OPINION OF ADVOCATE GENERAL JACOBS
delivered on 14 January 1993 *

My Lords,

1. In this case the Finanzgericht Hamburg has referred three questions on the measurement of the purity of syrups for the purpose of determining the monetary compensatory amounts ('MCAs') payable on the export of sugar. Under the applicable Community regulations it is necessary to determine the purity of a syrup, when calculating MCAs, in order to decide whether MCAs are payable on the actual sugar content of the syrup, expressed as sucrose, or at a flat rate based on an assumed sucrose content of 73% by weight in the dry state.

2. The questions referred for a preliminary ruling are the following:

'(1) Must Article 13(2) of Regulation (EEC) No 394/70 be interpreted as meaning that the percentage purity of the syrup is to be calculated by dividing total sugar content, after multiplying by 0.95, by dry matter content and multiplying the result by one hundred?

(2) Must Article 13(2) of Regulation (EEC) No 394/70 be interpreted as meaning that the purity of fruit-sugar syrups may be determined by measuring the fructose content and relating it to the dry matter content?

(3) Must Article 13(2) of Regulation (EEC) No 394/70 be interpreted as meaning that the purity of fruit-sugar syrups may be determined by establishing the dry matter content in the inverted solution by appropriate methods and relating it to the sugar content of the inverted solution?'

3. The reference is made in the course of an action brought by the plaintiff, Süddeutsche Zucker, against the defendant customs office, and relating to the export of fructose syrup from Germany to Belgium. The plaintiff exported syrup falling within heading 17.02 D II of the common customs tariff ('other sugars and syrups'). For the purposes of awarding MCAs on those exports, the defendant determined the purity of the syrup to be between 92.9% and 93.9% of the dry matter content. In making that determination the defendant first expressed the sugar content of the syrup as sucrose, by multiplying the figure for the total sugar content by a factor of 0.95, before dividing that figure by the figure for the dry matter content. The plaintiff objects to that method of calculation, arguing that in determining the purity

* Original language: English.

of fructose syrup it is inappropriate to make such an adjustment to the total sugar content. The plaintiff points out that the result of making such an adjustment is consistently to underestimate the purity of fructose syrup. The consequence of such an underestimation, in the present case, was that MCAs were awarded on the basis of the flat rate of 73% sucrose content, rather than on the basis of the actual sugar content of the syrup (expressed as sucrose).

4. In the relevant period, the MCAs referred to in Article 1 of Council Regulation No 974/71 of 12 May 1971 (OJ, English Special Edition 1971 (I), p. 257) were set by Commission Regulation No 1800/83 of 28 June 1983 (OJ 1983 L 176, p. 65). By Annex I to the latter regulation, MCAs for sugar are fixed by 1% of sucrose content and by 100 kg net of the products listed, including in particular those falling under tariff heading 17.02 ex D II ('other sugars and syrups excluding sorbose'). According to note (4) to that annex:

'The sucrose content, including other sugars expressed as sucrose shall be determined in accordance with ... Article 13 of Regulation (EEC) No 394/70 in the case of exports.'

5. For what follows, it is necessary to have some understanding of the concepts of 'sucrose content' and of 'other sugars expressed as sucrose'. Sucrose is a sugar of the kind known as 'disaccharide', with a molecular weight of approximately twice that of such 'monosaccharides' as fructose (also known as 'fruit-sugar') and glucose. A solution of sucrose can be converted into a solution consisting of a mixture of fructose and glucose, by a procedure known as 'inversion'. When the sucrose solution is thus inverted, each molecule of sucrose ($C_{12}H_{22}O_{11}$) breaks down into a molecule of fructose and a molecule of glucose (each $C_6H_{12}O_6$); however, in order to produce fructose and glucose from a molecule of sucrose, a molecule of water is necessary:

$$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6.$$

6. It follows that, when a syrup of sucrose is inverted into a solution of fructose and glucose, the dry matter content of the solution is increased by slightly more than 5%; the increase in the mass of dry matter results from the incorporation of a molecule of water for each molecule of sucrose converted into fructose and glucose. That increase is known as 'inversion gain'. Conversely, the weight of a quantity of fructose or glucose must be multiplied by a factor of 0.95 if it is to be expressed as an equivalent weight of sucrose. As we have seen, MCAs for the export of sugar are calculated in terms of the sucrose content of the product, including other sugars 'expressed as sucrose'.

7. As I have already mentioned, the sucrose content of syrups is determined, for that

purpose, in accordance with Article 13 of Commission Regulation No 394/70 of 2 March 1970 on detailed rules for granting export refunds on sugar (OJ, English Special Edition 1970 (I), p. 132; hereafter 'the regulation'). According to Article 13(1) of the regulation:

'... without prejudice to the provisions of paragraphs 2 and 3, the sucrose content including where appropriate other sugars expressed as sucrose, shall be the total sugar content resulting from the application of the Lane and Eynon method (copper reduction method) to the solution inverted according to Clerget-Herzfeld. The total sugar content determined in this manner shall be expressed as sucrose by multiplying by 0.95.'

The 'Lane and Eynon method', or 'copper reduction method', is a standard method for measuring the sugar content of solutions. That method is however suitable only for measuring the amounts of monosaccharides present. Before the sugar content of a syrup containing sucrose can be accurately measured, therefore, the syrup must be inverted, that is to say transformed into a solution consisting solely of fructose and glucose. As we saw above, the result of such an inversion is an increase in the mass of sugar contained in the solution. However, by the last sentence of Article 13(1), the resulting figure for sugar content is then expressed in terms of sucrose by means of a multiplication by 0.95.

8. It will be recalled that MCAs, like export refunds, are calculated in terms of sucrose 'including other sugars expressed as sucrose' (see, for the case of export refunds, Article 8 of Council Regulation No 766/68 of 18 June 1968; OJ, English Special Edition 1968 (I), p. 155). Accordingly, even in the case of a syrup which does not undergo inversion gain, because it already consists solely of monosaccharides, it is appropriate to multiply the sugar content, as determined by the copper reduction method, by a factor of 0.95: all the sugar contained in the syrup is then expressed in terms of the equivalent amount of sucrose.

9. The provision which causes difficulty in the present case is Article 13(2) of the regulation, according to which:

'In the case of syrups which are 85% or more but less than 94.5% pure, the sucrose content including where appropriate other sugars expressed as sucrose shall be fixed at a flat rate of 73% by weight in the dry state. The percentage purity of the syrups shall be calculated by dividing total sugar content by dry matter content and multiplying the result by one hundred. Total sugar content shall be determined in accordance with the method referred to in paragraph 1 and the dry matter content according to the areometric method.'

The issue raised by the first of the three questions referred by the Finanzgericht is whether, in that provision, the 'method referred to in paragraph 1' includes the multiplication by 0.95 mentioned in the last sentence of paragraph 1, or whether the

reference is simply to the copper reduction method applied (if necessary) to the inverted solution, without any such adjustment. I shall discuss that problem first, before turning to the issues raised by the second and third questions referred.

The first question

10. When the purity of a syrup is being determined, three distinct cases can be distinguished: (1) syrups consisting only of disaccharides such as sucrose, (2) syrups consisting only of monosaccharides such as fructose or glucose, and (3) syrups consisting of a mixture of monosaccharides and disaccharides. It is to be noted that, in laying down the procedure to be used in determining purity, Article 13(2) of the regulation does not make any express distinction between the three cases. It will be recalled that in cases (1) and (3), the application of the copper reduction method specified in Article 13(1) requires a prior inversion of the syrup, leading to an increase in the mass of the sugar contained. Such an increase will not however occur in case (2), since there the copper reduction method can be used without any prior conversion of sucrose into fructose and glucose.

11. If, in cases (1) and (3), the dry matter content of the syrup is measured before it is inverted, and the resulting figure used in the calculation of the purity of the syrup, it is clear that the degree of purity will be overestimated — unless, that is, an adjustment can be made to the figure for the total sugar content. In case (1), the overestimation can be corrected by multiplying the total sugar content, as determined by the copper reduction method, by 0.95: in other words, by the application of the entire procedure laid down by Article 13(1), including the adjustment provided for in the last sentence of that paragraph. It is equally clear, however, that the application of such a procedure in cases (2) and (3) will lead to an underestimation of the purity of the syrup, since a quantity of sugar corresponding to the fructose or glucose originally present in the syrup would also be subject to the adjustment. As we have seen, such an underestimation can have serious consequences for the exporter, given that Article 13(2) fixes a flat rate of sucrose content of 73% by weight for syrups measured as less than 94.5% pure.

12. As the Commission suggests in its written observations, that difficulty could be resolved by distinguishing between the three cases. Thus in case (1), the adjustment would be applied to the entire figure for the total sugar content, since all the sugar measured by the copper reduction method will be derived from inverted sucrose. In case (2), it is clear that no adjustment would be necessary. In case (3), the adjustment could be applied to a proportionate part of the figure for the total sugar content, corresponding to that proportion of the sugar in the inverted solution which is derived from sucrose. As the Commission points out, the amount of sucrose present in the original syrup can be determined by applying the copper reduction method to samples of the syrup taken before and after inversion. Thus, if the sugar content is measured as α before inversion

and as β after inversion, a quantity β - α of monosaccharides in the inverted solution must derive from the conversion of sucrose into fructose and glucose. The amount of sucrose present in the original syrup is accordingly (β -α) multiplied by 0.95.

13. It seems to me that the approach proposed by the Commission is essentially correct. The purpose of Article 13 of the regulation would not be served by an interpretation of Article 13(2) which led to systematic inaccuracies in the measurement of the purity of syrups, inaccuracies which would be compounded in certain cases by the application of the flat rate for sucrose content laid down in the first sentence of that paragraph. The only difficulty with the Commission's proposed approach is that, as I have already observed, the wording of Article 13(2) makes no distinction between cases where an adjustment of the figure for total sugar content may be necessary, and cases where it is unnecessary because the original syrup consisted entirely of fructose or glucose. Similarly, the last sentence of Article 13(1) makes no such distinction, requiring the entire sugar content of the inverted solution to be expressed as sucrose for the purpose of awarding export refunds or, as the case may be, MCAs. Thus, the adjustment provided for in that sentence is applied to the whole of the sugar content of the inverted solution, and not merely applied pro rata to the proportion of the total sugar content derived from sucrose in the original syrup.

14. The purpose of making a pro rata adjustment, in determining the purity of the syrup under Article 13(2), must however be distinguished from the purpose of the adjustment provided for in the last sentence of Article 13(1). The point of making the former adjustment is to ensure that an accurate measurement is made of the purity of the syrup. If the dry matter content of the original syrup is determined by means of the areometric method specified in Article 13(2), but the total sugar content of the syrup is measured after the solution has been inverted, no account will have been taken of a possible gain in mass as a result of the inversion. Given that, as we have seen, the proportion of sucrose in the original syrup can be determined by using the copper reduction method, there can be no objection to making a pro rata adjustment which ensures that the mass of sugar in the original syrup is compared with the dry matter content of that same syrup. The purpose of the adjustment provided for in the last sentence of Article 13(1) is, on the other hand, quite different. That adjustment must be applied to the entire sugar content of the inverted solution, and not merely the proportionate part deriving from sucrose in the original syrup, because even fructose and glucose must be expressed as sucrose for the purpose of awarding MCAs. It is clear, therefore, that when Article 13(2) of the regulation speaks of 'the method referred to in paragraph 1', the method in question is the copper reduction method as applied to the inverted solution, and not the entire procedure for determining sucrose content laid down by Article 13(1).

15. It seems to me therefore that the Commission is right to consider that a pro rata adjustment is necessary which takes into account the fact that the original syrup may

already contain monosaccharides. As I have already said, such an adjustment must be distinguished from the adjustment provided for in the last sentence of Article 13(1). However, it might fit better with the wording of Article 13 to regard the pro rata adjustment as made in the figure for the dry matter content, rather than in the figure for the total sugar content. Although it appears from the Order for Reference that the areometric method specified in Article 13(2) cannot be applied to a syrup once it has been inverted, since the solution is then too dilute, it is clear that the method can be applied to the original syrup, and the result then adjusted to take into account any gain in the mass of sugar resulting from inversion.

16. The calculation provided for in Article 13(2) would then proceed as follows. First, the proportion of sucrose in the original syrup is determined by applying the copper reduction method to samples taken before and after inversion, and the dry matter content of the original syrup is determined by the areometric method. The total sugar content of the inverted solution is determined without any adjustment in respect of inversion gain. Finally, the dry matter content of the inverted syrup is determined by making a pro rata adjustment for inversion gain, and the total sugar content divided by the dry matter content. Thus, the dry matter content referred to in Article 13(2) would be taken to be that of the inverted solution rather than of the original syrup.

17. In practical terms, there is no difference between the procedure suggested above and that suggested by the Commission. An accurate determination of the purity of the syrup can as well be obtained by comparing the dry matter content and total sugar content of the original syrup as by a comparison of the dry matter content and total sugar content of the inverted solution. It must again be emphasized, however, that in neither case is the last sentence of Article 13(1) being applied: that sentence relates to the determination of sucrose content, including other sugars expressed as sucrose, and not to the antecedent determination of the purity of the syrup.

The second and third questions

18. By its second and third questions, the Finanzgericht asks, in substance, whether methods other than those specified in Article 13 may be used to measure the total sugar content or the dry matter content of the syrup. It appears that more advanced technology, only recently widely available, permits sugar content to be measured directly, without any need for a prior inversion of the syrup in the case of a syrup containing sucrose. Similarly, more recent methods permit the direct measurement of the density, and hence the dry matter content, of an inverted solution. The Finanzgericht suggests that the object of Article 13 would be better served by the use of such more advanced methods.

19. It is however clear that the aim of Article 13 is to define a standard method for

determining the sucrose content of syrup in order to ensure the equal treatment of all parties concerned: see the twelfth recital to the regulation. It follows that the only procedures which may be used are the standard methods specified in Article 13. Although it might be thought advisable for those methods to be adapted in the light of technical progress, that can in my view be done only by way of an amendment to the regulation. A technical adaptation of the regulation cannot be achieved by means of a reinterpretation of its provisions to include methods other than those specified in Article 13.

Conclusion

20. I am accordingly of the opinion that the questions referred by the Finanzgericht should be answered as follows:

(1) Article 13(2) of Regulation No 394/70 must be interpreted as meaning that the purity of the syrup is to be determined by the following procedure:

(a) the total sugar content of the syrup is measured by applying the copper reduction method to the inverted solution;

(b) the dry matter content of the inverted solution is determined by measuring the dry matter content of the original syrup by means of the areometric method, and adjusting the figure so determined in order to take into account any gain in the dry matter content resulting from the inversion of the syrup;

(c) the total sugar content of the inverted solution is divided by the dry matter content of the inverted solution.

However, where no inversion of the syrup is necessary in order to apply the copper reduction method, the purity of the syrup is determined by dividing the total sugar content of the syrup by the dry matter content of the syrup.

(2) Article 13 of Regulation No 394/70 must be interpreted as meaning that no method other than the copper reduction method or the areometric method may be applied in determining the sugar content or the dry matter content of the syrup or its inverted solution.