

The adoption of the International System of Units as the primary system of measurement in the United Kingdom

Report by the Department of Trade and Industry

“A general uniformity of weights and measures is so obviously desirable in every commercial country, in order to the saving of time, the preventing of mistakes, and the avoiding of litigation, that its establishment has been a fundamental principle of the English constitution from time immemorial.”

First Report of the Commissioners appointed to consider more uniform Weights and Measures, 1819

“A uniform system of units of weights and measures, nationally used and enforced, is plainly part of the basic vocabulary of consumer protection.”

Final Report of the Board of Trade Committee on Consumer Protection, 1962

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FOREWORD BY THE MINISTER FOR COMPETITION AND CONSUMER AFFAIRS

This report is about the adoption of the International System of Units - the modern version of the metric system - as the primary system of measurement in the United Kingdom.

Since 1965, successive Administrations have promoted the use of metric weights and measures in order to assist industry to compete in an increasingly metric global market. The debate since 1965 has been about the pace and timing of the change from imperial to metric units for specific purposes.

The case for metrication is even stronger in the 1990s. Other Commonwealth countries have gone metric. Metrication is now under way in the United States. The metric system has been taught in our schools since 1974. Metric units are now used by the public sector for most purposes.

The retail sector has adopted metric weights and measures in stages, for an ever-increasing range of goods. Today, more than ninety per cent of consumer goods sold by weight or measure are sold in metric units. Under legislation made in 1994, goods sold loose by weight - mainly fresh food - must be priced and weighed in grams and kilograms after 31 December 1999.

Selling all foods in metric weights will make it easier than it is at present to compare the price and weight of foods sold pre-packed and loose. But retailers can continue to display the price per imperial unit alongside the price per metric unit. And consumers can continue to express in ounces and pounds the quantity they wish to buy: retailers will simply weigh out the equivalent quantity in grams and kilograms.

The supermarket chains, which account for eighty per cent of sales of loose goods, have started selling loose goods in metric weight. To assist small retailers and their customers with the change, DTI is publishing an information package. Further information and advice is also available from DTI's metric helpline and website.

Weights and Measures in this country and in other countries have changed over time and responded to developments beyond national borders. In the short term, the ounce and the pound will continue in everyday speech. In the longer term, they may join other traditional measures - such as the ell, the scruple and the thurdendel - long since discarded and forgotten.

1. THEORY AND PRACTICE OF MEASUREMENT

1.1 Throughout history governments have sought to establish systems of measurement so that quantity can be expressed and measured with certainty and consistency and without confusion or dispute¹. To fulfil its function, a measurement system must prescribe the *units of measurement* to be used for expressing each type of quantity (length, weight, volume etc), the *value* that each unit represents, and the *physical standards* of the unit values by reference to which the accuracy of measuring instruments can be checked².

1.2 Uniformity between the name, value and physical standard of units is inherent in the theory of accurate measurement. But in the past this uniformity often proved difficult to realise in practice, particularly where the same name was used for expressing different values or where the physical standards were unreliable. For example, a difference in the values of the UK and the US inches meant that reference gauges used in precision engineering in the US did not conform to the same specification in the UK and vice versa, with adverse implications for trade between the two countries in engineered goods and spare parts³.

1.3 The development of metric units has overcome the problem of lack of uniformity. They now form the basis of a common international system that provides certainty in measurement for science and trade, which otherwise would be hampered by differences in the national systems of each country and the consequent need to convert quantities from one system to another and to make goods to different specifications.

1.4 This report summarises how the metric system has been adopted internationally and in the UK. It then considered the three issues for completing UK metrication: the change to metric units for goods sold loose by weight; the use of imperial units as supplementary indications of quantity;

¹ Eg Magna Carta ("Let there be one measure of wine throughout our Kingdom, and one measure for ale, and one measure for corn... and one width for cloths... Let it be the same with weights as with measures".) and the Act of Union between England and Scotland ("from and after the Union, the same weights and measures shall be used throughout the United Kingdom, as are now established in England").

² For example, the kilogram is the prescribed *unit of mass (weight)* of the International System. Its *value* is equal to the mass of the international prototype of the kilogram, a metal artefact kept by the International Bureau of Weights and Measures near Paris. The UK copy of the prototype is the *physical standard* against which weights and weighing machines are calibrated in the UK.

³ *Report of the Committee on Weights and Measures Legislation*. Cmd. 8219. HMSO, 1951. The discrepancy was resolved by re-valuing the UK and US yards by reference to the metre, the prescribed unit of length of the International System. The US ton is 2,000 pounds compared with the UK ton of 2,240 pounds. The US gallon (3.785 litres) is less than the UK gallon (4.546 litres), but the US fluid ounce (29.573ml) is more than the UK fluid ounce (28.412ml), because there are sixteen fluid ounces to the US pint compared with twenty fluid ounces to the UK pint. These differences have little impact on consumers, although cosmetics and perfumes are often labelled in US rather than UK fluid ounces.

and the use of metric units for describing the dimensions of goods not sold by weight or measure.

1.5 The report focuses on the use of metric units for economic purposes, particularly for the sale of consumer goods. But inevitably metric units have also been adopted in other areas of life where there is a need to express quantity and make measurements, including in science and education⁴, public administration and sport.

⁴ Thus, for example, it is no longer necessary to learn the three different units of weight of the imperial system: apothecaries, avoirdupois, and troy.

2. INTERNATIONAL ADOPTION OF THE METRIC SYSTEM

2.1 The metric system was first developed in France at the end of the eighteenth century as a simple but scientifically-based replacement for the complex weights and measures then in use. By the second half of the nineteenth century the majority of countries in Europe and the Americas had adopted metric units. In 1875 seventeen countries signed a diplomatic treaty - the "Convention du Mètre" (Metre Convention) - to agree and establish international metric standards⁵. The Convention also authorised the General Conference of Weights and Measures to develop the system over time in line with advances in science and the needs of users. In 1960 11th General Conference re-designated the metric system the "Système international d'unités" (International System of Units), with the abbreviation "SI". The 21st General Conference is due to meet in October 1999.

2.2 There are currently 48 signatories to the Metre Convention, including Commonwealth or former Commonwealth countries that formerly used the UK imperial system. SI units are also used in the great majority of international technical and safety regulations and engineering standards. The USA, which began a metrication program in 1975, is now the only major trading country where a significant proportion of trade is still conducted in non-SI units.

2.3 In 1971 the six original Member States of the European Economic Community adopted Directive 71/354/EEC on units of measurement with the objective of establishing the harmonised use of (mainly) SI units throughout the EEC⁶. The Directive was replaced in 1979 by Directive 80/181/EEC which requires SI units to be used for most economic, public health, public safety and administrative purposes in order to promote clarity in the use of units and the free movement of goods⁷. An amending directive - Directive 89/617/EEC - was adopted in 1989 which set 31 December 1994 as the date by which most of the imperial units still in use in Ireland and the UK would be phased out⁸. Non-SI units were authorised for use as supplementary indications alongside SI units until 31 December 1999.

2.4 In March 1999 the European Commission published a proposal to further amend Directive 80/181/EEC to reflect recent changes made to the SI by the General Conference of Weights and Measures and to permit the use of supplementary indications until 31 December 2009. The proposal also provides for a review at a later date of the application and functioning of

⁵ The UK signed the Convention in 1884 and has participated since then in the development of the metric system.

⁶ Harmonising the use of units of measurement forms part of a wider programme of harmonisation for measuring instruments and weights and measures controls on packaged products.

⁷ Except where international conventions or agreements concerning air and sea transport and rail traffic prescribe other units.

⁸ The Directive authorised the use of a number of imperial units - including the pint and the mile - in Ireland and the UK after 31 December 1999 for a number of specific purposes. These are listed in Appendix C.

the Directive. The SI changes are relevant for science and engineering, but have no impact on retail trade. The reason for extending the use of the supplementary indications is discussed more fully in Section 6 of this report.

3. METRICATION IN THE UNITED KINGDOM: 1965-1995

3.1 Metric units have been adopted in the UK in stages for an ever-increasing range of uses. The main developments behind the decision to go fully metric are summarised below. A more detailed account is set out in Appendix A.

3.2 In 1965 the Government informed Parliament that it supported UK industry's intention to adopt metric units over ten year period, sector by sector, so that the metric system could become in time the primary system of measurement for the country as a whole⁹. To assist the process, the Metrication Board was established in 1968 to guide, stimulate and co-ordinate the planning of sectoral change-overs.

3.3 In the White Paper on metrication published in 1972¹⁰, the Government confirmed its support for an orderly transition to metric units for the country as a whole. The Government said the UK would find itself at a competitive disadvantage if it retained the imperial system for the home market in isolation from the international trend in favour of the metric system.

3.4 Under the 1972 Treaty of Accession to the EEC, the Government committed the UK to complete its adoption of SI units in line with cut-off dates to be agreed in future directives on units of measurement¹¹. Directive 71/354/EEC as amended by Directive 76/770/EEC de-authorised certain imperial units, some after 31 December 1977 and others after 31 December 1979¹². Directive 80/181/EEC as amended by Directive 89/617/EEC de-authorised most of the remaining imperial units after 31 December 1994, with temporary or permanent exemptions for a number of units for specific purposes in the UK and Ireland¹³.

3.5 As a consequence of these developments, manufacturing industry largely went metric in the period up to 1975, with the main changes thereafter in the retail sector. Most packaged goods have been labelled in metric units since 1978. Many staple pre-packed foods have additionally been sold in standard metric quantities. The remaining packaged goods went metric in 1995 in response to legislation made in 1994 to implement Directive 89/617/EEC.

⁹ *Hansard (Commons)*, 25 May 1965, Col.32-3. The announcement is re-produced in full at Annex B.

¹⁰ *Metrication*. Cmnd. 4880. HMSO, 1972.

¹¹ Articles 29 and 152 of the Treaty of Accession added imperial units to the non-SI units in Directive 71/354/EEC to be phased out.

¹² Including the chain, furlong, UK nautical mile, UK knot, cubic yard and bushel by the end of 1977, and the yard, cubic inch, cubic foot, stone, quarter and hundredweight by the end of 1979.

¹³ The exemptions are listed in Appendix C. Permanent exemptions include the pint for draught beer and for milk in returnable containers and the mile, etc for road traffic. Temporary exemptions include the ounce and pound for goods sold loose from bulk until 31 December 1999.

3.6 As regards goods measured or weighed at the point of sale, petrol largely converted to the litre in the early 1980s. Wine and spirits sold by the glass have been served in metric measures since 1995. Similarly, goods sold by length (eg wood and cable) or by area (eg floor coverings) have been priced and cut in metric units since 1995. Under the 1994 legislation goods sold loose by weight are due to convert to metric units by no later than 1 January 2000.

4. COMPLETING UK METRICATION

4.1 The Better Regulation Task Force, business organisations and the local authorities have asked DTI to clarify the position regarding the change to metric units for goods sold loose by weight, the use of imperial units as supplementary indications, and the units of measurement to be used for describing the size and dimensions of goods not sold by weight or measure. A number of organisations representing small businesses and the British Weights and Measures Association have requested that the 1994 legislation should be amended to permit traders to continue to use imperial units so as to avoid the cost of changing to metric. But consumer groups consider that delaying still further the completion of metrication would not be in the best interest of consumers.

4.2 From the trade's perspective, the Department recognises that each stage of metrication has inevitably imposed a change-over cost on individual businesses. An estimate of the cost for changing to metric units for loose goods is set out in paragraphs 5.8 and 5.9 below. But the Department must also recognise that delaying the metrication of loose goods now would simply defer the costs of change to a later date. To delay or reverse metrication now would also be unfair to retailers and manufacturers who have already invested in converting to metric in response to the legislation. It must also be recognised that manufacturers and wholesalers would incur extra costs in supplying some retailers in imperial units and others in metric¹⁴.

4.3 From the consumer's perspective, if goods were sold in metric units in some shops and in imperial in others it would be difficult to compare prices unless all shops priced in both metric and imperial units. Mandatory dual pricing in metric and imperial units would be a burden for some retailers, particularly for small shops where prices are calculated manually rather than by computer and where there is likely to be limited space for displaying prices¹⁵.

4.4 The Department has concluded that, on balance, there would be no advantage in seeking to defer the date agreed by the previous Administration in Directive 89/617/EEC for completing the adoption of metric units for goods sold by weight or measure. Retailers therefore face the challenge over the coming months of helping their customers to become familiar with buying loose goods by the gram and the kilogram. As is

¹⁴ For example, during the debate on proposals that were subsequently adopted as Directive 89/617/EEC (see paragraph), the House of Commons was informed that the Institute of Production Engineers had estimated the additional cost of dual manufacture and stockholding to be three per cent of turnover: *Hansard (Commons)*, 11 April 1989, Col. 844.

¹⁵ Under UK price marking legislation, if retailers sold loose goods in metric units prior to 1994 they were obliged to indicate their prices in metric and imperial units. Goods sold in imperial units were not obliged to display the equivalent metric price. The legislation was amended as part of the metrication legislation in 1994 in recognition of the cost mandatory dual pricing would impose on retailers, particularly small traders.

explained more fully in the following paragraphs, DTI will provide information and advice about the change for small traders and their customers.

5. GOODS SOLD LOOSE BY WEIGHT

5.1 Under the 1994 legislation, goods sold loose by weight must be weighed in grams and kilograms and priced per kilogram or per 100 grams by no later than 1 January 2000. The main impact of this change will be on fresh foods, including fruit and vegetables, meat, poultry, fish and dairy products. Loose foods account for about ten per cent of sales in the typical supermarket. Pre-packed foods are already sold in metric units. The change will also affect a few non-food goods, such as loose nails and ballast. The majority of non-foods are sold pre-packed and are already sold in metric units.

Timing of the change-over

5.2 As with the earlier stages of metrication, it would be impractical for all retailers of loose goods to change to metric units on the same day. Each retailer will therefore change at a time before 1 January 2000 that is most convenient for his or her business. Inevitably this will mean that in the run up to 1 January 2000 loose goods will be sold in metric units in some shops and in imperial units in others.

5.3 DTI is monitoring the pace of change in consultation with representatives of local authorities, business and consumers. The likely pattern is that the large retailers will change early in the second half of 1999 (some supermarket chains have changed already) and that small retailers will change towards the end of the year.

Consumer impact

5.6 For many years, pre-packed goods - which account for about 90 per cent of sales in the typical supermarket - have been labelled and priced only in metric units. Goods measured at the point of sale - such as petrol, fabrics and lengths of wood, cable, etc - have been sold in metric units since 1995 or earlier. Consumers therefore already have direct experience of buying many goods in metric units. But if consumers are uncertain about specifying a quantity in grams and kilograms, they can continue to ask in ounces and pounds: the retailer will weigh out the equivalent quantity in metric units.

5.7 The metrication of loose goods will improve price transparency for the consumer. Fresh foods are subject to more frequent price changes than most goods sold by weight or measure due to seasonal fluctuations. At present, with loose food priced per pound or per quarter pound and pre-packed food priced per kilogram or per 100 grams, the relative price difference between foods sold both loose and pre-packed can be identified only after time-consuming calculations, with the risk of error in the calculation and misinformed choices. By contrast, comparisons will be simpler and quicker when prices of all foods are indicated in metric units.

Business impact

5.8 DTI published a compliance cost assessment for business when the 1994 metrication legislation was laid before Parliament. The assessment is re-printed in Appendix D. The overall costs were estimated to be about £33m, with additional unquantified costs for staff training. The main cost - about £30m - was identified as the conversion or replacement of an estimated 200,000 weighing machines.

5.9 The assessment did not apportion the costs between the metric changes in 1995 and the change for loose goods in 1999. The UK Weighing Federation estimates that at the beginning of 1999 there were about 95,000 weighing machines that still had to be converted or replaced. About 76,000 machines should be capable of conversion. The remaining 19,000 will have to be replaced. The typical costs of conversion range between £60 and £145 per machine. The cost of a replacement will depend on the model chosen. The cheapest model costs about £450. A set of metric weights costs about £50.

Information and advice for consumers and small retailers

5.10 As with earlier metric changes, information for consumers about the latest change is of most help at the point of sale, to assist with purchasing decisions. Large retailers are providing their customers with information about buying loose goods in grams and kilograms. To assist small retailers and their customers, DTI has prepared an information package. This comprises a leaflet for retailers, with information and sources of further advice on how to change to metric units; a wall chart with metric and imperial weight comparisons for display in shops; and copies of a leaflet for consumers about buying loose goods in grams and kilograms.

5.11 Retailers can contact members of the UK Weighing Federation for more detailed advice about whether a weighing machine can be converted or will need to be replaced. In addition, DTI is meeting sectors that are concerned about the change to see if there are ways of minimising its impact.

5.12 Copies of the consumer leaflet are also being distributed to Citizens Advice Bureaux, trading standards departments, libraries, consumer groups, Age Concern, and the Royal National Institute for the Blind. Further copies of the leaflets and the wall chart are available from DTI¹⁶. The consumer leaflet is also available in Welsh and a number of other languages, in Braille and on audiotape. The text of the retailer leaflet is available in Welsh and a number of other languages¹⁷.

5.13 The DTI information package is being supplemented by a telephone help-line¹⁸ for enquiries from consumers and retailers about the latest

¹⁶ By telephoning 0845 601 0540.

¹⁷ Arabic, Bengali, Chinese, Greek, Hindi, Punjabi, Turkish, Urdu, Vietnamese.

¹⁸ 0845 601 0540.

change; and a website¹⁹ with more general information about units of measurement.

¹⁹ <http://www.dti.gov.uk/cacp/ca/metric/index.htm>.

6. IMPERIAL UNITS AS SUPPLEMENTARY INDICATIONS

6.1 Throughout the metrication process traders have had the option of using imperial units as *supplementary indications*, as a second indication of quantity alongside the metric units. Supplementary indications were used during the earlier stages of metrication until traders considered that their customers had become accustomed to metric units. Thus, because most packaged goods have been marked with metric indications of quantity since the 1970s, few packages are still dual marked with imperial indications today. Similarly, the unit prices of most packaged goods are now indicated only in metric units (ie price per kilogram, per litre, etc).

6.2 Under Directive 80/181/EEC supplementary indications are authorised until 31 December 1999²⁰. The Government considers that this authorisation should be extended, because some retailers may wish to use supplementary indications after 31 December 1999 for pricing loose goods and for describing the size or dimensions of other goods, to help their customers with the change. A further difficulty with the present time-limit for supplementary indications is that under the US metrication programme packaged goods sold in the US must be dual marked in metric and US units. This means that, after 31 December 1999, EU manufacturers would have to use metric-only labels on the packages sold in the EU and metric/US unit labels on packages exported to the US. These separate labelling requirements would have adverse cost implications for packaging and distribution.

6.3 In order to avoid additional costs for EU manufacturers, the European Commission has proposed an extension of the authorisation for supplementary indications until 31 December 2009²¹. The Commission considers that this extension should provide a sufficient period for the US, as part of its metrication programme, to permit products to be labelled only with metric units.

6.4 The UK and other Member States have already indicated their support for an extension. The Government therefore anticipates that the proposal will be adopted later this year by the Council of Ministers and the European Parliament. When the proposal has been adopted it will have to be implemented in the UK. At that stage the Department will take the

²⁰ See paragraph 2.3

²¹ See paragraph 2.4

opportunity to consolidate and clarify the three sets of regulations²² that implement Directive 80/181/EEC.

²² The Units of Measurement Regulations 1986 (SI 1986/1082), the Units of Measurement Regulations 1994 (SI 1994/2867) and the Units of Measurement Regulations 1995 (SI 1995/1804).

7. DESCRIPTIONS OF SIZE AND DIMENSION

7.1 The change-over of loose goods will complete the metrication programme for units of measurement that are used for trade within the meaning of the Weights and Measures Act 1985²³. The position is less complete regarding metric descriptions of the size or dimensions of goods not sold by weight or measure. For example, although fitted carpets and curtain material are now sold in metric units, the length and width of free-standing carpets and ready-made curtains are frequently given only in imperial units, with no equivalent information in metric units. Similarly, not all clothes are marked with a metric size. The dimensions of furniture and of some DIY products are often described only in imperial units. In such cases the consumer must rely on imperial units as part of his or her purchasing decision.

7.2 The Better Regulation Task Force has recommended that the position regarding metric sizes and descriptions should be clarified and that authoritative metric equivalents to imperial sizes should be communicated to business and consumers in order to ensure consistency. The British Retail Consortium has expressed concern that the provision of reliable metric information about sizes is hampered by the lack of suitable conversion tables for goods manufactured to imperial specifications (eg screw length) and by the lack of consistent labelling practice within the EU for some goods (eg clothes' sizes). Consumer groups have described the situation as a "metric muddle" and consider that the absence of metric information about sizes delays consumer familiarisation with metric units more generally.

7.3 The National Federation of Consumer Groups and the Metric Sense Campaign consider that the UK fails to use metric in everyday life because practices in the UK are not as user-friendly as those in other European countries. For example, surveys by the two organisations show that most people dislike 1700mm instead of 1.70m for the length of a bath; or 22mm x 32mm instead of 2cm x 3cm for the dimensions of a piece of timber; or 125ml instead of 12cl for a glass of wine. But the British Weights and Measures Association considers that metric descriptions of goods manufactured to imperial specifications are more likely to confuse than to assist consumers, because in such cases an accurate metric description is invariably less user-friendly than the imperial specification (eg describing an 18" saw as 457mm).

7.4 DTI recognises the force of these concerns and intends to discuss with business and consumer groups what action can be taken to enable

²³ Under Section 7 of the Weights and Measures Act 1985, "use for trade" means use in respect of a transaction for money or money's worth or in payment of a toll or duty. The use must determine or state the quantity by reference to which the transaction is made. Units used to describe the size or dimensions of goods sold by number (for example, a piece of furniture) are not in "use for trade" because the use does not determine or state the quantity by reference to which the sale is made.

consumers to be given reliable information about metric sizes and dimensions, including conversion tables for metric and imperial dimensions, and to clarify the UK legislation on units of measurement²⁴ in line with Directive 80/181/EEC as amended.

²⁴ The Units of Measurement Regulations 1986 (SI 1986/1082), the Units of Measurement Regulations 1994 (SI 1994/2867) and the Units of Measurement Regulations 1995 (SI 1995/1804)

APPENDICES

Appendix A Chronology of UK metrication

Appendix B 1965 Government announcement in support of metrication

Appendix C Imperial units authorised for specified purposes

Appendix D 1994 compliance cost assessment

Appendix E 1895 Parliamentary Select Committee on Weights and Measures

APPENDIX A

CHRONOLOGY OF UK METRICATION SINCE 1862

A1. By the beginning of the nineteenth century weights and measures in the British Isles, as elsewhere in Europe, were a confusing mix of different local standards despite repeated attempts to secure uniformity. To address this problem, an Act of Parliament “*for ascertaining and establishing Uniformity of Weights and Measures*” was passed in 1824²⁵ which created the modern imperial system and phased out many traditional units, such as the ell²⁶.

Legalisation of the metric system

A2. In 1862 a Parliamentary Select Committee reported that the imperial system had not been adopted fully in the UK, and that other European countries were adopting the metric system. The Committee recommended that metric units should be legalised and should be used in public administration in order to promote their use more widely in the UK²⁷. In response, the Metric Weights and Measures Act 1864 legalised references to metric units in contracts and dealings, but not in public administration.

A3. In 1895 another Parliamentary Select Committee recommended that metric units should be legalised for all purposes and should be made compulsory after a transition period of two years²⁸. In response, the Weights and Measures (Metric System) Act 1897 legalised the metric system for all purposes, but did not make it compulsory.

Metric units as the UK’s secondary measurement system

A4. Following the passing of the 1897 Act, metric units were adopted in the UK for science and for trade with countries that had adopted the metric

²⁵ 5 G.4.c.12. The recital to the Act referred to the absence of uniformity as being “*the cause of great confusion and of manifest frauds*”. The Act had to be supplemented by further legislation - in 1825, 1834, 1835, 1859 and 1878 - and progressively tougher penalties for non-compliance before the system was fully established.

²⁶ The ell was a traditional unit of length somewhat larger than the yard.

²⁷ *Report of the Select Committee appointed to consider the practicality of adopting a simple and uniform system of weights and measures*, 15 July 1862. Parliamentary Papers 1862, vii, pp. 187-478. The Select Committee commented: “*The silent influence of usage has baffled the decrees of legislation; and we are still far distant from the uniformity at which we have so often, yet so vainly, aimed*”.

²⁸ *Report of the Select Committee appointed to enquire into whether any and what changes in the present system of weights and measures should be adopted*, July 1895. The Select Committee also recommended that the metric system should be taught in elementary schools. The main findings are reproduced in Appendix E.

system. But most overseas trade was with the UK's dominions and colonies and the US and continued to be conducted in imperial units. Imperial units continued to be taught as the primary system of measurement in schools and to be used for internal trade, retail sales and public administration. The status quo was reinforced by statutory obligations to use imperial units for specific purposes (eg excise duties, health and safety requirements, weight marks on packaged goods, price indications, local acts and bye-laws).

A5. In 1951 a Board of Trade Committee on Weights and Measures concluded that:

the metric system is, in the broadest sense and in the interests of world uniformity, a 'better' system of weights and measures than the imperial; that a change from imperial to metric for all trade purposes is sooner or later inevitable; that a continuance of the present option to use either the metric or the imperial until the inevitable comes about will cause in the long run more inconvenience than an ordered change within a specified period; and that the long-term advantages which would flow from an organised change in the near future would far outweigh the inconvenience of the change itself²⁹.

At the time fifty-seven per cent of the UK's external trade was with countries that still used imperial units. Industry was therefore divided about the desirability of an overall change to metric units, and the Committee's conclusions were regarded as premature.

Metric units as the UK's primary measurement system

A6. In 1965 the Federation of British Industries (now the Confederation of British Industry) informed the Government that a majority of its members favoured the adoption of the metric system as the primary and ultimately the only method of measurement to be used in the UK. The Federation suggested that the time was appropriate for Government to support the principle and timing of full metrication. In response, the Parliament was informed that the Government supported the adoption by industry, sector by sector, of metric units so that they could become in time the primary system of weights and measures for the country as a whole, and that a joint standing committee would be established to identify any obstacles to metrication.³⁰

A7. When the Joint Standing Committee reported in 1968 it identified three main obstacles. First, manufacturing industry could make the change efficiently only if the economy as a whole went metric on a broadly similar time-scale. Second, a Metrication board was needed to guide, stimulate and co-ordinate the change. Third, all legal restrictions on the use of metric

²⁹ *Report of the Committee on Weights and Measures Legislation*. Cmd. 8219. HMSO, 1951.

³⁰ *Hansard (Commons)*, 25 May 1965, Col. 32-33. The announcement is re-produced in full at Appendix B

units would have to be removed³¹. In a statement to Parliament, the Government accepted the Joint Standing Committee's findings and announced its intention to establish a Metrication Board as soon as possible³².

A8. In 1972 the Government published a White Paper on metrication³³ which advised that the UK, on its accession to the European Community, would be bound by Directive 71/354/EEC to adopt metric units after a transitional period. The White Paper also summarised the metric changes that were taking place across the manufacturing sectors, and said that it would be costly and confusing to keep imperial units for the consumer while industry changed to metric units. Plans were outlined for removing legal restrictions on the use of metric units and for assisting consumers during the change-over (mainly by labelling packages in metric units, and by packing in standard metric quantities, supported by the Metrication Board's co-ordination and publicity role). The White Paper concluded that:

Metrication has been taking place over many years, but the Government believe that the time has now come when they must act to ensure the orderly completion of the process. In doing so they will not hesitate to take whatever steps are necessary to protect the consumer during the period of changeover and to reduce to a minimum any difficulties which the introduction of the new system may cause.

A9. The House of Commons debated metrication in 1973³⁴. Later that year the first of a series of orders was made introducing standard metric quantities for pre-packed staple foods³⁵. In 1974 the metric system became the primary system of measurement to be taught in schools. In 1975 most pre-packed goods were required to be labelled in metric and imperial units³⁶. In 1976 the House of Commons debated proposals for a new units of measurement directive³⁷. The Units of Measurement Regulations 1976 implemented Directive 71/354/EEC, giving legal recognition to the SI units and authorising their use for economic, public health, public safety and administrative purposes. The Weights and Measures, etc Act 1976 made provision for restricting the use of imperial units for selling goods sold by weight or measure. The Government reported to Parliament in 1977 on the

³¹ *Change to the Metric System in the United Kingdom: Report by the Standing Joint Committee on Metrication*. HMSO, 1968.

³² *Hansard (Commons)*, 26 July 1968, Col. 1167-1171. The Metrication Board was established later in 1968 and came into operation in 1969. In addition to promoting metrication in industry, the Board advised Government and published regular reports detailing the progress of metrication.

³³ *Metrication*. Cmnd. 4880. HMSO, 1972

³⁴ *Hansard (Commons)*, 24 July 1973, Cols. 1424-1482.

³⁵ Between 1973 and 1978 sixteen orders were made prescribing standard metric quantities for prepacked staple foods, sand and ballast.

³⁶ Dual labelling remained mandatory until 1980. The obligation thereafter was to label in metric, with the option to label also in imperial.

³⁷ Adopted subsequently as Directive 76/770/EEC. *Hansard (Commons)*, 7 July 1976, Cols. 1515-1546.

progress of metrication³⁸. Directive 76/770/EEC was implemented by the Units of Measurement Regulations 1978.

A10. In 1979 the Government informed Parliament that metric units had been adopted extensively in manufacturing and retailing, and that the Metrication Board would be closed and its functions would be transferred to the Departments of Trade and Industry. The Government said it had no plans to increase the number of foods to be pre-packed in standard metric quantities, but encouraged industry to expedite future metrication in an orderly way and on a voluntary basis³⁹. The following month the House of Commons debated proposals for a new units of measurement directive⁴⁰ and resolved that no decision on phasing out more units should be taken until the House had given its approval⁴¹. The Metrication board, in its final report, concluded that most consumer groups favoured a speedy completion of metrication but that, in the absence of statutory deadlines, the retailers could not guarantee voluntary completion in the near future⁴².

A11. In 1989 the House of Commons debated proposals for a new units of measurement directive⁴³. The timetable for phasing out most of the remaining imperial units was welcomed by the House “*as providing adequate transitional periods to enable businesses and consumers to adapt and become used to the new measurements*”⁴⁴. The Government informed Parliament in 1991 that, following public consultation, the UK’s implementing legislation would generally take maximum advantage of the Directive’s transitional arrangements and derogations⁴⁵. The legislation was made in 1994⁴⁶. It ceased to authorise the use of imperial units for most economic,

³⁸ *Metrication: Report to Parliament by the Department of Prices and Consumer Protection*. HMSO, 1977.

³⁹ *Hansard (Commons)*, 14 November 1979, Cols. 642-3.

⁴⁰ Adopted subsequently as Directive 80/181/EEC - see paragraph 2.3.

⁴¹ *Hansard (Commons)*, 19 December 1979, Cols. 809-834

⁴² Final Report of the Metrication Board, 1980.

⁴³ Adopted subsequently as Directive 89/617/EEC - see paragraph 2.3.

⁴⁴ *Hansard (Commons)*, 11 April 1989, Cols. 839-862.

⁴⁵ *Hansard (Commons)*, 2 July 1991, Col. 99

⁴⁶ The legislation was laid before Parliament in July and was debated on 1 November by the First Standing Committee on Statutory Instruments, etc of House of Commons and the House of Lords (*Hansard (Lords)*, 1 November 1994, Cols. 775-784).

public health, public safety or administrative purposes after 30 September 1995⁴⁷, and required metric units to be used after 30 September 1995 for most goods sold by weight or measure, and after 31 December 1999 for goods sold loose by weight. Imperial units were authorised for optional use as supplementary indications. Guidance notes and leaflets about these changes were issued to the public and private sectors in 1995.

⁴⁷ Except where derogations apply under the Directive.

APPENDIX B

GOVERNMENT ANNOUNCES ITS SUPPORT FOR METRICATION: HANSARD (COMMONS), 24 MAY 1965, COLS. 32-33

Weights and Measures (Metric System)

Mr Horner: *Asked the President of the Board of Trade if he will make a statement on the adoption in Great Britain of metric weights and measures.*

Mr Jay: *The Government are impressed with the case which has been put to them by the representatives of industry of the metric system of weights and measures. Countries using that system now take more than one-half of our exports; and the total proportion of world trade conducted in terms of metric units will no doubt continue to increase. Against that background the Government consider it desirable that British industries on a broadening front should adopt metric units, sector by sector, until that system can become in time the primary system of weights and measures for the country as a whole.*

One necessary condition for advances in this field will be the provision of metric standards, wherever possible internationally recognised, which will enable particular sectors of industry to work in metric units. The Government have therefore asked the British Standards Institution - and the Institution have agreed - to pay special attention to this work and to press on with it as speedily as possible. The Government will, of course, take this new commitment into account in determining the amount of future grants-in-aid to the Institution. We are also considering how we can best encourage the educational work to familiarise future school generations and students in technological establishments with working in terms of metric units.

We shall also encourage the change to the metric system as and when this becomes practicable for particular industries, by seeking to arrange that tenders for procurement by the Government and other public authorities shall be in terms of metric specifications.

Practical difficulties attending the changeover will, of course, mean that this process must be gradual; but the government hope that within ten years the greater part of the country's industry will have effected the change. To this end they propose to establish a small standing joint committee of representatives of government departments and industry to facilitate the removal of obstacles and to keep under constant review the progress which is being achieved.

The Government will keep in touch with Commonwealth Governments on this matter.

APPENDIX C

IMPERIAL UNITS AUTHORISED FOR SPECIFIED PURPOSES IN THE UK AND IRELAND BY DIRECTIVE 80/181/EEC AS AMENDED BY DIRECTIVE 89/617/EEC

Units authorised until 31 December 1999

- *fathom* for marine navigation;
- *pint and fluid ounce* for beer, cider, water, lemonade and fruit juice in returnable containers⁴⁸;
- *gill* for spirit drinks⁴⁹;
- *avoirdupois ounce* and *pound* for goods sold loose in bulk;
- *therm* for gas supply.

Units authorised without time limit

- *mile, yard, foot, inch* for road traffic signs, distance and speed measurement;
- *pint* for draught beer and cider and for milk in returnable containers;
- *acre* for land registration⁵⁰;
- *troy ounce* for transactions in precious metals.

⁴⁸ Most pre-packaged liquids had converted to metric units by the mid 1980s.

⁴⁹ From 1 January 1995 spirit measures have been sold in prescribed quantities of 25ml, 35ml, and multiples of 25ml and 35ml.

⁵⁰ Since 1995 any registered file plans which include a dimension have been expressed in metric units.

APPENDIX D

DIRECTIVE 80/181/EEC ON UNITS OF MEASUREMENTS AS AMENDED BY DIRECTIVE 89/617/EEC: COMPLIANCE COST ASSESSMENT

Note: This assessment was prepared by DTI and published in June 1994 as an attachment to the legislation that implements Directive 89/617/EEC in the UK.

COMPLIANCE COST ASSESSMENT

This Assessment applies to the costs arising out of making the instruments required to implement the Units of Measurement Directive 89/617/EEC in relation to the authorisation of units of measurement, weights and measures and price marking legislation.

Purpose and expected benefits

2. *The purpose of the measures is to implement amendments made to the Units of Measurement Directive 80/181/EEC by Directive 89/617/EEC. The 1980 Directive lays down the legal units of measurement to be used for expressing quantities for economic, public health, public safety or administrative purposes. The principal changes made by the implementing Regulations and Orders are to end the use of the pound and ounce for the sale of goods loose from bulk from 1st January 2000 and for pre-packed goods made up in varying quantities, such as cheese and meat, from 1st October 1995. The effect of the implementing legislation is to provide that from 1st January 2000, only one system of measurement, the metric system, is generally to be used for retail sales.*

Business sectors affected

3. *The main sectors affected are grocers, greengrocers, fruiterers, dairymen, butchers, fishmongers and poulterers (62,200 legal business units) and manufacturers of scales and weighing machines (106 legal business units). (Source: Business Monitor). Total for manufacturers of scales and weighing machines includes portable power tools manufacturers.)*

Compliance costs for a typical business

4. *The main cost is likely to be the modification or replacement of weighing machines. There are likely also to be smaller costs for new counter ticketing, for modifying computer systems, for staff training and for customer information.*

5. *Industry and trade sources have estimated that the cost of modifying weighing machines is likely to be between £40 and £180 per machine. The British Retail Consortium estimate that around 15% of machines will need to be replaced as it will be uneconomic to convert them and a new retail machine could, on average, cost around £400. It is understood from LACOTS that the charge for testing and stamping machines might be, on average, around £15 per machine.*

6. *For a retailer with total sales of around £8 billion, the cost of modifying and replacing machines could be around £2m, representing 0.03% of sales. For a small store with annual sales of around £250,000 and with one weighing machine, a cost of £125 to modify, test and stamp or £415 to purchase, test and stamp a new machine would amount to 0.05% or 0.17% respectively of sales. Reliable estimates for individual firms are not available for other costs except the British Retail Consortium estimate that new counter ticketing could cost around £110,000 for a large retailer. All costs are non recurring.*

Total compliance cost

7. *The weighing machine industry estimate that there are some 200,000 retail and industrial scales not yet metricated. If 15% of machines are replaced at an average cost of £400 and the remaining machines were converted at an average cost of £110 the total conversion cost would be around £30m. If the average cost of testing and stamping were £15 and if this were required on 30% of converted machines then such costs would add around a further £1m.*

8. *The British Retail Consortium estimate the total cost of new counter tickets at over £1m and changing computer systems at between £50,000 and £100,000. Reliable estimates for staff training and publicity are not available but the British Retail Consortium expect the costs of the former to be substantial.*

9. *There will also be costs in changing the designs of labels of pre-packed goods which bear both imperial and metric quantity marketing so as to show the metric quantity first. The trade estimate that this could cost around £2m.*

10. *These costs are likely to be incurred between 1993 and 1999.*

Effect on international competitiveness

11. *It is considered that in general the measures are unlikely to affect the international competitive position of the UK. However, to the extent that the Directive provides for weighing machines to be calibrated in the same unit of measurement in the UK as in other EC Member States and in most other countries this will reduce barriers to exports from, and imports into, the UK.*

Extent of consultation

12. Over 700 bodies were consulted and over three months were allowed for comments on the detailed provisions. Information is generally based on trade estimates.

Arrangements for monitoring and review

13. No arrangements have been made to monitor compliance costs. The proposals implement an EC Directive and implementation has generally gone no further than the Directive's requirements.

APPENDIX E

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS OF 1895 SELECT COMMITTEE ON WEIGHTS AND MEASURES

THE SELECT COMMITTEE appointed to inquire whether any and what changes in the present system of Weights and Measures should be adopted:- HAVE considered the matters to them referred, and have agreed to the following REPORT:-

THEY have in the first place received evidence from witnesses representing many different interests, (1) official; (2) commercial; (3) manufacturing; (4) trade; (5) educational; (6) professional.

They have also received from numerous corporations, school boards, and other public bodies, resolutions without exception in favour of the adoption of the metrical system.

Your Committee find that, almost all the witnesses express a strong opinion as to the complicated and unsatisfactory condition of our present weights and measures, and of the distinct and serious drawback to our commerce, especially our foreign trade, which this system entails, differing as it does from the system (metrical) now adopted by every European nation except ourselves and Russia, as well as by far the majority of non-European countries with which this kingdom trades. The evidence, however, goes further to show that not only is our foreign trade, in every branch, seriously handicapped, but that the home trade would be benefited if more simple and uniform standards of weights and measures than those now existing were adopted.

Moreover strong evidence was brought forward as to the serious loss of time incurred by English school children in having to learn the complicated system of tables of existing weights and measures, and the urgent need of the adoption of a simpler system. It was stated that no less than one year's school time would be saved if the metrical system were taught in place of that now in use.

Evidence from competent witnesses proved to the satisfaction of your Committee that a compulsory change from an old and complicated system to the metrical had taken place in Germany, Norway, and Sweden, Switzerland, Italy, and many other European countries without serious opposition or inconvenience. That this change was carried out in a comparatively short period, and that as soon as the simple character of the new system was understood, it was appreciated by all classes of the population, and no attempt to use the old units or to return to the old system was made.

In the United States, where a system founded on the English units exists, a Commission is at present engaged in an investigation of the same character as that with which your Committee is charged, and the Federal Government has this year passed an Act rendering the metrical system compulsory for pharmaceutical purposes.

Your Committee believes that the adoption of the metrical system by England would greatly tend to render that system universal.

Your Committee recommend:-

- a) That the metrical system of weights and measures be at once legalised for all purposes.*
- b) That after a lapse of two years the metrical system be rendered compulsory by Act of Parliament.*
- c) That the metrical system of weights and measures be taught in all public elementary schools as a necessary and integral part of arithmetic, and that decimals be introduced at an earlier period of the school curriculum than is the case at present.*

1 July 1985