and finally why they had to use steel containers. Out of 81 respondents who reported that they must use one type of drum, 74 gave reasons why they must use steel rather than other materials.
22. We asked what the realistic alternatives to each type of new large steel drum were. For each of the four types, fewer than half the respondents answered the question and among those at least one-third had no alternatives to the four types of large steel drum. Table 2 shows that the main alternatives that were identified included: intermediate bulk containers; large plastic drums; reconditioned large steel drums; and small steel drums (ie under 210 litres).

²This study was carried out by a former Greif industrial chemist, who used his knowledge of the products and the production processes of Greif's top 40 customers to assess whether and what proportion of those customers' steel drum purchases could be changed to plastic drums or IBCs.

³These are customers who could possibly use plastic, not customers who would use plastic in any particular circumstance, such as in response to a 5 per cent price increase.

⁴Tight-head plain, open-head plain, tight-head lacquered, open-head lacquered.

TABLE 2 Alternatives to new steel drums

	<i>per cent</i>			
	<i>Open-head lacquered</i>	<i>Open-head plain</i>	<i>Tight-head lacquered</i>	<i>Tight-head plain</i>
IBCs	34	26	41	45
Large plastic drums (210 litres)	23	41	37	33
Reconditioned large steel drums	25	22	20	41
Small steel drums (less than 210 litres)	14	26	22	24
Bulk packaging	16	11	20	20
Small plastic drums (less than 210 litres)	7	11	14	16
Pails and small containers	14	7	6	2
Fibre drums	7	7	0	0
Cardboard cubes	2	0	4	0
None of the above	43	41	31	35
<i>Base</i>	<i>44</i>	<i>27</i>	<i>49</i>	<i>51</i>

Source: Customer survey.

Notes:

1. Multiple responses: percentages do not sum to 100.
2. Caution should be exercised when interpreting results for fewer than 50 respondents.

Regulations on the transport of dangerous goods

23. Safety requirements for transport and packaging of industrial products, and in particular dangerous goods, are derived from UN Recommendations.⁵
24. In the UK, the UN Recommendations and EU and other treaty obligations relating to transport are given effect by a series of regulations.⁶
25. The Recommendations set out a framework for the classification of articles and substances and the requirements for their transportation. There are some 3,000 substances or types of substance listed in the Recommendations as Dangerous Goods. Some of these relate to a specific chemical or product, some relate to broader categories of goods. For each, the Recommendations set out a framework for assessing the acceptable packaging:
 - Each substance is assigned to one of nine Classes of dangerous goods.⁷
 - Each substance is also grouped into Packing Group I, II or III, in accordance with the degree of danger it presents, Packing Group I being for the most dangerous. Any given substance may be assigned to more than one packing group depending on the volume to be packed.
 - Each substance is allocated one or more sets of Packing Instructions and Portable Tank Instructions.
 - Each Packing Instruction contains lists of packaging formats, variously including: bags, boxes, cylinders, drums, IBCs, jerrycans and different kinds of composite packaging, specifying for each the sizes of packaging and materials used. Within

⁵United Nations, Recommendations on the Transport of Dangerous Goods, Model Regulations.

⁶Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations, Air Navigation (Dangerous Goods) Regulations and the Merchant Shipping Dangerous Goods and Marine Pollutant Regulations.

⁷The nine Classes are: (i) explosives; (ii) gases; (iii) flammable liquids; (iv) flammable solids, substances liable to spontaneous combustion, and substances emitting flammable gases in contact with water; (v) oxidizing substances and organic peroxides; (vi) toxic and infectious substances; (vii) radioactive material; (viii) corrosive substances; and (ix) miscellaneous dangerous substances and articles. There are a number of sub-classes within each.

a given Packing Instruction only some of the options listed will be suitable for a particular substance, depending on its classification and packing group. Some Packing Instructions simply require that only packaging specifically approved by a competent authority may be used.

- For each type of packaging listed in a Packing Instruction, the Recommendations set out detailed requirements for the design, construction and testing of that packaging according to the packing group and classification of the substance to be packed.
26. The Recommendations also set out requirements for labelling and accompanying documentation; and various operational requirements relating to the mode of transport.
 27. Although the Recommendations are immensely detailed and specific according to the substance to be packaged, the Department for Transport and Pira Consulting⁸ told us that there were very few dangerous substances for which the Packing Instructions would be restricted to a single type of industrial container.

⁸Pira Consulting was the operator of the testing and certification scheme for packaging in the UK up to April 2007.