Statistics and Comprehensive Reports on Six Sectors of Measuring Instruments and their Coverage by Eight Directives, with use of the EU Standard Cost Method to Estimate Administrative Cost Savings

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FINAL REPORT

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Statistics and Comprehensive Reports on Six Sectors of Measuring Instruments and their Coverage by Eight Directives, with use of the EU Standard Cost Method to Estimate Administrative Cost Savings

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by

Risk & Policy Analysts Limited,
Farthing Green House, 1 Beccles Road, Loddon, Norfolk, NR14 6LT

Tel: +44 1508 528465 Fax: +44 1508 520758
post@rpaltd.co.uk www.rpaltd.co.uk

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Executive Summary

To reduce the legislative burden and to ensure harmonisation across the EU, 'New Approach' Directives have been developed across a wide range of sectors (including electrical equipment, construction products, telecommunications equipment, etc.). These 'New Approach' Directives focus on the essential requirements rather than the more prescriptive specifications which are a feature of the 'Old Approach' Directives.

In relation to measuring instruments, Directive 2004/22/EC provides a harmonised legal framework (including standardised conformity testing and CE marks) for measuring instruments which were previously covered by eleven 'Old Approach' Directives. Consideration is now being given to three policy options for a further eight Directives relating to measuring instruments.

The three policy options are:

- *Option 1: maintain existing regulatory framework;*
- *Option 2: repeal the existing Directives; and*
- *Option 3: extend the MID to cover the existing Directives.*

These Options (and a number of sub-Options) were considered for the following eight Directives covering six sectors:

- *Cold water meters for non-clean water (Dir 75/33);*
- *Alcohol meters (Dir 76/765) and Alcohol tables (Dir 76/766);*
- *Medium and above-medium accuracy weights (Dir 71/317 & Dir 74/148);*
- *Tyre pressure gauges for motor vehicles (Dir 86/217);*
- *Standard mass of grain (Dir 71/347); and*
- *Calibration of ship tanks (Dir 71/349).*

For each sector, consideration was given to the current status of the market and to relevant national and international requirements. Information was obtained from desk-based research as well as consultation with manufacturers, suppliers, users and authorities across the EU. Although the information obtained was not sufficient to prepare detailed costings of the options in accordance with the EU Standard Cost Model, it was possible to prepare a qualitative commentary on the implications for administrative costs of the various options (and sub-options).

The results of the analysis are summarised on the next page.

Cold Water Meters for Non-Clean Water

The market for cold water meters for non-clean water is probably of the order of €4m per year. There is a range of national requirements but there appears to be little reliance on Directive 75/33/EEC. A need for further harmonisation has not been identified.

Alcohol Meters and Alcohol Tables

The alcohol drinks industry is very large and there are many ways of determining alcoholic strength. It appears that traditional glass alcohol meters are still used alongside electronic analyses in many production sites. The market for (calibrated) traditional glass alcohol meters is of the order of €2m per year. Such meters may be calibrated against Directive 76/765/EEC or another standard (such as ISO 4801 or OIML R 44 - as prescribed by Regulation 2676/90 concerning the analysis of wines). Advantages associated with the incorporation of the existing Directives (alone) into the MID have not been identified.

Medium and Above-medium Accuracy Weights

The market for medium and above-medium accuracy weights could be as much as €30m per year. However, consultation has indicated widespread agreement that the existing Directives (71/317/EEC and 74/148/EEC) are no longer of any significance as the de facto standard is the OIML standard R 111-1:2004 which is routinely used by manufacturers, suppliers, calibration services and national authorities.

Tyre Pressure Gauges for Motor Vehicles

Tyre pressure gauges covered by Directive 86/217/EEC are being replaced by digital pre-set machines in petrol stations and garages. Nevertheless, given the numbers of such facilities, the market for the 'old' gauges could still be €3m per year. Although, in some countries, reliance is also placed on other standards (such as those based on EN 12645:1998), there may be merit in incorporating tyre pressure gauges into the MID to improve clarity in the marketplace.

Standard Mass of Grain

The market for bulk density meters is probably of the order of €4m per year and is now dominated by integrated electronic analysers. Although Directive 71/347/EEC appears to have been displaced by the ISO 7971-2 standard (in both legislation and practice), consultation suggests that there is a need for further harmonisation.

Calibration of Ship Tanks

Consultation has confirmed that, in most Member States, Directive 71/349/EEC is not used as the basis for calibrating ships' tanks. Most companies carry out tank calibration work in accordance with the latest American Petroleum Institute (API) Manual of Petroleum Measurements Standard and/or ISO Standards.

1. INTRODUCTION

1.1 Background to Study

To reduce the legislative burden and to ensure harmonisation across the EU, 'New Approach' Directives have been developed across a wide range of sectors (including electrical equipment, construction products, telecommunications equipment, etc.). These 'New Approach' Directives focus on the essential requirements rather than the more prescriptive specifications which are a feature of the 'Old Approach' Directives[1].

In relation to measuring instruments, Directive 2004/22/EC[2] provides a harmonised legal framework (including standardised conformity testing and CE marks) for measuring instruments which were previously covered by eleven 'Old Approach' Directives. Consideration (including public consultation[3]) is now being given to three policy options for a further eight Directives relating to measuring instruments. The options under consideration are set out in the *Key Issues Document* (for the public consultation) as follows:

- ***Option 1:*** *Maintaining the current regulatory framework unchanged. This option will act as the baseline for assessing the impacts of adopting either Option 2 or 3.*
- ***Option 2:*** *Repeal existing Directives without proposing any new Community legislative instrument to replace them. Under this option, the free movement of measuring instruments within the Internal Market would implicitly rely on the Mutual Recognition Principle and horizontal legislation framing its correct functioning. Rather than national regulation Member States could rely on the voluntary application of European standards. For the updating and development of such standards the Commission could give a mandate. Member States wanting to keep national regulation would need to base their laws on international standards. For most instruments international standards exist. Under WTO/TBT obligations, international standards would be the basis for national regulation as well as for European standards.*
- ***Option 3:*** *Replacing the current Directives by new harmonising legislation added into the Measuring Instruments Directive 2004/22/EC, the latter already providing a legal framework for certain measuring instruments under the New Approach. This option implies the inclusion of these new sectors into this New Approach Directive. It does not allow any national rules, although Member States remain free to choose the tasks for which they want to prescribe legal metrological control. For these tasks they may only allow instruments conformity assessed on the essential requirements in the directive to be used on their territory.*

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1 European Commission (2000): **Guide to the Implementation of Directives based on the New Approach and the Global Approach**.

2 **Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments**, OJ L135, 30/04/2004, p1. This Directive is also known as the Measuring Instruments Directive (or MID for short).

3 Public consultation was open to 15 July 2008 through DG Enterprise's website: http://ec.europa.eu/enterprise/prepack/ms_inst/mid_directives.htm

1.2 Study Objectives

Risk & Policy Analysts has been commissioned to provide data input to the impact assessment for the preferred policy option which will be undertaken by Commission services. As outlined in the Task Specifications (see Annex 1), the specific requirement is:

> *... to provide statistical input as regards the economic importance of the sectors involved and to what degree their production is covered by the existing directives.*

The study will compile, assess and present the information on the following six groups of instruments which are subject to eight 'Old Approach' Directives:

- Cold water meters for non-clean water (Dir 75/33);
- Alcohol meters (Dir 76/765) and Alcohol tables (Dir 76/766);
- Medium and above-medium accuracy weights (Dir 71/317 & Dir 74/148);
- Tyre pressure gauges for motor vehicles (Dir 86/217);
- Standard mass of grain (Dir 71/347); and
- Calibration of ship tanks (Dir 71/349).

1.3 Approach to the Study

The study involved six tasks as summarised in Table 1.1.

Table 1.1: Approach to the Study by Task

Task	Comment
Task 1: Scoping Meeting	The Scoping Meeting was held at the Commission offices on 26th March 2008.
Task 2: Data Review	The data review comprised data searches and initial discussions with stakeholders (including each of the Commission's co-ordinators for the various sectors) in order to provide an overview of the usage of each of the Directives under consideration.
Task 3: Consultation	Consultation was undertaken with stakeholders across the EU including national/regional metrology offices, industry associations and individual companies.
Task 4: Market Analysis - Existing Situation	The results of Tasks 2 and 3 have enabled views to be presented on the existing situation (i.e. Option 1).
Task 5: Future Scenario Analysis	The results of Tasks 2 and 3 have enabled views to be presented on future scenarios (i.e. Options 2 and/or 3)
Task 6: Final Reporting	This Final Report presents the results of the study

1.4 EU Standard Cost Model

One of the aims of the Commission's Better Regulation strategy[4] is to measure and reduce administrative costs associated with regulation. The preferred means of measuring administrative costs is the *EU Standard Cost Model* which, in 2006, was incorporated into the Commission's *Impact Assessment Guidelines*[5]. In summary, the model requires that obligations are broken down into individual tasks which are costed in terms of staff time spent on individual tasks and the associated staff costs.

It was originally hoped that sufficient data would be obtained to enable robust estimates to be made of the administrative costs associated with each of the Options (outlined above). Although this has not proved to be possible, attempts have been made to suggest (qualitatively at least) whether administrative costs are likely to increase or decrease (with respect to the existing regulatory framework) for each of the sectors under each of the Options. Sub-options for the current regulatory framework are presented in Table 1.2.

Table 1.2: Framework used to Consider Administrative Costs of Options for Existing Old Approach (OA) Directives - Option 1 Maintain Current Regulatory Framework

Under the Current Regulatory Framework, instruments conforming to the OA Directives must be permitted to be placed on the market of Member States (MS). However, there are several scenarios (sub-options) by which this can occur as shown below

Sub-Option	Instruments which do not conform to the OA Directive	Implications for Trade	Administrative Costs
1A	are not permitted	Non-compliant instruments prohibited (and technical progress limited)	Low costs associated with European conformity assessment (ECA)
1B	are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress)	Mutual recognition of international standards should ensure free movement of compliant instruments	Similar low costs as for Option 1 - since one national conformity assessment (NCA) should ensure free trade across the EU
1C	are permitted if they conform to national requirements (not based on international standards)	Potential for limited intra-EU trade if different MS adopt different requirements	Potentially high costs as NCAs could be required for each MS market
1D	are permitted (i.e. no restrictions)	Free trade with no barriers but potential for inferior products to be on the market	No costs

It is, of course, possible that the existing regulatory framework will vary from Member State to Member State and that the overall EU position could involve a combination of the sub-options presented in Table 1.2. The other options are presented in Table 1.3.

[4] http://ec.europa.eu/governance/netter_regulation/index_en.htm

[5] European Commission (2006): **Impact Assessment Guidelines**, SEC(2005) 791 dated 15 June 2005 with March 2006 update.

Table 1.3: Framework used to Consider Administrative Costs of Options for Existing Old Approach (OA) Directives - Options 2 (Repeal OA Directives) and 3 (Extend Scope of MID)			
Option	**Sub-Option**	**Implications for Trade**	**Administrative Costs**
2. Repeal OA Directive	2A. National requirements (based on international standards - which have been adapted to technical progress)	Mutual recognition of international standards should ensure free movement of compliant instruments	Low costs - since one national conformity assessment (NCA) should ensure free trade across the EU
		Similar to Option 1B	
	2B. National requirements (not based on international standards)	Potential for limited intra-EU trade if different MS adopt different requirements	Potentially high costs as NCAs could be required for each MS market
		Similar to Option 1C	
	2C. No national requirements	Free trade with no barriers but potential for inferior products to be on the market	No costs
		Similar to Option 1D	
3. Extend Scope of MID	3A. Use of MID instruments prescribed for some measuring tasks	Non-compliant instruments may not be used for prescribed tasks	Medium costs associated with European conformity assessment (ECA)
	3B. Use of MID not prescribed (and, therefore, no national requirements) for any measuring tasks	Free trade with no barriers but potential for inferior products to be on the market	No costs
		Similar to Options 1D and 2C	

This framework immediately suggests that the level of administrative costs is likely to depend on the starting point for a particular directive - which, in turn, may well vary amongst Member States. Furthermore, the changes in administrative costs may be minimal in moving from one sub-option to another as illustrated in Table 1.4.

Table 1.4: Possible Scenarios for Old Approach Directives				
Future Scenarios	**Characterisation of Existing Situation**			
	Option 1A	**Option 1B**	**Option 1C**	**Option 1D**
2A	Logical. Accounts for technological change, low costs, benefits for trade	Logical - no change	Logical. Accounts for technological change, low costs, benefits for trade	Not logical - as few advantages over current situation (albeit with low costs)
2B	Not logical. Could limit trade, costs could be high.	Not logical as retrograde step	Logical - no change	Not logical. Could limit trade, costs could be high.
2C	Logical. Liberalisation, no costs, benefits for trade	Logical? Could be regarded as liberalisation or a retrograde step	Logical? Could be regarded as liberalisation or a retrograde step	Logical - no change
3A	Logical. Accounts for technological change, medium costs, benefits for trade	Logical. Accounts for technological change, medium costs, benefits for trade	Logical. Accounts for technological change, medium costs, benefits for trade	Not logical - as few advantages over current situation and medium costs.
3B	Logical. Liberalisation, no costs, benefits for trade	Logical? Could be regarded as liberalisation or a retrograde step	Logical? Could be regarded as liberalisation or a retrograde step	Logical - no change

1.5 Organisation of the Report

From an early stage, it became clear that each sector was different. As a consequence, descriptions of each are presented on a section by section basis albeit with a common template. Furthermore, there are a number of international bodies of relevance to this study and these are briefly summarised in Annex 2.

Cold water meters, alcohol meters, weights, tyre pressure gauges, mass of grain and ship tanks are considered in Sections 2 to 7 respectively. The associated questionnaires used for the stakeholder consultation are presented in Annex 3.

The results of the work are summarised in Section 8.

2. COLD WATER METERS FOR NON-CLEAN WATER

2.1 The Directive

2.1.1 Introduction

Directive 75/33/EEC on cold-water meters[6] defined the parameters for cold-water[7] meters to be granted EEC marks and signs to permit unhindered trade and use throughout the EU.

The Directive prescribed three classes (A, B and C) of water meter against four flow characteristics: minimum flow rate (Qmin); transitional flow rate (Qt); nominal flow rate (Qn); and maximum flow rate (Qmax). For all classes of water meter, the required accuracy was 5% for flow rates between Qmin and Qt, and 2% between Qt and Qmax. Classes A, B and C represent increasing accuracy at low flow rates (in other words, the values for Qmin and Qt (relative to Qn) decrease as one moves from Class A to Class C).

This Directive has been partially replaced by the MID (Annex M1-001 refers) which covers *water meters intended for the measurement of volumes of clean, cold or heated water in residential, commercial and light industrial use.*

2.1.2 Purpose of Directives

Given the provisions of MID, the prime focus for this study is the metering of non-clean cold water in residential, commercial and light industrial use. Potential areas where such meters could be used include:

- abstraction of water from surface waters (rivers, lakes, sea) or ground water for:
  - irrigation - agricultural and non-agricultural (including parks, golf courses, etc);
  - water treatment (to produce drinking/treated water);
  - cooling of industrial processes and power plants;
  - hydroelectric power generation; and
  - mining and quarrying;
- discharges of industrial waste water; and
- discharges of domestic waste water.

It should be noted that, in some cases, these uses would not be classified as 'residential, commercial and light industrial use'. Examples would include cooling water for large power stations and wash-water from large mines and quarries.

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6 **Council Directive 75/33/EEC of 17 December 1974 on the approximation of the laws of the Member States relating to cold-water meters**, OJ L014, 20/01/1975, p1.

7 Water is 'cold' when between 0 and 30 degrees C.

2.1.3 Measuring Non-Clean Water

There are numerous ways to measure the flow of (non-clean) cold water. At the most basic, timing the movement of a floating object through a channel of known dimensions will provide the basis for a reasonable estimate.

Continuous flow meters have been developed to measure water flows in both open channels and pipes across a wide range of conditions. However, it is important to stress that Directive 75/33/EEC only covers traditional mechanical meters, i.e. turbine meters and positive displacement meters.

Table 2.1 provides an overview of some of the key methods currently employed in water meters.

Table 2.1: Types of Water Flowmeters

Type of Meter	Location	Flows	Suitable for Non-Clean Water?	Covered by 75/33/EEC?
Differential Pressure	Pipes	All	Generally no, but some DP methods can be used	No
Turbine	**Large Pipes**	**Medium/High**	**Yes (without debris)**	**Yes**
Electro-Magnetic	Pipes	Low/High	Yes	No
Positive Displacement	**Small/Medium Pipes**	**Low/Medium**	**Not really**	**Yes**
Open Channel	Channels	All	Yes	No
Ultrasonic - Transit	Pipes	All	No	No
Ultrasonic - Doppler	Pipes	All	Yes (but not very accurate)	No
Fluid Oscillation	Pipes	All?	No	No

Sources: www.liquidflows.com and the UK *Abstraction Metering Good Practice Manual (2002)*

Cleary, the precision of any measurement of non-clean water flow will be dependent on the nature and extent of the presence of non-water materials. Although, a commonly expressed view was that precision measurements are rarely required for non-clean water, it would appear that a metering solution could be found for any particular set of circumstances.

2.2 Other Relevant Standards and Legislation

No standards have been identified which specifically relate to flow meters for non-clean water. However there are various standards (such as ISO 4359:1983[8]) relating to flow measurements in open channels.

[8] **ISO 4359:1983 Liquid Flow Measurement in Open Channels - Rectangular, Trapezoidal and U-shaped Flumes**.

Of course, in relation to meters for clean, cold water there is not only the MID but also international ISO standards[9] and OIML recommendations[10] as well as cross-reference guidance (from WELMEC[11]). Although the terminology relating to flow rates in Directive 75/33/EEC is still widely used, the MID and OIML R 49 are based on different flow parameters (Q1, Q2, Q3 and Q4) and different accuracy requirements.

National requirements for non-clean water metering vary from country. Although there are no statutory requirements for metering raw water abstractions in the UK, the issue of an abstraction licence by the authorities may be dependent on metering in accordance with best practice[12] (as opposed to compliance with a particular standard). On the other hand, in Austria, all water meters are regulated (with particular regard to calibration very five years[13]) while in Germany, regulated meters for non-clean water are required in commercial applications.

Spain has recently issued national regulations[14] which specifically relate to cold water meters not covered by the MID. The requirements are based on those of OIML R 49.

2.3 Consultation

2.3.1 Consultees

Short questionnaires (see Annex 3) were sent to a number of key manufacturers/suppliers and users (with a particular emphasis on water companies) and associated trade associations. These were supplemented with a visit to IWEX 2008 (International Water and Effluent Exhibition) and discussions with a few metrological authorities and other authorities.

2.3.2 Nature of Responses

It would appear that little reliance is placed on the requirements of Directive 75/33/EEC in relation to meters for non-clean water since the prime driver is compliance with national requirements.

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9 Including **ISO 4064-1:2005 Measurement of Water Flow in Fully Charged Closed Conduits - Meters for Cold Potable Water and Hot Water - Part 1: Specifications.**

10 OIML (2006): **Water Meters intended for the Metering of Cold Potable Water and Hot Water - Part 1: Metrological and Technical Requirements**, International Recommendation OIML R 49-1 Edition 2006.

11 WELMEC (2006): **Measuring Instruments Directive 2004/22/EC Water Meters Corresponding Tables OIML R49 2006 and R 49-2 2004 - MID-001**, dated November 2006.

12 WRc (2002): **Abstraction Metering Good Practice Manual**, published by the UK Environment Agency and currently being revised.

13 See BEV website: www.metrologie.at/index.html/homepage_mess-eichwesen_080.htm

14 **Orden ITC/279/2008, de, 31 de enero, por la que se regula el control metrológico del Esatado de los contadores de agua fría, tipos A y B** (*Order ITC/279/2008 of 31 January regulating Metrological Control of Cold Water Meters, Types A and B).*

2.4 The Market for Non-Clean Water Meters

2.4.1 Manufacture and Supply

Market Characterisation

The EU market for water meters is estimated[15] to be the order of €500m. There are numerous manufacturers and suppliers of water meters across the EU ranging from large multinational companies (with headquarters both within and outside the EU) manufacturing a comprehensive range of meters to national companies (perhaps specialising in particular types of meters - including manufacturing companies from the Czech Republic, France, Germany, Italy, Sweden, UK) and numerous suppliers (both general and specialised).

The prime focus of the EU market is on the provision of meters for potable water at consumer premises. Most meters appear to be fabricated within the EU although there are meters on the market from the US, India and China.

Typical Products and Prices

A simple Class B water meter for domestic use with a nominal flow rate of 1.5 m^3/hr (25 litres/min) can be purchased from around €30.

However, meters for non-clean water will tend to be for larger flows than those for clean water. As such, they are physically larger as the associated pipe diameter is also much greater. Typical prices of around €400 will buy Class A (mechanical) meters capable of handling non-clean water at a rate of 125 m^3/hr (over 2000 l/min) with a lifetime of 10-20 years. More specialised meters such as electro-magnetic meters are more expensive but can be used across a wide range of applications.

Given the diversity of meters on the market, it has not been possible to make meaningful price comparisons from one country to another.

Market for Non-Clean Water Meters

Robust statistics on sales of meters for non-clean water have not been obtained but the market is probably of the order of ten thousand meters per year (based on consultation responses and associated research and estimates). With a typical price of around €400 per meter (a little cheaper than the equivalent sized clean water meter), the annual market would be expected to be worth perhaps €4m per year - less than 1% of the total water meter market.

[15] Based on various sources including a presentation to the *Deutsche Bank 2008 Alternative Energy Conference* by Sensus Metering Systems, San Francisco, 24 June 2008.

2.4.2 Usage of Meters for Non-Clean Water

As indicated in Section 2.1, there are numerous applications for non-clean water. Available EU-27 data[16] suggest that the largest application of water abstraction of surface and ground waters is for cooling water in electricity generation plants (power stations) - particularly in Germany and France. The second largest use application is for irrigation in agriculture - particularly in Italy. The third largest use is for public drinking water supplies.

Each of these major uses will involve, in some cases, the metering of non-clean water flow rates. However, it is important to stress that the numbers of meters are orders of magnitude lower than those used for metering clean water for residential, commercial and light industrial use (as covered by the MID). By way of example, although a regional UK water company may have hundreds of abstraction points each of which is likely to be fitted with a meter, such companies provide potable water to a few million premises each of which could have a clean water meter. In other words, the ratio of the numbers of clean water meters to those of non-clean water maters could be 1000:1 or more[17].

It is worth noting that small-scale abstraction for, say, domestic or agricultural use is often excluded from metering requirements. Similarly, whilst it is common for premises to have meters for the incoming clean water supply (to provide a basis for charging), the vast majority of premises will not have meters monitoring outgoing wastewater flows.

For some uses, it is not necessary to have precise measurements. By way of example, there are meters on the market which are essentially indicators of low/normal/high flows. These are useful for irrigation as they provide a ready means to indicate to the farmer whether the irrigation hoses are working (normal flow), are blocked (low flow) or have become disconnected or split (high flow).

2.4.3 Trade and Trade Barriers

As already noted, there are numerous manufacturers and suppliers of meters for non-clean water across the EU. Many suppliers provide meters from a number of different countries. Although many of the meters are produced within the EU, there are also imported meters on the market (and there are also exports from the EU).

There was no indication that the current regulatory framework presented any significant barriers to trade.

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[16] As presented in Ecologic (2007): **EU Water Saving Potential**, report prepared for DG Environment dated 19 July 2007.

[17] And if the price of non-clean water meter is at least 10 times that for a clean water meter, the associated market share will be the order of 1%.

2.5 Developments of Note

There are now many more techniques used in water metering than were used in 1975 when Directive 75/33/EEC was enacted.

The key legislative development has been that meters for clean, cold water are now covered by the MID. In addition, as has already been noted, there are also international ISO standards and OIML recommendations as well as cross-reference guidance (from WELMEC).

Finally, of course, the EU is also much larger than the EU-9 of the mid-1970s.

2.6 Scenario Analysis

2.6.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

2.6.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Instruments which do not conform to Directive 75/33/EEC:

- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

No Member State has been identified as prohibiting meters (for non-clean water) which do not conform to Directive 75/33/EEC. Furthermore, no international standard has been identified which relates specifically to flow meters for non-clean water. With these points in mind, the existing regulatory framework can best be represented as either Option 1C (as in Austria, Germany and Spain) or Option 1D (as in the UK).

As such, maintaining the existing regulatory framework could entail significant administrative costs to meet the requirements in those countries with national requirements. However, it should be noted that issues involving such trade barriers have not been raised by consultees.

2.6.3 Repeal Directive 75/33/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

As noted above, there are no international standards relating specifically to flow meters for non-clean water. As such, the only available options (at present) are Options 2B and 2C. It would be expected that should Directive 75/33/EEC be repealed, those Member States with national requirements would retain them whilst those without such requirements would (in the short term at least) be unlikely to develop new national requirements. In other words moving from the current situation to Option 2 would not entail any additional administrative costs - as, in effect, there would be no change from the current situation.

2.6.4 Extend Scope of MID to incorporate Directive 75/33/EEC (Option 3)

Although the requirements for mechanical meters as set out in Directive 75//33/EEC could be incorporated into the MID, there are numerous other methods for measuring the flow of (non-clean) water in pipework. Although it might be possible to have general requirements within the MID for non-clean water meters, consultees have expressed the view that due to the diversity in the nature and quantity of non-clean waters used in a wide range of applications, it would be very difficult to develop a meaningful standard.

At present, the general view appears to be that where there is a particular need to meter the flow of non-clean water, a technical solution can be provided to meet the required flow characteristics and accuracy. Furthermore, such a solution can entail the use of meters that already meet the (metrological) requirements for clean water meters.

With these points in mind, there appears to be little support for Option 3. The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include non-clean cold water meters which are prescribed for some measuring tasks (Option 3A); and*
- *although MID extended to include non-clean cold water meters, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

Whilst those countries which currently have national requirements might have an interest in Option 3A (for some measuring tasks at least), there are concerns over the technical benefits. In other words, whilst the costs might be lower, the benefits are uncertain. For those countries with no national requirements, moving to Option 3B would not represent any significant change.

3. ALCOHOL METERS AND ALCOHOL TABLES

3.1 The Alcohol Meters Directives

3.1.1 Introduction

Directive 76/765/EEC on alcohol meters[18] defines parameters for alcoholometers (which measure the alcoholic strength by mass or volume of water/ethanol mixtures) and for hydrometers (which measure the density of water/ethanol mixtures). The associated Directive 76/766/EEC[19] provides the direction on conversion of readings from alcohol meters to alcohol strength figures using international (OIML) 'alcohol tables'.

3.1.2 Meters covered by the Directives

The alcohol meters covered by Directive 76/765/EEC are described as follows:

Alcoholometers are glass instruments which indicate:

- *the alcoholic strength by mass, or*
- *the alcoholic strength by volume,*

of a mixture of water and ethanol.

They are described as either mass alcoholometers or volume alcoholometers, depending upon what is measured.

Alcohol hydrometers are glass instruments designed to measure the density of a mixture of water and ethanol.

The instruments defined in this Directive are graduated at a reference temperature of 20 ºC, in accordance with the values appearing in the international alcohol tables published by the International Organization of Legal Metrology.

The Directive specifies three classes of alcohol meters (I, II and III). Those in Classes II and III may incorporate a (mercury or metallic resistance) thermometer. The section of Directive 76/765/EEC on thermometers was amended by Directive 82/624/EEC[20].

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[18] **Council Directive 76/765/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to alcoholometers and alcohol hydrometers**, OJ L262, 27/09/1976, p143.

[19] **Council Directive 76/765/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to alcohol tables**, OJ L262, 27/09/1976, p149.

[20] **Commission Directive 82/624/EEC of 1 July 1982 adapting to technical progress Council Directive 76/765/EEC on the approximation of the laws of the Member States relating to alcoholometers and alcohol hydrometers**, OJ L252, 27/08/1982, p8.

3.1.3 Purpose of the Directives

The Directives require that alcohol strength figures derived from readings from alcohol meters bearing the EEC pattern approval sign or EEC verification mark should not be challenged within the EU.

As with other Directives considered in this report, the Directives do not place an obligation on the use of such alcohol meters or alcohol tables. In other words, use of the Directives is optional - subject, of course, to national requirements.

3.2 Other Relevant Standards and Legislation

3.2.1 Alcohol Strength

Although alcohol meters may be used to derive the alcoholic strength of water/ethanol mixtures, there are other methods available. These include alternative methods to determine the mixture density as well as methods to measure alternative characteristics.

3.2.2 ISO 4801 and 4805

The International Organization of Standardization (ISO), founded in 1947, issues numerous internationally accepted standards. In relation to traditional glass alcohol meters, there are two standards relating to those with and without a thermometer - ISO 4805:1982[21] and ISO 4801:1979[22] respectively.

3.2.3 OIML R 44

The International Organization of Legal Metrology (OIML) formed in 1955 produces international recommendations across the entire range of metrological activities. In relation to alcohol meters, the current standard is OIML R 44:1985[23].

By inspection, the requirements of R 44 appear to be identical to those of Directive 76/765/EEC (as amended). The associated alcohol tables (as referred to in Directives) are to be found in OIML R 22:1975[24].

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[21] ISO 4805:1982 **Laboratory Glassware - Thermo-Alcoholometers and Alcohol-Thermo-hydrometers**.

[22] ISO 4801:1979 **Glass Alcoholometers and Alcohol Hydrometers not incorporating a Thermometer**.

[23] OIML (1985): **Alcoholometers and Alcohol Hydrometers and Thermometers for use in Alcoholometry**, International Recommendation OIML R 44 Edition 1985.

[24] OIML (1975): **International Alcoholometric Tables**, International Recommendation OIML R 22 Edition 1975.

3.2.4 Regulation 2676/90

Regulation 2676/90 (as amended[25]) prescribes methods for the analysis of wines. In relation to 'alcoholic strength by volume', adaptations to technical progress have resulted in three reference methods:

- pycnometer (a flask used to compare weights when empty, when filled with water and when filled with wine distillate) to determine density and, hence, alcoholic strength;
- hydrostatic balance (displacement of water by wine distillate) to determine density and, hence, alcoholic strength; and
- as of 2005, electronic densimetry using a frequency oscillator[26].

There are also two usual methods:

- hydrometry (using a glass hydrometer to measure density and, hence, strength); and
- refractometry (measuring refractive index of light which varies with alcoholic strength).

Although the hydrometers as traditional glass alcohol meters would be covered by Directive 76/765/EEC, there is no reference to the Directives on alcohol meters in Regulation 2676/90. Indeed, the Regulation specifies that alcohol meters must conform to OIML R44[27]. Furthermore, it should be noted that the Regulation relies, to some extent, on methods approved by the International Office of Vine and Wine[28].

However, tracing back Regulation 2676/90 in time, the earlier Regulations 2984/78[29] and 1108/82[30] specified one reference method (pycnometry) and two usual methods (hydrometry and use of hydrostatic balance) with specific reference to use of hydrometers complying with Directives 76/765/EEC.

The costs associated with traditional glass laboratory equipment are relatively low. Calibrated hydrometers without thermometers generally cost from €20 whilst those with thermometers generally cost from €40. Although modern electronic equipment is precise, it is expensive - electronic densimeters can cost €1500 or more and a

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25 **Commission Regulation (EEC) No 2676/90 of 17 September 1990 determining Community Methods for the Analysis of Wines**, OJ L272, 03/10/1990, p1 (as amended).

26 It is worth noting that electronic density meters have their own standards including: **ISO 15212-1:1999-06: Oscillation-type Density Meters - Part 1: Laboratory Instruments**.

27 Although this reference was subsequently repealed by Commission Regulation (EC) No 1622/2000.

28 As published by OIV (2006): **Compendium of International Methods of Wine and Must Analysis**, available with a 2008 update (in French & English) from www.oiv.int/fr/acceuil/index.php.

29 **Commission Regulation (EEC) No 2984/78 of 17 November 1978 determining Community Methods for the Analysis of Wines and Repealing Regulation (EEC) No 1539/71**, OJ L360, 22/12/1978 p1.

30 **Commission Regulation (EEC) No 1108/82 of 21 April 1982 determining Community Methods for the Analysis of Wines and Repealing Regulation (EEC) No 2984/78**, OJ L133, 14/05/1982 p1.

modern bench mounted Abbe refractometer with digital output will cost upwards of €2000.

3.2.5 Regulation 2870/2000

Regulation 2870/2000 (as amended[31]) prescribes reference methods for the analysis of spirits drinks. In relation to 'alcoholic strength by volume', three reference methods are prescribed - pycnometry, electronic densimetry and hydrostatic balance - which are the same as those in the (amended) Regulation 2676/90 described above.

As for Regulation 2676/90, there is no reference to the Directives on alcohol meters in Regulation 2870/2000.

3.2.6 Directive 2007/51/EC

Following the development of the Community strategy concerning mercury in 2005, the Commission proposed a directive to limit the use of mercury in measuring instruments with particular reference to thermometers. Although the resultant Directive[32] focuses on measuring instruments for sale to the general public, there would be merit in ensuring that future alcohol meters did not rely on mercury filled thermometers.

3.2.7 Comparison with Existing Directives

Whilst the requirements of the existing Directives remain largely unchallenged in respect of traditional glass alcohol meters (as defined), it is apparent that new and developing technologies provide effective alternative methods to the determination of alcohol strength. Furthermore, it would appear that, for some applications at least, the Directives have been superseded by subsequent European legislation.

There is also a range of national standards which, in most cases, are likely to be based on the ISO standards

[31] **Commission Regulation (EC) No 2870/2000 of 19 December 2000 determining Community Reference Methods for the Analysis of Spririts Drinks**, OJ L333, 29/12/2000, p20 (as amended).

[32] **Directive 2007/51/EC of the European Parliament and of the Council of 25 September 2007 amending Council Directive 76/769/EEC relating to Restrictions on the Marketing of certain Measuring Devices containing Mercury**, OJ L257, 03/10/2007, p13.

3.3 Consultation

3.3.1 Consultees

Short questionnaires (see Annex 3) for manufacturers/suppliers, users and authorities have been distributed to a range of companies, trade associations and organisations.

3.3.2 Nature of Responses

The responses received indicate a continuing use of traditional glass alcohol meters alongside much more sophisticated analysers used in automated production processes.

Although reference was made to ISO and national standards, sales and use of calibrated traditional glass alcohol meters still refer, in some cases, to Directive 76/765/EEC.

3.4 The Market for Alcohol Meters

3.4.1 Manufacture and Supply

Market Characterisation

The market comprises three main segments:

- simple uncalibrated instruments (glass or plastic) intended for home brewers;
- calibrated glass instruments for professional use; and
- sophisticated instruments and analysers.

Although there are imports from China at the lower end of the market (particularly for plastic hydrometers), alcohol meters (of all types) are manufactured and supplied by companies across the EU. Calibrated glass instruments tend to be manufactured and/or supplied at a national level and, in some countries, one or two national companies dominate the national market.

The more sophisticated instruments include not only electronic densimetry and refractometry (as mentioned previously) but also near infra red (NIR) spectroscopy[33]. In addition, there are a number of integrated analysers which measure a number of different parameters. These instruments are produced by specialised companies within the EU (including those based in Austria, Denmark and Germany) with international sales or are imported from outside the EU.

Typical Products and Prices

Prices for alcohol meters start from a few euros for a simple hydrometer intended for use by those brewing beer or wine at home.

[33] NIR spectroscopy relies on the absorption of particular infra-red frequencies be the alcohol molecules.

Calibrated glass hydrometers without thermometers generally cost from €20 and those with thermometers generally cost from €40. However, in the traditional glass blowing areas of the Czech Republic, hydrometers primarily for the Czech market seem to be a little less expensive.

More sophisticated instruments including electronic densimeters, refractometers, NIR spectrometers and integrated analysers are much more expensive - from €1500 upwards. Furthermore, there will be additional costs for servicing and purchase/preparation of test solutions.

Market for Traditional Glass Alcohol Meters

Based on responses from manufacturers, suppliers and users, the market for traditional glass meters is buoyant. The prime reason is that electronic instruments are very expensive and, for the less expensive instruments, no more accurate than a simple hydrometer costing a tiny fraction of the cost.

Respondents from several countries indicated national markets for calibrated traditional glass alcohol meters to be thousands of units per year. Such figures suggest an EU market of, perhaps, 50,000 units per year which taking a price of €40 would give a market value of €2m per year. Although detailed information has not been obtained, it is likely that the overall market for alcohol meters of all types will be several times greater, perhaps as much €6-8m per year.

3.4.2 The Alcohol Market

With a European market in alcoholic beverages of over €250 billion/year[34] (including extensive national taxes), the correct measurement (and labelling) of alcoholic strength remains important.

The alcoholic beverage industry comprises three large similarly-sized markets (in terms of volumes of pure alcohol and associated values - see Table 3.1 below):

- every country in the EU-27 produces beer - around 400 million hl per annum[35] (or 80 litres for every EU citizen) - although the consumption is somewhat lower;
- the production of wine is less at around 185 million hl per annum[36] with production focused in France, Italy and Spain. As for beer, the EU is a net exporter of wines; and
- the UK leads the production of spirits accounting for about 25% of the 40 million hl per annum produced in the EU - of which about 25% are exported[37].

[34] See, for example, *Western Europe: A Mature Market*, Beverage Industry on-line article dated September 2007.

[35] www.europeanbeerguide.net/eustats.htm (1hl = 100 litres).

[36] EC (2007): **Fact Sheet - Towards a Sustainable European Wine Sector**, issued by DG Agriculture and Rural Development, July 2007.

[37] Extensive information is available from CEPS, the European Spirits Organisation (www.europeanspirits.org).

Table 3.1: Indicative Comparison of Size and Value of Alcohol Beverage Markets					
Beverage	**Production**	**Strength**	**Equivalent Alcohol**	**Retail Price**	**Market**
Beer	400 million hl	4%	16 million hl	€2 per litre	€80 bn
Wine	185 million hl	12%	22 million hl	€5 per litre	€93 bn
Spirits	40 million hl	40%	16 million hl	€15 per litre	€60 bn
All			54 million hl		€233 bn
Note: This table is intended for indicative purposes only and, as such, the value of €233 bn given in the row above should not be seen as being inconsistent with that of €250 bn presented in the text above.					

3.4.3 Usage of Alcohol Meters

The extent to which these three industry groups (and their regulators) rely on traditional glass alcohol meters is less than it used to be. However, although newer instruments (and techniques) such as multi-parameter electronic analysers have displaced traditional glass alcohol meters, there is still a role for the traditional instruments. Indeed, most producers still use traditional glass alcohol meters (alongside other techniques) as a simple, quick and accurate means to check the alcohol density/strength during the brewing process.

As a consequence, there is a significant market for traditional glass alcohol meters calibrated in accordance with the Directive or other international standard (such as ISO 4801). As noted above, the market size is probably in the order of tens of thousands of units per year with an associated value of €2m (equivalent to 50,000 units at €40).

3.4.4 Trade and Trade Barriers

It would appear that the markets for calibrated traditional glass alcohol meters tend to be nationally based with national standards (usually based on international standards). A good example is provided in the (previously referenced) international guidance from the French-based International Organisation of Vine and Wine on methods of analysis which specifies that hydrometers must meet the AFNOR (French national) standards

3.5 Developments of Note

Since the enactment of the Directives concerning alcohol meters, there have been four major developments of relevance;

- the development of new techniques to determine alcohol strength (such as electronic densimetry, refractometry and, more recently, NIR spectroscopy);
- the development of an international standard (OIML R 44) - albeit very similar to the Directives;

- the enactment of Regulations 2676/90 and 2870/200 (and their amendments) which prescribe various methods to determine alcohol strength in wines and spirits respectively; and
- moves by the Commission (and others) to limit the use of mercury in measuring instruments (including Directive 2007/51/EC).

In addition, the EU has, of course, expanded from EU-12 in 1986 (the year of the last amendment to Directive 76/765/EEC) to the EU-27. During the intervening period, it is worth noting that considerable resources were expended through the PHARE program on aligning the metrological facilities of the (then) candidate countries in Central and Eastern Europe with the EU requirements.

3.6 Scenario Analysis

3.6.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

3.6.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Instruments which do not conform to Directive 76/765/EEC:
- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

No Member State has been identified as prohibiting traditional glass alcohol meters which do not conform to Directive 76/765/EEC and do not use the associated alcohol tables of Directive 76/766/EEC.

Although there are international standards (with particular regard to ISO 4801/4805 and OIML R 44), the situation for sales and use appears to be determined by national standards and, seemingly, national legislation. As such, the current situation could be characterised by Option 1C. Of course, it is also possible to buy and use glass alcohol meters in situations for which there are no national regulations. By way of example, whilst a suitably regulated glass hydrometer may be used by government inspector at

a particular production facility, the production chemist is free to use any glass hydrometer (i.e. Option 1D).

As such, maintaining the existing regulatory framework could entail significant administrative costs to meet the potential different requirements in various countries which, in turn, could present trade barriers. However, it should be noted that issues involving such trade barriers have not been raised by consultees.

Finally, there are many uses of traditional glass alcohol meters which are not regulated for which there would be no administrative costs.

3.6.3 Repeal Directives 76/765/EEC & 76/766/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

Given the existing and likely future use of traditional glass alcohol meters due to their ease of use, accuracy and low cost, there will be continuing requirements for ensuring their reliability (for some uses at least).

Furthermore, given the presence of other Regulations (for wines and spirits) as well the presence of international standards (and OIV guidance), Option 2A might seem an attractive option should Directives 76/765/EEC and 76/766/EEC be repealed.

However, since the existing situation appears to be more nationally focused, even in the presence of international standards, Option 2B appears to be the more likely outcome.

In other words moving from the current situation to Option 2 would not entail any additional administrative costs - as, in effect, there would be no change from the current situation.

3.6.4 Extend Scope of MID to incorporate Directives 76/765/EEC & 76/766/EEC (Option 3)

Although the requirements for traditional glass alcohol meters as set out in Directive 76//765/EEC (with the associated tables in Directive 76/766/EEC) could be incorporated into the MID, there are several other methods for measuring the alcoholic strength.

Given that the measurement is of a physical property, it should be possible to generate general requirements within the MID for measurements of alcoholic strength to be of a certain precision under certain conditions (such as temperature) irrespective of the

method used. Consideration could also be given to the use (or otherwise) of mercury thermometers.

With these points in mind, although there would seem to be little merit in moving to Option 3 for traditional glass alcohol meters alone, a case might be made for an MID Annex covering all the main methods for determining alcohol strength.

The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include alcohol meters which are prescribed for some measuring tasks (Option 3A); and*
- *although MID extended to include alcohol meters, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

The prime measuring task of interest would be those measurements carried out in respect of payment of taxes on the presence of alcohol and for ensuring quality for alcoholic drinks on the market. This Option 3A would incur some initial costs as manufacturers, suppliers and users of alcohol meters (of all types) developed the necessary procedures to adapt to the new regime. Thereafter, administrative costs would be minimal as a single test certificate would be valid across the EU. Other uses would not be prescribed, allowing home brewers and alcohol production chemists to use instruments of their choice and budget. There would be no administrative costs for these uses.

At first sight, there would appear to be few benefits of moving to Option 3B although there would be no costs.

4. MEDIUM AND ABOVE-MEDIUM ACCURACY WEIGHTS

4.1 The Directives

4.1.1 Introduction

Directive 71/317/EEC covers medium accuracy weights[38] with:

> *.... the following nominal values: - rectangular bar weights of 5, 10, 20 and 50 kg; - cylindrical weights of 1, 2, 5, 10, 20, 50, 100, 200 and 500 g and 1, 2, 5 and 10 kg* (Article 1).

Directive 74/148/EEC[39] concerns:

> *.... weights of above-medium accuracy the nominal value of which is equal to 1 mg or more and less than or equal to 50 kg.*
> *This Directive does not apply to metric carat weights or to special weights covered by other directives* (Article 1).

4.1.2 Purpose of Directives

These Directives regulate the initial verification of weights used for:

- precision weighing;
- calibration of other weights; and
- calibration of weighing machines.

It is important to stress that the Directives do not place an obligation on the use of such weights. In other words, use of such weights is optional - subject, of course, to national requirements.

4.2 Other Relevant Standards

4.2.1 The Kilogram

Mass is the last remaining base unit of the SI that is defined in terms of a physical artefact; a 1 kilogram cylinder manufactured in the 1880s, of an alloy of 90% platinum and 10 % iridium, which is held at the Bureau International des Poids et Mesures[40] near Paris. Theoretically, all mass measurements undertaken in the world

[38] **Council Directive 71/317/EEC of 26 July 1971 on the approximation of the laws of the Member States relating to 5 to 50 kilogramme medium accuracy rectangular weights and 1 to 10 kilogramme accuracy cylindrical weights**, OJ L202, 06/09/1971, p14.

[39] **Council Directive 74/148/EEC of 4 March 1974 on the approximation of the laws of the Member States relating to weights of from 1mg to 50 kg of above-medium accuracy**, OJ L084, 28/03/1974, p3.

[40] For further information: http://www.bipm.org/en/scientific/mass/prototype.html

should be traceable to this artefact via national institutes and accredited laboratories. More than eighty copies of this international prototype have been manufactured in Pt/Ir by the BIPM for use as 1 kg national prototypes since 1889.

4.2.2 OIML R 111

The International Organization of Legal Metrology (OIML) formed in 1955 produces international recommendations across the entire range of metrological activities. In relation to medium and above-medium accuracy weights, the current standard is OIML R 111-1:2004 (which amends the 1994 edition[41]).

OIML R 111 specifies technical requirements for the following weight classes (in order of decreasing precision):

- Class E1: Weights intended to ensure traceability between national mass standards (with values derived from the International Prototype of the kilogram) and weights of class E2 and lower;
- Class E2: Weights intended for use in the verification or calibration of class F1 weights and for use with weighing instruments of special accuracy class I;
- Class F1: Weights intended for use in the verification or calibration of class F2 weights and for use with weighing instruments of special accuracy class I and high accuracy class II;
- Class F2: Weights intended for use in the verification or calibration of class M1 and possibly class M2 weights. Also intended for use in important commercial transactions (e.g. precious metals and stones) on weighing instruments of high accuracy class II;
- Class M1: Weights intended for use in the verification or calibration of class M2 weights, and for use with weighing instruments of medium accuracy class III;
- Class M1–2: Weights from 50 kg to 5 000 kg of lower accuracy intended for use with weighing instruments of medium accuracy class III.
- Class M2: Weights intended for use in the verification or calibration of class M3 weights and for use in general commercial transactions and with weighing instruments of medium accuracy class III;
- Classes M2-3: Weights from 50 kg to 5 000 kg of lower accuracy intended for use with weighing instruments of medium accuracy class III; and
- Class M3: Weights intended for use with weighing instruments of medium accuracy class III and ordinary accuracy class IIII.

The OIML requirements (as were) for **Classes E1, E2, F1, F2 and M1** were adopted as the basis for Directive 74/148/EEC for **above-medium accuracy weights** in the range 1 mg to 50 kg whilst the requirements for **Class M2** weights are similar to those adopted in Directive 71/317/EEC for **medium accuracy weights** in the range 1 kg to 50 kg.

[41] OIML (2004): **Weights of Classes E1, E2, F1, F2, M1, M1-2, M2, M2-3 and M3. Part 1: Metrological and Technical Requirements**, International Recommendation OIML R 111-1 Edition 2004.

4.2.3 Comparison of R 111-1 and Existing Directives

As indicated above, the requirements of the existing Directives are closely linked to the OIML recommendations. This is illustrated by the permitted errors as shown in Table 4.1 for Class F1 (as an example for above-medium accuracy weights) and Class M2 for a range of weights.

Table 4.1: Comparison of Permissible Errors (mg) under OIML R 111-1 and the Existing Directives 74/148/EEC and 71/317/EEC

Weight	Above-Medium Accuracy Weights		Medium Accuracy Weights	
	74/148/EEC Class F1	OIML R 111-1 Class F1	71/317/EEC (Class M2)	OIML R 111-1 Class M2
1000 kg	*n/a*	*±5000*	*n/a*	*±160000*
50 kg	±250	±250	**+8000/-0**	**±8000**
2 kg	±10	±10	**+400/-0**	**±300**
100g	±0.5	±0.5	**+30/-0**	**±16**
5g	**±0.15**	**±0.16**	+10/-0	±5.0
200mg	±0.06	±0.06	*n/a*	*±2.0*
10mg	±0.025	±0.025	n/a	n/a
1mg	±0.020	±0.020	n/a	n/a

Note: This table only presents a sample of entries for two classes of weights.

Although the full range of permissible errors across all weights and classes has not been presented in Table 4.1, a number of observations can be made:

- the OIML R 111-1 covers a greater range of weights than the Existing Directives (illustrated by *yellow italic entries*);
- for above-medium accuracy weights (as illustrated by Class F1) the permissible errors are the same in most, but not all, cases (illustrated by **bold entries**);
- for medium accuracy weights (Class M2) under the existing Directive, short weights are not permitted (i.e. the permissible error must be in excess of the stated weight - as highlighted in turquoise); and
- for medium accuracy weights (Class M2), the error bands are smaller for higher weights under the existing Directive than under OIML R 111-1 (illustrated by **bold entries**).

4.3 Consultation

4.3.1 Consultees

Short questionnaires were sent to a range of manufacturers/suppliers, users and national metrological authorities. Fifteen detailed responses were received from across the EU.

4.3.2 Nature of Responses

There was widespread agreement that the existing Directives are no longer of any significance as the *de facto* standard is R 111-1:2004 which is routinely used by manufacturers, suppliers, calibration services and national authorities.

Although R 111-1:2004 is the recognised international standard, several respondents noted that there are also national requirements. This is also true for major non-EU markets, including North America and China.

4.4 The Markets for Weights

4.4.1 Manufacture and Supply

Market Characterisation

Medium and above-medium accuracy weights are manufactured by a few specialised European companies (including those based in France, Germany and Switzerland). They are supplied to customers through national equipment suppliers (which may supply weights from different companies).

Although the EU market for medium and above-medium accuracy weights is mainly supplied by these European companies, there will also be imports from elsewhere - although it has not been possible to determine the relative significance of such imports.

Typical Products and Prices

Weights may be bought individually or in sets (but not usually across the entire range of a particular weight class). Precision weights can be relatively inexpensive with sets of F1 weights[42] from 1g to 1000g costing as little as €300. However, prices increase significantly with the inclusion of heavier weights and higher precision classes.

Since weights are produced a few specialised companies, it is unlikely that there will be significant price variations across the EU.

Market for Medium and Above-medium Accuracy Weights

Although weights may be used routinely, they do not break and should last a long time - 50 years or more. Nevertheless, the EU market for medium (Class M2) and above-medium (Classes E1, E2, F1, F2 and M1) accuracy weights is surprisingly large - perhaps as much as €30m per year with a few hundred thousand weights being sold in the EU each year.

[42] A 'set' comprises one weight for, say, 1g, 5g, 10g, 50g and 100g and two weights for 2g and 20g giving all weights in the range 1g to 210g in 1g intervals.

4.4.2 Usage of Weights

Verified weights[43] are used extensively by local authorities and inspection companies for testing commercial scales and for more general calibration services. They are also used in-house by industry and commerce to check the accuracy of weighing machines. However, it would appear that few carry verification marks from either Directive 74/148/EEC for above-medium accuracy weights or Directive 71/317/EEC for medium accuracy weights.

Although difficult to estimate precisely, each EU country will have hundreds and, in most cases, thousands of sets of medium and above-medium accuracy weights in use - usually verified or calibrated against R 111.

4.4.3 Trade and Trade Barriers

Since nearly medium and above-medium accuracy weights are usually verified or calibrated against R 111, there are few barriers to trade - although there appear to be some minor differences between R 111 and national requirements in a few countries.

4.5 Developments of Note

Since the enactment of the Directives concerning medium and above-medium accuracy weights in the early 1970s, there have been two major developments of relevance;

- the development and amendment of an international standard (OIML R 111); and
- development of electronic weighing systems which has been assumed to lead to a decrease in the usage of balance weighing machines which, in turn, has reduced the need for weights in day-to-day transactions/activities.

In addition, the EU has, of course, expanded from the EU-9 in 1974 to the current EU-27.

4.6 Scenario Analysis

4.6.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

[43] In some cases, weights will not be 'verified' by a legal authority but rather will be accompanied by a certificate confirming compliance with the accuracy requirements of R 111-1:2004.

4.6.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Weights which do not conform to Directive 71/317/EEC or Directive 74/148/EEC:

- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

No Member States prohibits weights which do not conform to the Directives. Indeed, weights bearing verification marks in accordance with the Directives are rare.

Although some Member States have no restrictions on weights (such as Sweden), others have national requirements with specific reference to OIML R 111 (such as Estonia) whilst others have national requirements which may differ slightly from the Directives and/or OIML R 111 (such as the UK). However, the over-riding view is that where verification and calibration services are carried out, the common standard is OIML R 111.

As such, maintaining the existing regulatory framework could entail significant administrative costs to meet the potential different requirements in those countries with national requirements which diverge from the international standard (Option 1C). Elsewhere, the administrative costs (characterised by Options 1B and 1D) would be minimal.

4.6.3 Repeal Directives 71/317/EEC & 74/148/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

Given the low usage of the existing Directives and widespread acceptance of the OIML R 111 standard, Option 2A would seem an attractive option should Directives 71/317/EEC & 74/148/EEC be repealed. Although this would involve some transitional costs to amend the national regulations, the future administrative costs would be lower than at present (since verification would be accepted across the EU through mutual recognition).

It is also possible that a case could be presented for no national requirements (Option 2C) as is already the case in some countries. This would result in even lower costs in the longer term.

4.6.4 Extend Scope of MID to incorporate Directives 71/317/EEC & 74/148/EEC (Option 3)

Given that weight is a physical property which is amenable to measurement, it should be possible to generate general requirements within the MID for weights to be of a certain precision.

The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include weights which are prescribed for some measuring tasks (Option 3A); and*
- *although MID extended to include weights, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

It is possible to argue that wherever medium or above-medium accuracy weights are being used then this could be regarded as measuring task which could be prescribed under the MID. In other words, any task which requires the use of precision weights merits the use of reliably calibrated weights - i.e. Option 3A. Option 3A would incur some initial costs as manufacturers, suppliers and users of weights developed the necessary procedures to adapt to the new regime. Thereafter, administrative costs would be minimal as a single test certificate would be valid across the EU.

However, since there is already a widely accepted international standard, OIML R 111, it is difficult to see whether Option 3A (and, indeed, Option 3B) would offer any advantages over Option 2A or Option 2C.

5. TYRE PRESSURE GAUGES FOR MOTOR VEHICLES

5.1 The Directive

5.1.1 Introduction

Directive 86/217/EEC[44] defines tyre pressure gauges as:

> *... instruments not fitted with pre-setting devices used in fixed or mobile installations for inflating motor-vehicle tyres in which a mechanical measuring system transmits the elastic deformation of a sensing element to an indicating device* (Annex to the Directive).

It is understood that this Directive relates to the mechanical gauges found on pressurised air-delivery (or pneumatic) lines in commercial garages, petrol stations and tyre fitting shops for the inflation of motor vehicle tyres. The Directive specifically excludes gauges which are digital and those fitted with pre-setting devices. Furthermore, most of the gauges owned by consumers (such as those on foot pumps and hand-held gauges) are outside the scope of the Directive.

5.1.2 Purpose of the Directive

Inflation of motor vehicle tyres to the correct pressure influences ease of driving, tyre wear, road safety[45] and fuel consumption. Many drivers routinely use the tyre inflation equipment provided at petrol stations to ensure that their tyres are inflated to the correct pressure. The purpose of the Directive is to ensure that equipment covered by the Directive will provide an accurate indicator of tyre pressures and that there is free movement (within the EU) of those gauges in compliance with the Directive. It should be noted that the appropriate design to ensure the safety of such systems is covered by other Directives[46].

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44 **Council Directive 86/217/EEC of 26 May 1986 on the approximation of the laws of the Member States relating to tyre pressure gauges for motor vehicles**, OJ L152, 06/06/1986, p48.

45 TUV Automotive (2004): **Survey on Motor Vehicle Tyres & Related Aspects**, report for DG Enterprise dated June 2004.

46 **Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipmen**t OJ L 181, 09/07/1997, p1 and/or **Council Directive 87/404/EEC of 25 June 1987 on the harmonisation of the laws of the Member States relating to simple pressure vessels**, OJ L 220, 08/08/1987, p48 (as amended).

5.2 Other Relevant Standards and Legislation

5.2.1 OIML R 23

In relation to tyre pressure gauges, the relevant OIML standard is R 23:1975[47] (which predates the Directive 86/217/EEC). Although the scope of R 23 includes hand-held and dashboard-mounted gauges, its current use appears very limited.

5.2.2 EN 12645:1998

CEN, the European Committee for Standardization, was founded in 1961. CEN publishes standards for adoption by its members which comprise national organisations in all the EU and EFTA countries. CEN standards must be adopted by all members and any conflicting standards must be withdrawn.

In relation to pressure gauges, the most relevant standard is EN 12645:1998[48] which has been adopted by CEN members. So, for example, the standard appears as:

- BS EN 12645:1999 in the UK published by BSI (British Standards Institution);
- NF EN 12645 in France published by AFNOR (Association Française de Normalisation); and
- CSN EN 12645 in the Czech Republic published by CNI (Český Normalizační Institut).

Although the scope of EN 12645 appears to cover a broader range of pressure gauges than Directive 86/217/EEC, it is of note that the permitted errors for EN 12645 are the same, viz:

- ±0.08 bar(g) up to 4 bar(g); and
- ±0.16 bar(g) from 4 to 10 bar(g).

5.2.3 National Requirements

Requirements on the design and use of tyre pressure gauges vary from country to country. By way of example, in France, Décret 88/78[49] prohibits the manufacture, import and commercial use of gauges which do not conform to an approved model - such as one complying with Directive 86/217/EC or NF EN 12645. In Germany, tyre

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47 OIML (1975): **Tyre Pressure Gauges for Motor Vehicle**, International Recommendation OIML R 23 Edition 1975.

48 CEN (1998): **Pressure Gauges - Apparatus for Inspection of Pressure and/or Inflation of Tyres for Motor Vehicles - Metrology, Requirements and Testing**, EN 12645:1998. It is worth noting that, in relation to stand-alone precision mechanical pressure gauges with a dial face designed for professional use, there is another standard of relevance: CEN (1996): **Pressure Gauges - Part 1: Bourdon Tube Pressure Gauges - Dimensions, Metrology, Requirements and Testing**, EN 837-1:1996.

49 **Décret n°88-78 du 19 janvier 1988 réglementant la catégorie d'instruments de mesure Manomètres pour pneumatiques des véhicules automobiles**.

pressure gauges not covered by Directive 86/218/EC are subject to approval under national regulations.

At the other end of the spectrum, there appear to be no specific restrictions on the measurements aspects of tyre pressure gauges in the UK and Greece.

5.3 Consultation

5.3.1 Consultees

Short questionnaires were sent to a number of key manufacturers/suppliers, petroleum companies and industry trade associations.

5.3.2 Nature of Responses

Apart from confirmation that tyre pressure gauges are still being manufactured (and supplied) in accordance with the Directive, very little information was received from manufacturers and suppliers. No responses were received from the users approached (petroleum companies and industry trade associations).

5.4 The Market for Tyre Pressure Gauges

5.4.1 Manufacture and Supply

Market Characterisation

Tyre pressure gauges complying with Directive 86/217/EEC are produced by several manufacturers and supplied through numerous suppliers across the EU. Whilst many gauges are manufactured within the EU (including in the UK, France and Germany), it is clear that there are also many imports from other countries including China, Taiwan and the US.

Typical Products and Prices

A typical tyre pressure gauges marketed as complying with Directive 86/217/EEC can be bought for under €100. It is worth noting that such gauges may also carry CE markings, which are presumed to relate to compliance with other Directives relating to the safety of the design.

Interestingly, pre-set digital gauges are also being marketed as being compliant with Directive 86/217/EEC when such gauges are clearly excluded from the scope of the Directive. In these cases, it has been assumed that the reference to the Directive 86/217/EEC should be taken to be a reference to the associated accuracy requirements. Commercial pre-set digital tyre inflator units (as found in many petrol stations) are much more expensive - about €1,000.

Market for Tyre Pressure Gauges

In the absence of sufficient data from manufacturers and suppliers, it has been necessary to derive an estimate of the annual market value to be €3m - as discussed further below.

5.4.2 Usage of Tyre Pressure Gauges

Across the EU-27, there are over 260 million vehicles in use of which the vast majority (230 million) are cars[50]. Every vehicle uses pneumatic tyres each one of which must be inflated and inspected from time to time.

Most (if not all) commercial garages, petrol stations and tyre fitting shops have facilities for inflating motor vehicle tyres and determining their pressure.

Detailed information on the petroleum industry is published by Europia (the European petroleum industry association[51]). This includes statistics on the number of petrol stations in 18 of the 27 Member States which, when extrapolated, suggest that there are about 115,000 filling stations in the EU-27. Data from another study[52] for 10 countries (representing 80% of the EU-27 cars) suggest (with extrapolation) that there are 380,000 garages (and car dealer facilities).

An estimate of the potential market size can be made as follows:

- Number of facilities with tyre inflator/pressure gauge: 500,000 (approx)
- % mechanical (as opposed to digital): 30% (estimate)
- Number of in-line inflator/gauges: 150,000
- Lifetime of gauge: 5 years (estimate)
- Demand per year: 30,000
- Cost per gauge: €100 (typical)
- Market size: €3m (per annum)

However, the market is shrinking as in the more populous states (particularly Germany and UK), the move to pre-set digital machines appears to be proceeding apace and the numbers of petrol stations (and of garages?) are falling. Using this approach would suggest a much larger market for digital pre-set units - perhaps as much as €70m (= 500,000 units x 70% (digital) x 1000 (euros)/5(years)).

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50 **European Motor Vehicle Parc 2006 - Vehicles in Use,** report dated January 2008 and published by ANFAC (Spanish Auto-trade Federation) and ACEA (European Automobile Manufacturers' Association). Available from: www.acea.be/index.php/files/category/publications

51 www.europia.com/Content/Default.asp

52 London Economics (2006): **Developments in Car Retailing and After-sales Markets under Regulation 1400/2002**, report for DG Competition, dated June 2006.

5.4.3 Trade and Trade Barriers

Since Directive 86/217/EEC is still used as a reference standard alongside national standards based on EN 12645:1998, it would be expected that there would be few, if any, trade barriers.

5.5 Developments of Note

Since the enactment of the Directive concerning tyre pressure gauges in the mid-1980s, there have been two major developments of relevance;

- the development and adoption of an international standard (EN 12645:1998); and
- the development of tyre inflators with pre-set digital gauges.

In addition, the EU has, of course, expanded from the EU-12 in 1986 to the current EU-27.

5.6 Scenario Analysis

5.6.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

5.6.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Tyre pressure gauges which do not conform to Directive 86/217/EEC:

- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

No Member States prohibits tyre pressure gauges which do not conform to the Directives. Where there are national regulations, these are based on the Directive and/or international standards (EN 12645:1998).

As such, maintaining the existing regulatory framework would entail minor administrative costs since compliance with EN 12645:1998 and/or the Directive would be recognised by those countries with regulations (i.e. Option 1B). Elsewhere, there would be no administrative costs (characterised by Option 1D).

5.6.3 Repeal Directive 86/217/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

In the absence of Directive 86/217/EEC, those countries with national regulations would probably opt for Option 2A given the widespread use and acceptance of EN 12645:1998. Although this would involve some transitional costs to amend the national regulations, the future administrative costs would be similarly low as at present.

For those countries with no national requirements, Option 2C would seem the logical outcome. In this case, the costs would be the same as at present.

5.6.4 Extend Scope of MID to incorporate Directives 86/217/EEC (Option 3)

Given that pressure is a physical property which is amenable to measurement, it should be possible to generate general requirements within the MID for tyre pressure gauges to be of a certain precision.

The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include tyre pressure gauges which are prescribed for some measuring tasks (Option 3A); and*
- *although MID extended to include tyre pressure gauges, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

There are two broad types (i.e. tasks) of tyre inflation and pressure measurement:

- tyre inflation and/or pressure measurement undertaken using equipment owned by domestic consumers; and
- tyre inflation and pressure measurement undertaken (by or for consumers) in commercial garages, petrol stations and tyre fitting shops.

Given that correct tyre pressures influence road safety and fuel consumption and that many consumers rely on their local garage and/or petrol station for the correct inflation of the car tyres, it could be argued that the second task should be a

prescribed task under the MID - i.e. Option 3A. Option 3A would incur some initial costs as manufacturers, suppliers and users of tyre pressure gauges (both mechanical and digital pre-set types) developed the necessary procedures to adapt to the new regime. Thereafter, administrative costs would be minimal as a single test certificate would be valid across the EU.

However, since there is already a widely accepted international standard, EN 12645: 1998, it is difficult to see whether Option 3A (and, indeed, Option 3B) would offer any advantages over Option 2A (and Option 2C for those countries with no regulations).

6. STANDARD MASS OF GRAIN

6.1 The Directive

6.1.1 Introduction

Directive 71/347/EEC provides the basis for presenting the standard mass of grain per storage volume[53]. This Directive describes a piece of equipment (also known as a chondrometer) and associated procedures for weighing 20 litres of grain and expressing the result in terms of kilogrammes per hectolitre.

6.1.2 Purpose of Directives

The standard mass of grain per storage volume (also known as bulk density and specific weight) varies with numerous factors including moisture, temperature, grain size, degree of compression, etc. This Directive provides a reference basis for such measurements. More specifically, the Directive requires:

- the Community standard instrument shall be deposited with the German Metrology Service (PTB);
- national standard instruments (complying the with Directive) shall be checked against the Community standard instrument at least every 10 years; and
- trade in grain between Member States must use the standard mass per volume based on measurements derived from standard instruments.

The Directive also provides (in Annex II) for other instruments to be granted type approval provided that their specifications are within specified precision limits and that their results are sufficiently close to those derived from the national instruments.

As such, it would be expected that trade in grain amongst Member States would be reliant on this Directive. More generally, sales of grain from and/or to farmers, traders, cereal/bread/food producers might be expected to be influenced by this Directive.

6.2 Other Relevant Standards and Legislation

6.2.1 OIML R 15

The specifications for the standard 20 litre instruments presented in the Directive are the same as those given in the earlier OIML International Recommendation R 15:1970[54]. Once implemented, the Directive superseded OIML R 15 within the EU.

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[53] **Council Directive 71/347/EEC of 12 October 1971 on the approximation of the laws of the Member States relating to the measuring of the standard mass of grain per storage volume of grain**, OJ L239, 25/10/1971, p1. The Directive has been amended over the years to included reference to those countries which have joined the EU since 1971.

[54] OIML (1970): **Instruments de Mesure de la Masse à l'Hectolitre des Céréales**, International Recommendation OIML R 15 Edition 1970. The English Edition was published later: OIML (1974):

6.2.2 ISO 7971-2

The International Organization of Standardization (ISO), founded in 1947, issues numerous internationally accepted standards. In relation to trade in cereals, there are four ISO standards in use:

- *ISO 3093 Wheat, Rye and Respective Flours, Durum Wheat and Durum Wheat Semolina - Determination of the Falling Number according to Hagberg-Perten* (2004):
- *ISO 5529 Wheat - Determination of the Sedimentation Index - Zeleny Test* (2007);
- *ISO 9648 Sorghum - Determination of Tannin Content* (1988); and, of particular relevance,
- *ISO 7971-2 Cereals Determination of Bulk Density called "Mass per Hectolitre"* (1995).

ISO 7971-2 specifies a routine method for the measurement of the bulk density of cereals (wheat, barley, oats and rye) by weighing a one litre cylinder filled with cereal.

6.2.3 Regulation 824/2000

The European regulation on cereals through intervention is set out in Regulation 824/2000[55]. The intervention price is based on the quality of the cereals which is determined on the results of nine methods of analysis - including those covered by the four ISO methods set out above. Specifically, Article 3.9 states:

3.9. the standard method for determining the specific weight shall comply with ISO 7971/2:1995.

This suggests that one of the original aims of Directive 71/347/EEC has been overtaken by events since the Regulation 824/2000 makes no reference to the Directive.

Since ISO 7971-2 specifies that the method applies to wheat, barley, oats and rye, Regulation 824/2000 was adapted in 2006[56] to include reference to bulk density measurements for maize as follows:

3.9. the standard method for determining the specific weight shall comply with ISO 7971/2:1995 and, in the case of maize, with the traditional methods applied.

Instruments for Measuring the Hectolitre Mass of Cereals, International Recommendation OIML R 15 Edition 1974.

[55] **Commission Regulation (EC) No 824/2000 of 19 April 2000 establishing procedures for the taking-over of cereals by intervention agencies and laying down methods for analysis for determining the quality of cereals**, OJ L100, 20/04/2000, p31.

[56] **Commission Regulation (EC) No 1572/2006 of 18 October 2006 amending Regulation 824/2000 establishing procedures for the taking-over of cereals by intervention agencies and laying down methods for analysis for determining the quality of cereals**, OJ L100, 20/04/2000, p31.

6.2.4 National Requirements

Various national standards are also used for determining the bulk density of grain (presumably based on ISO 7971-2) such as BS 4317-32 (1996) in the UK, AFNOR NF V03-719 (1996) and ČSN ISO 7971-2 (2003) in the Czech Republic. However some countries including Germany, Sweden and most of the new Member States have national requirements based on the Directive.

6.2.5 Current Revisions

There have been concerns over the robustness of ISO 7971-2:1995 in relation to the European regulation of cereals[57] and it is currently being revised under the direction of CEN's Technical Committee 338 - *Cereals and Cereal Products*. CEN/TC 338 Working Group 7 has prepared drafts of a revised prEN ISO 7971 which are currently 'under approval'.

6.3 Consultation

6.3.1 Consultees

Short questionnaires were sent to key manufacturers/suppliers and users to explore the extent of the market in grain density meters. These were supplemented with discussions with a few metrological authorities, local grain merchants and one of the leading manufacturers.

6.3.2 Nature of Responses

It has been confirmed that the Community standard instrument (with PTB in Germany) is still operational. Although used to check national standard instruments in four new Member States[58] since 2000, it is clear that other national instruments are not being checked in accordance with the Directive. The Community standard instrument is also used to verify Annex II instruments used by the German authorities as reference standards.

However, the measurement of the specific weight of grain is an ongoing issue. As indicated above, ISO 7971 is currently under revision and some respondents would like to see a wider debate over the proposed measures. This could include the wide metrological community including OIML, WELMEC and, even, the Commission.

Although the Directive and ISO 7971 were originally based on the mechanical weighing of a fixed volume of grain, the vast majority of instruments used to measure the bulk grain density now use electronic load cells. Nevertheless, some of these load cells have been granted type approval under Annex II of the Directive.

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[57] See, for example, M Provot (2006): *Normalisation in Cereals Sector and Relationship with European Regulation*, presentation to CEN/JRC Workshop in Brussels, 9 March 2006 available from: www.cen.eu/cenorm/businessdomains/sectors/food/

[58] The standard instrument for Romania (view at: http://www.inm.ro/en/?page=lab&lab=lab02) is scheduled to be checked later this year.

6.4 The Market for Grain Density Meters

6.4.1 Manufacture and Supply

Market Characterisation

No current manufacturers or suppliers of the instrument detailed in the Directive 71/347/EEC (i.e. one using a 20 litre volume to determine bulk density) have been identified.

Within the EU, other instruments for determining the quality of grain are manufactured by a few specialised companies (including those based in France, Germany and the UK) and distributed by a number of national and regional suppliers.

Typical Products and Prices

There are several manufacturers (and suppliers) of instruments for measuring bulk density based on ISO 7971-2:1995 (i.e. using a one litre volume). The price of a standard machine (including verification certificate and a set of weights) is around €2,000. Such machines may last 10-20 years.

However, there are also a number of integrated electronic analysers (typically costing €5,000) which provide rapid measurements of several parameters.

Market for Grain Density Meters

The market probably involves the sale of around a thousand units per year (mainly of the electronic type) suggesting a market value of €4m per annum[59].

6.4.2 Usage of Grain Density Meters

As indicated earlier, all grain transactions will involve measurement of bulk density as one of the parameters checked in relation to grain quality and price.

6.4.3 Trade and Trade Barriers

Although there is still reliance on bulk grain density measurements using instruments which conform to the Directive and/or ISO 7971, they are outdated. There is some concern that there is a lack of coherence amongst national reference standards - although there appear to be few problems regarding trade at a national level.

[59] The calculation might be: 700 x €5,000 (electronic) + 300 x €2,000 (ISO 7971-2) = €4m (approx).

6.5 Scenario Analysis

6.5.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

6.5.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Grain density meters which do not conform to Directive 71/347/EEC:

- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

Maintaining the existing situation is most likely to be characterised by Option 1B with reliance still being placed upon the existing Directive and/or the ISO 7971-2 standard - which is currently being revised. However, the provisions of the Directive as regards testing of national instruments appear to have lapsed in many cases which has led to some concern over the coherence of national standards. To further complicate matters, subsequent legislation (with particular regard to Regulation 824/2000) specifies use of the ISO 7971-2 standard rather than the Directive.

In relation to administrative costs, there will be ongoing costs associated with maintaining national instruments and associated calibration services in those countries (particularly amongst new Member States) which still use the Directive. Elsewhere, the administrative costs to commerce are likely to be minimal as most grain transactions rely on the widely accepted ISO standard.

6.5.3 Repeal Directive 71/347/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

In the absence of Directive 71/347/EEC, the most likely option to emerge would be expected to be Option 2A given the widespread use and acceptance of ISO 7971 (as well as the requirements of Regulation 824/2000 which specifies the ISO 7971 should be used). Although this would involve some transitional costs, in some cases, to amend national regulations, the future administrative costs would be similarly low as at present.

6.5.4 Extend Scope of MID to incorporate Directives 71/347/EEC (Option 3)

One of the difficulties of grain density measurements is that the answer is dependent, to some extent, on the means of measurement. Nevertheless, there may be merit in extending the MID to encompass bulk grain density measurements so that measurements from one type of instrument could be reliably compared to those from another type of instrument. However, such arguments may lead to the view that other parameters for determining grain quality should be incorporated.

The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include grain density meters which are prescribed for some measuring tasks (Option 3A); and*
- *although MID extended to include grain density meters, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

The prime measuring task of interest would be those measurements carried out in respect of a commercial transaction or statutory requirement. Option 3A would incur some initial costs as manufacturers, suppliers and users of grain density meters (of all types) developed the necessary procedures to adapt to the new regime. This option could require significant investment in order to generate a solution which benefits all parties with harmonised procedures and traceability of standards. Thereafter, administrative costs would be minimal as a single test certificate would be valid across the EU. Other uses would not be prescribed allowing companies to use instruments of their choice and budget for internal use. There would be no administrative costs for these uses.

At first sight, there would appear to be few benefits of moving to Option 3B although there would be no costs.

7. CALIBRATION OF SHIP TANKS

7.1 The Directives

7.1.1 Introduction

Directive 71/349/EEC provides the basis for the calibration (using liquid levels) of the tanks of inland waterway vessels and of coasters[60].

7.1.2 Purpose of Directive

Directive 71/349/EEC aims to ensure mutual recognition by all Member States through mandatory provisions for the methods by which tanks (including liquid fuel bunkers) of inland waterway vessels and of national and international coasters may be calibrated and used to measure their contents. Precise definition for these two types of vessels remains unclear. Directive 71/349/EEC likens the calibration of tanks (including liquid fuel bunkers) to the initial verification procedure for measuring instruments. The Directive specifies certification and record keeping requirements, but no specific metrological instruments for calibration are recommended. Instead, two methods are specified, as follows:

- the transfer of water or another suitable liquid, whose volume is measured by measures or measuring equipment with meters specifically calibrated for this purpose; and/or
- calculations based on the tank dimensions, as determined; this operation shall be supplemented, where possible, by a partial cross check using measured volumes of liquid.

7.2 Other Relevant Standards and Legislation

7.2.1 European Union Regulations and Directives

There are two main Regulations facilitating the movement of inland waterway vessels within the EU - Regulations 3921/91[61] and 1356/96[62].

The European Maritime Safety Agency (EMSA) is currently involved in preparations to set up a system of mutual recognition of national navigation certificates without the need for an additional inspection of foreign vessels.

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60 **Council Directive 71/349/EEC of 12 October 1971 on the approximation of the laws of the Member States relating to the calibration of the tanks of vessels**, OJ L239, 25/10/1971, p15.

61 **Council Regulation (EEC) No 3921/91 of 16 December 1991 laying down the conditions under which non-resident carriers may transport goods or passengers by inland waterway within a Member State**, OJ L373, 31/12/1991, p1,

62 **Council Regulation (EC) no 1356/96 of 8 July 1996 on common rules applicable to the transport of goods or passengers by inland waterway between Member States with a view to establishing freedom to provide such transport services**. OJ L175, 13/07/1996, p7.

Technical requirements for inland waterway vessels are set down in Directive 2006/87/EC[63] which applies to vessels of a length of 20 metres or more and a volume of at least 100 m^3. It also applies to floating equipment, tugs and pushers, and vessels intended for passenger transport carrying more than 12 passengers in addition to the crew. Interestingly, the Directive makes no reference to Directive 71/349/EEC or to the calibration of ships' tanks.

7.2.2 OIML R 95

This international recommendation[64] for members of the OIML (including all EU MS) lays down general requirements for ships' tanks containing quantities of liquid products (including fuel oil for the ship itself) subject to legal measurement.

Section 5.5 of OIML R 95, presents the specific methods for tank calibration, as follows:

- volumetric (liquid method);
- geometric (measurement method); and
- a combination of the two

Section 5.6 describes the internationally recognised certification process including the compilation of tank calibration records and the application of the verification mark.

7.2.3 API & IP

The American Petroleum Institute (API) technical standards are designed to help users improve the efficiency and cost-effectiveness of their operations, comply with legislative and regulatory requirements, and safeguard health, ensure safety, and protect the environment.

The Energy Institute, based in the UK, was formed in 2003 by the merger of the Institute of Petroleum (IP) and the Institute of Energy. The Energy Institute publishes a significant range of technical publications including safety codes, industry standards, guidance notes and measurement manuals - some of which are joint publications with API.

The API Manual of Petroleum Measurement Standards (MPMS) includes the following guidelines for ship tank calibration;

- Chapter 2.7 Calibration of Barge Tank[65];

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63 **Directive 2006/87/EC of the European Parliament and of the Council of 12 December 2006 laying down technical requirements for inland waterway vessels and repealing Council Directive 82/714/EEC**, OJ L389, 30/12/2006, p1.

64 OIML (1990): **Ships' Tank - General Requirements**, International Recommendation OIML R 95 Edition 1990.

65 **Chapters 2.7 - Calibration of Barge Tanks** (revised March 2002). This document is a joint API/IP standard. As such, it also carries the IP designation *Petroleum Measurement Manual, Part 2, Section 5A*.

- Chapter 2.8A Calibration of Tanks on Ships and Oceangoing Barges[66]; and
- Chapter 2.8B Establishment of the Location of the Reference Gauge Point and the Gauge Height of Tanks on Marine Tank Vessels (revised 2005).

The calibration utilises three methods for determining the total incremental volumes of liquids in barge and ships' tanks for both coastal and inland waterways and ocean-going vessels with integral hull tanks, as follows:

- liquids calibration;
- calibration by linear measurement; and
- calibration from vessel drawings.

It is worth noting that the intention of these methods is to calibrate the tank volumes at the beginning of the vessel's life rather than as a means to re-calibrate in later years.

7.2.4 ISO Standards

ISO guidelines for the calibration of petroleum and liquid petroleum products include the following documents:

- *ISO 4269:2001 - Petroleum and liquid petroleum products -- Tank calibration by liquid measurement -- Incremental method using volumetric meters;*
- *ISO 4512:2000 - Petroleum and liquid petroleum products -- Equipment for measurement of liquid levels in storage tanks -- Manual methods*; and
- *ISO 5024:1999 - Petroleum liquids and liquefied petroleum gases -- Measurement -- Standard reference conditions*.

These guidelines provide a working method, a reference method or a referee method for measuring a tank using a steel strapping tape. The operation of strapping, the corrections to be made and the calculations leading to the compilation of the tank capacity table are described.

7.2.5 The Phoenix Agreement

For many years the petroleum industry has maintained two main sets of standards (used worldwide) for measurement:

- API (American Petroleum Institute) MPMS (Manual of Petroleum Measurement Standards - based on US practice); and
- IP (Institute of Petroleum, now Energy Institute) PMM (Petroleum Measurement Manual – based on UK and European practice).

[66] **Chapter 2.8A - Calibration of Tanks on Ships and Oceangoing Barges** (revised February 2007). This document is a joint API/IP standard, which also carries the IP designation *Petroleum Measurement Manual, Part 2, Section 5B.*

Additionally, ISO (International Organization for Standardization) has produced a number of petroleum measurement standards through the subcommittees of Technical Committee (TC) 28. These have been designed for international use, drawing from both API and IP (now EI) documents and expertise within the ISO subcommittees. However, this process did not result in the envisaged single set of international standards. Rather, it produced an ISO third standard which might be technically different to the API or EI equivalent or ISO standards that were not as technically current as their API or EI counterparts (and vice versa).

In March 2005 in Phoenix, Arizona, the API/EI and ISO agreed to review standards in all areas of petroleum measurement in order to produce a single set of standards for international use including those related to *Calibration of Barge Tanks* and *Calibration of Tanks on Ships and Oceangoing Barges*.

7.2.6 Comparison of OIML, API/EI/ISO and Directive 71/349/EC

A major difference between the Directive and other standards lies in the definition of the ships requiring tank calibration. While Directive 71/349/EEC refers only to inland waterway vessels and coasters, the API/EI/ISO documents refer more specifically to vessels carrying petroleum and its products. The OIML classifies all ships used expressly for the transport of liquid products in bulk as 'tankers'. It is not clear why 'coaster' was given as a class for this Directive since coasters can be of any size and sail short or long distances. Some coasters may even transport cargos between countries and may therefore be classified as 'ocean-going vessels'. Similarly, inland waterway vessels come in a range of sizes; many of the barges carrying liquid cargos on the inland waterways of Europe can be larger than sea-going liquid cargo carriers, and calibration of these vessels in practice is often the same as for vessels sailing on open seas.

The API/EI/ISO documents refer specifically to calibration of ships' tanks for petroleum and petroleum products whereas the OIML covers ships' tanks used either for the transport and measurement of liquid products in bulk, or for the storage and measurement of the fuel oil used by the ship itself, that are subject to the control of the National Service of Legal Metrology.

The OIML Recommendations and the API/EI/ISO documents contain certification, calibration and record-keeping standards, similar to those under Directive 71/349/EC although the Directive does not give as detailed information on the precise methods and instruments to use in tank calibration.

7.3 Consultation

7.3.1 Consultees

Initial enquires were sent to all MS national metrology authorities, asking for information covering the period 1998 - 2008. In addition, several shipping agents and maritime institutions were contacted by telephone and email directly. These institutions were asked about the number of vessels registered to carry liquids in tanks, which regulations and standards applied to them, and which standards for calibration were most often used. In addition, assistance with definitions for 'coaster' and inland waterway vessels were sought.

7.3.2 Nature of Responses

Directive 71/349/EC is referred to as one of the 'old approach' directives and, as such, is not generally subject to legal metrological control and is not widely applied in the EC, although it has been transposed into national legislation. Several respondents have noted that advances in technology (such as lasers) have simplified tank measurements. Furthermore, the move towards double-hull construction in the interests of safety and the environment has simplified the internal layout of ships' tanks which, in turn, facilitates spatial measurements.

7.4 The Markets for Tank Calibration

7.4.1 Calibration Services

Tank calibration is carried out by a number of maritime calibration services across Europe and worldwide. However, few vessels with tanks are calibrated on a regular basis, usually relying on builders' blueprints. Precise measurements of the quantities of liquid cargoes from tankers are usually derived from land-based measurements.

7.4.2 Usage of Calibration Services

Shipping companies and national maritime authorities use calibration services for liquid carrying vessels extensively. However, it would appear that few require the EEC Calibration plate or certificate as specified under the Directive. Instead, it appears that most companies carry out tank calibration work in accordance with the latest American Petroleum Institute (API) Manual of Petroleum Measurements Standard and/or International Organization of Standardization (ISO) Standards.

7.4.3 Analysis by Country

Calibration practice varies by country as illustrated in the national summaries presented below.

United Kingdom

The Directive has been transposed into UK legislation but is not subject to legal metrological control i.e. not prescribed for trade purposes, in the UK. Since the Directive covers inland waterway and coasters only, such vessels may not cross the Channel into European coastal and inland waterways. (The term 'coaster' needs to be more clearly defined to determine whether UK registered tankers need the EC calibration certification). One source stated that the UK has not issued any EEC calibration certificates or verified any calibration plates under Directive 71/349/EEC.

Estonia

In Estonia Vessels over 75 GT are under Recognised Organisation[67] technical supervision and the tank calibration is done by its rules and recommendation.

The Netherlands

In the Netherlands the legal metrological aspects of ships tanks are divided into 'regulated measuring instruments' and 'regulated measuring tasks'[68]. Ships' tanks are regulated instruments, so there are requirements (according to the Directive 71/349/EC) which means that, for the purpose of obtaining an EEC initial verification mark, they shall meet the applicable requirements laid down in the Directive, and the calibration shall be carried out by an Agent authorised by the State. However, there is no legal obligation to have the ships tanks calibrated. In other words: the owner is free (from a legal point of view) to have his tank calibrated according to the Directive, or according to any other standard or procedure, or not calibrated at all.

In practice, most customers (oil companies, refineries etc.) voluntarily require that the tanks are calibrated in accordance with the Directive 71/349/EC. About 100 calibrations are carried out per year - split equally between new vessels and re-calibration of old vessels. There are only two authorised Agents for the Directive 71/349/EC which are allowed to issue the EEC certificates and to affix EEC sealing marks on the calibration plates for ships tanks.

Denmark

The Danish Accreditation and Metrology Fund[69] stated that Directive 71/349/EC concerning calibration of tanks of inland waterway and coaster vessels is optional. It has never been used for calibration of tanks in Denmark.

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67 Recognised organisations are authorised by Member States to undertake inspection, surveys and certification of ships (with particular regard to safety and pollution conventions) in accordance with **Council Directive 94/57/EC of 22 November 2004 on common rules and standards for ship inspection and survey organisations and for the relevant activities of the maritime administrations**, OJ L 319, 12/12/1994, p20.

68 *Measuring Instruments Decree II*, in particular: Chapter 1 (Article 1), Chapter 2 (Articles 2 and 3), and Chapter 3, Section 1, article 6.

69 www.dansk-metrologi.dk

Czech Republic

The Czech office for standards, metrology and testing declared that the tanks of vessels are not included within legally controlled measuring instruments and that there is no authorised metrological centre carrying out tank verification in the Czech Republic.

Germany

A small but significant portion of Germany's goods are transported by inland waterways. The fleet of inland vessels has halved over the past 30 years from around 4,500 to 2,300 vessels - with an average age of over 40 years[70]. The fleet includes nearly 400 tankers as well as a number of fuel barges. Even with an aging and reducing fleet, there are still new vessels added every year with associated calibration requirements. However, identifying the appropriate authority has proved difficult.

7.4.4 Market for Calibration Services

The European transport of goods on inland waterways is dominated (nearly 90%) by the Netherlands, Germany and Belgium[71]. As a basis for estimating the market for (re) calibration of ships' tanks for inland waterways and coasters, the following assumptions were used:

- annual number of calibrations (and recalibrations) is three times that for the Netherlands; and
- the calibration cost is €2,500 per vessel based on a combination of (existing) drawings, laser measurements and computer modelling.

On this basis, the market for calibration services in the EU for ships' tanks for inland waterways and coasters is estimated to be about 3 x 100 x €2,500 = €750,000 per annum.

7.5 Scenario Analysis

7.5.1 Scenarios

The three options under consideration are:

- Option 1: maintain existing regulatory framework;
- Option 2: repeal the existing Directives; and
- Option 3: extend the MID to cover the existing Directives.

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[70] These and other statistics are available from the Elekronisches Wasserstraßen - Informationssystem (www.elwis.de) operated by the federal Water and Navigation Administration (www.wsv.de).

[71] As summarised in Eurostat (2006): **Inland Waterways Freight Transport in Europe in 2005**, Statistics in Focus Paper 13/2006, dated 31 December 2006.

7.5.2 Maintain Existing Situation (Option 1)

Using the framework presented in Table 1.2, there are four possible scenarios (sub-options) for the existing situation:

Tank calibrations which do not conform to Directive 71/349/EEC:

- *are not permitted (Option 1A);*
- *are permitted if they conform to national requirements (based on international standards - which have been adapted to technical progress) (Option 1B);*
- *are permitted if they conform to national requirements (not based on international standards) (Option 1C); or*
- *are permitted (i.e. no restrictions) (Option 1D).*

Maintaining the existing situation is most likely to be characterised by Option 1D for most Member States with no associated administrative costs. This reflects the widespread view that the calibration of a ship's tanks is something that is undertaken during the ship's construction. In today's world, calculating the volume of a tank is relatively straightforward using computer-based designs and/or laser-based measurements.

Whilst vessel inspection agencies undertake periodic vessel inspections, it is rare (Netherlands excepted) for tanks to be recalibrated. Rather, data from the initial calibration will be cross-checked with subsequent direct and indirect (i.e. computer modelled) measurements to ensure compliance with evolving national/international requirements.

7.5.3 Repeal Directive 71/349/EEC (Option 2)

Using the framework presented in Table 1.3, there are three possible scenarios (sub-options) for Option 2:

- *national requirements (based on international standards - which have been adapted to technical progress) (Option 2A)*
- *national requirements (not based on international standards) (Option 2B)*
- *no national requirements (Option 2C)*

In the absence of Directive 71/349/EEC, the most likely option to emerge would be expected to be Option 2C - although the Netherlands and, perhaps, Germany may opt for Option 2A. In other words, since most Member States have no particular requirements regarding the calibration of ships' tanks at present, there is no reason for this to change in the near future.

7.5.4 Extend Scope of MID to incorporate Directives 71/349/EEC (Option 3)

The two sub-options (based on the framework presented in Table 1.3) are:

- *MID extended to include the means of calibration of ships' tanks which are prescribed for some measuring tasks (Option 3A); and*

- *although MID extended to include means of calibration of ships' tank, their use is not prescribed (and, therefore, there are no national requirements) for any measuring tasks (Option 3B).*

If it was determined that there was merit in incorporating the means to calibrate (and, perhaps, recalibrate) ships' tanks within the MID, there would need to be clarity over which vessels (and tanks) were to be covered.

Given that the associated measurement procedures are well advanced, there would be few practical difficulties in calibrating selected vessels/tanks. In other words, wherever a tank/vessel was calibrated this would be a 'prescribed' task under the MID. Option 3A would incur some initial costs as vessel manufacturers and inspection agencies developed the necessary procedures to adapt to the new regime. Thereafter, administrative costs would be minimal as a single test certificate would be valid across the EU.

At first sight, there would appear to be few benefits of moving to Option 3B although there would be no costs.

8. SUMMARY BY SECTOR

Cold Water Meters for Non-Clean Water

The market for cold water meters for non-clean water is probably of the order of €4m per year. There is a range of national requirements but there appears to be little reliance on Directive 75/33/EEC. A need for further harmonisation has not been identified.

Alcohol Meters and Alcohol Tables

The alcohol drinks industry is very large and there are many ways of determining alcoholic strength. It appears that traditional glass alcohol meters are still used alongside electronic analyses in many production sites. The market for (calibrated) traditional glass alcohol meters is of the order of €2m per year. Such meters may be calibrated against Directive 76/765/EEC or another standard (such as ISO 4801 or OIML R 44 - as prescribed by Regulation 2676/90 concerning the analysis of wines). Advantages associated with the incorporation of the existing Directives (alone) into the MID have not been identified.

Medium and Above-medium Accuracy Weights

The market for medium and above-medium accuracy weights could be as much as €30m per year. However, consultation has indicated widespread agreement that the existing Directives (71/317/EEC and 74/148/EEC) are no longer of any significance as the *de facto* standard is the OIML standard R 111-1:2004 which is routinely used by manufacturers, suppliers, calibration services and national authorities.

Tyre Pressure Gauges for Motor Vehicles

Tyre pressure gauges covered by Directive 86/217/EEC are being replaced by digital pre-set machines in petrol stations and garages. Nevertheless, given the numbers of such facilities, the market for the 'old' gauges could still be €3m per year. Although, in some countries, reliance is also placed on other standards (such as those based on EN 12645:1998), there may be merit in incorporating tyre pressure gauges into the MID to improve clarity in the marketplace.

Standard Mass of Grain

The market for bulk density meters is probably of the order of €4m per year and is now dominated by integrated electronic analysers. Although Directive 71/347/EEC appears to have been displaced by the ISO 7971-2 standard (in both legislation and practice), consultation suggests that there is a need for further harmonisation.

Calibration of Ship Tanks

Consultation has confirmed that, in most Member States, Directive 71/349/EEC is not used as the basis for calibrating ships' tanks. Most companies carry out tank calibration work in accordance with the latest American Petroleum Institute (API) Manual of Petroleum Measurements Standard and/or ISO Standards.

Table 8.1: Summary of Options by Sector (and Associated Turnover)					
Sector	**Annual Turnover**		**Comments on Option**		
	'old' Directive	**'new' instruments**	**1 (maintain current situation)**	**2 (repeal OA Directives)**	**3 (extend MID)**
Cold (non-clean) water meters	€4m	negligible	Some MS have national requirements and some do not	Little change from current situation	May be technical difficulties in setting MID requirements
Alcohol meters	€2m	€4-6m	International and national requirements (including EC Regulations) for some tasks	Little change from current situation	May be benefits in extending MID to include 'new' as well as 'old' technologies
Weights	€30m	€0m	Reliance on international standards with some national requirements	Little change from current situation	Although possible, no obvious benefits over Option 2
Tyre gauges	€3m	€70m	Reliance on international standards with some national requirements	Little change from current situation	May be benefits in extending MID to include 'new' as well as 'old' technologies
Mass of grain	€0.6m	€3.5m	Reliance on international standards with some national requirements	Little change from current situation	May be benefits in extending MID to include 'new' as well as 'old' technologies - but may be technical difficulties in setting MID requirements
Calibration of ship's tanks	€0.75m	€0m	Generally no requirements except the Netherlands (and Germany?)	Little change from current situation	May be benefits in extending MID but would require clarity over vessels/tanks to be included
Overall	**c€40m**	**c€78m**	**Varies by sector**	**Generally, Option 2 will have little impact**	**May be benefits for most sectors**

Annex 1

Technical Specifications

TASK SPECIFICATIONS FOR THE ASSIGNMENT:

IMPACT ASSESSMENT UNDER ENTR/04/093 LOT N° 2

Statistics and comprehensive reports on six sectors of measuring instruments and their coverage by eight directives, with use of the EU Standard Cost Method to estimate administrative cost savings

(1) Background for the impact assessment

(a) Background and description of the topic

The six sectors are currently being analysed with a view to repeal the eight existing directives and to if necessary include harmonising legislation in Directive 2004/22/EC which provides a legal framework for measuring instruments under the New Approach.

(b) Scope of the impact assessment

The impact assessment itself will be assembled by the Commission services together with national experts. The purpose of this study is to provide statistical input as regards the economic importance of the sectors involved and to what degree their production is covered by the existing directives.

The study will give a full range of relevant national statistics per sector for 27 Member States and where possible the corresponding Eurostat figures. While the national data shall be passed to the Commission they will not be published. Data used for publication will include the totals for E-27 per sector as well as the estimates of the how much of each sector is covered by the existing directives.

The study will use the EU Standard Cost Method to set out administrative cost savings for the three options of no change, no regulation (voluntary standardisation) and regulation under the New Approach directive MID.

(2) Existing documentation and information

The directives to be simplified concern the following sectors:

1. Cold water meters for non-clean water Dir 75/33
2. Alcohol meters Dir 76/765 and Alcohol tables Dir 76/766
3. Medium and above medium accuracy weights Dir 71/317 & Dir 74/148
4. Tyre pressure gauges for motor vehicles Dir 86/217
5. Standard mass of grain Dir 71/347
6. Calibration of ship tanks Dir 71/349

Confidential information concerning the proposal by experts for each sector will be provided to the consultant upon the signing of the contract.

(3) Objectives and tasks of the assignment

(a) Objectives

The objective of the study is to obtain a comprehensive statistical overview of the sectors and the share in the sector of the instruments covered by the directives.

The analysis of the various options, including EU Standard Cost Method to estimate administrative cost savings, should allow an assessment of impacts.

The findings are to serve as an input to the impact assessment which will be finalised by the Commission services.

(b) Tasks

For each of the six sectors we need a description of the market comprising the following elements, both in volume and in value:

- Consumption
- Production
- Employment
- Imports, intra and extra - from which regions
- Exports, intra and extra - to which regions
- Size of producing enterprises and total production per category of SE (up to 10 employees), ME (11-250 employees)and LE (over 250 employees)
- Estimate of prospects of the sector

These figures should be compiled from national sources and then aggregated to achieve an EU-27 total. We need both national figures (for analysis, not for publication) and the EU-27 total.

Where possible these figures should be compared to Eurostat figures, which in the main are highly uncertain.

If possible, it should be indicated what share of each sector is covered by the current directives. (N.B. the result of the study should be economical-statistical, not legal.).

The study should also use the EU Standard Cost Method to set out administrative cost savings for the three options of no change, no regulation (voluntary standardisation) and regulation under the New Approach directive MID (Directive 2004/22/EC).

(c) Approach and specifications for data collection

The proposal from the contractor shall include a methodological approach for the achievement of each of the tasks identified.

Approach and Methodology

The contractor must outline the proposed methodological approach in his offer, which may include the use of such tools as:

- Desk research
  - Qualitative and quantitative analysis of existing reporting, including national statistics and EC statistics,.
  - Analysis of existing documents notably relevant sector reports available on the market.

- Interviews with
  - EU officials in DG Enterprise and Industry and other services, if deemed relevant
  - Relevant National and Regional Administration officials
  - Selected representatives from Industry and SMEs
  - other stakeholders where deemed relevant [specify if possible]
- Any other tools deemed appropriate for the purpose of the study.

(4) Reporting and/or deliverables

(a) Format and timing of documents, reports, publications

The Contractor is to provide the required reports and documents in accordance with the conditions agreed. The tender must include a proposed timeframe for the required deliverables.

(b) List of deliverables

The following deliverables will be produced following the timeframe specified in point (5.b) (below)

- Within 2 weeks after the signature of the contract, a kick-off meeting between the contractor and the Commission will be held in Brussels.
- Within 4 weeks after the signature of the contract, an Inception report will be delivered. It will specify the work programme for the evaluation and describe, in relation with the initial tender, the methodological and empirical approaches to be used for the tasks defined. In particular, it will include a detailed work plan to be submitted to the Commission. The report will also identify any additional need for information to be collected during the evaluation. It will take the form of a draft document to be discussed during the first progress meeting.
- Within 8 weeks after the signature of the contract, a draft Final Report will be delivered. It will summarise progress on all the points to be evaluated and raise any problems encountered. It will demonstrate how the existing data has been analysed, what preliminary conclusions have been drawn from the desk research phase, and how the contractor is planning to proceed for the remaining steps of the work. This report will also include the proposed structure of the final report.
- The Commission will provide comments on the report within 2 weeks of reception.
- Within 14 weeks after the signature of the contract, the Final Report will be delivered to the Commission, taking account of the comments made by the Commission. It will cover all points of the work plan and shall include sound analysis of findings and factually based conclusions, in line with the purpose and objectives described for the study. It will be written in English, of publishable quality and delivered both in paper and electronic form. It will include an executive summary of not more than 2 pages.
- The final report shall conform to the following schema:
  1. Title page
  2. Table of Contents
  3. Executive Summary

4. Introduction
5. Research Methodology
6. Evaluation Results
7. Conclusions
8. Annexes

As the final report may need to be made available to the public no form of confidential data shall be contained in the final report.

When approved, the final report may be published on DG Enterprise and Industry internet site.

Within 4 weeks of the acceptance of the final report the contractor may also be called upon to make an interactive audio-visual presentation or workshop based on its findings and conclusions.

(5) Organisation and timetable

(a) Timetable

Weeks	Tasks and deliverables
1-2	Sign the contract and Kick off meeting
3-4	Inception report + Inception meeting
4-8	Draft Final Report + Progress meeting
9-10	Commission response to Draft Final Report
11-14	Final Report + Meeting
15-16	Commission response to Final Report & Presentations

Annex 2

International Organisations

A2.1 International Organization for Standardization (ISO)

ISO is the world's largest developer and publisher of International Standards[72]. Prices for individual published standards (in English or French) are typically in the range €40 to €80.

ISO began operations in 1947 from its base in Geneva with the intention *to facilitate the international coordination and unification of industrial standards.*

Since then, ISO has developed over 17,000 International Standards on a variety of subjects and 1,100 new ISO standards are published every year. The organization now comprises a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat (still based in Geneva).

All EU-27 Member States are Members of ISO apart from Estonia and Lithuania which are Correspondent Members.

A2.2 International Organization of Legal Metrology (OIML)

OIML was established in 1955 as an intergovernmental organization to promote the global harmonization of legal metrology procedures. Since that time, the OIML has developed a worldwide technical structure that provides its Members with metrological guidelines for the elaboration of national and regional requirements concerning the manufacture and use of measuring instruments for legal metrology applications[73].

The OIML develops model regulations, International Recommendations, which provide Members with an internationally agreed-upon basis for the establishment of national legislation on various categories of measuring instruments. OIML publications (including International Recommendations) may be freely downloaded in electronic form from OIML's website. International Recommendations are published in English and French.

Most EU-27 Member States are Members of OIML although five of the smaller states (Estonia, Latvia, Lithuania, Luxembourg and Malta) are Corresponding Members which join OIML as observers.

A2.3 European Cooperation in Legal Metrology (WELMEC)

WELMEC[74] was founded in 1990 with 18 representative Members from national authorities responsible for legal metrology in European Union and EFTA member

[72] http://www.iso.org/iso/home.htm

[73] http://www.oiml.org/

[74] WELMEC stood for Western European Legal Metrology Cooperation. Although WELMEC now extends includes representatives from Central and Eastern Europe, the acronym has been retained.

States. The principal aim of WELMEC is to establish a harmonised and consistent approach to European legal metrology.

WELMEC now comprises 30 Members including all EU-27 Member States. There are also a number of Associate Members, Observer Organisations (including the Commission) and Corresponding Organisations.

WELMEC's work is carried out by 11 Working Groups. These groups provide guidance documents (WELMEC guides - in English) which may be freely downloaded in electronic form from WELMEC's website[75].

A2.4 European Committee for Standardization (CEN)

CEN, the European Committee for Standardization, was founded in 1961 by the national standards bodies in the European Economic Community and EFTA countries. CEN is a non-profit making technical organization set up under Belgian law[76] and has published over 13,000 standards.

CEN's National Members now comprise national standards organizations of 30 European countries including all EU-27 Member States. It is worth noting that these organizations are the same organisations represented in ISO. There are also seven Associate Members, two Counsellors and the CEN Management Centre in Brussels.

These National Members vote for European Standards (ENs) and, once accepted, it is their responsibility to implement European Standards as national standards, to distribute and sell them and to withdraw any conflicting national standards. The national standards are prepared in the national languages. The prices of individual national standards vary from standard to standard and from country to country but a typical price would be €100.

CEN works closely with the European Committee for Electrotechnical Standardization (CENELEC), the European Telecommunications Standards Institute (ETSI), and the International Organization for Standardization (ISO).

A2.5 European Association of National Metrology Institutes (EURAMET)

EURAMET coordinates the cooperation of National Metrology Institutes (NMI) of Europe in fields like research in metrology, traceability of measurements to the SI units, international recognition of national measurement standards and of the Calibration and Measurement Capabilities (CMC) of its members[77]. EURAMET e.V. is a registered association of public utility under German law which succeeded, as of 2007, EUROMET.

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75 http://www.welmec.org/

76 http://www.cen.eu/cenorm/homepage.htm

77 http://www.euramet.org

EUROMET was a cooperative voluntary organisation between national metrology institutes (NMIs) in the EU and EFTA, including the European Commission formally established in 1987.

EURAMET has 32 Members including all EU-27 Member States (apart from Cyprus), five Associates and a secretariat in Germany. Much of the work of EURAMET (and, previously, EUROMET) is done through 12 Technical Committees.

Similar to WELMEC, EURAMET (and, previously, EUROMET) publishes a number of guides (in English) which may be freely downloaded in electronic form from its website.

A2.6 Summary

As outlined above, there are five international organizations which are of general relevance to the 'old approach' measuring instrument Directives which are the subject of this report.

The organizations fall into two groups - the standards organizations (ISO and CEN) which are self-financing through the sale of standards and those based on national metrology organizations (OIML, WELMEC and EURAMET) which are funded by Member States and produce guidance documents free of charge.

Annex 3

Questionnaires

A3.1 Water Meters -Questionnaire for Manufacturers/Suppliers

RPA is undertaking a study for the European Commission (DG Enterprise & Industry) looking at policy options for a range of 'old approach' measuring Directives including 75/33/EEC relating to cold-water meters. Please note that we are only interested in meters for 'non-clean water' as those for 'clean water' have already been transferred to the 'new approach' Measuring Instruments Directive.

Our initial research suggests that such non-clean water meters could be used for metering or measuring:

- abstraction of water from surface waters (rivers, lakes, sea) or ground water for:
  - irrigation - agricultural and non-agricultural (including parks, golf courses, etc);
  - water treatment (to produce drinking/treated water);
  - cooling of industrial processes and power plants;
  - hydroelectric power generation; and
  - mining and quarrying;
- discharges of industrial waste water; and
- discharges of domestic waste water.

We would be most grateful if you could assist us with the following:

1) Does your company manufacture/supply cold-water flow meters for non-clean water? If YES, what are the main uses for your cold-water meters for non-clean water?
2) Please estimate how many cold-water meters for non-clean water you sell/supply per year.
3) What is the typical price of such a meter?
4) Please estimate the percentage of these meters which are for use within the EU.
5) Please estimate your share (approximate percentage) of your national market. Also, if known, provide an indication of your share of the EU market.
6) What standards (national and/or international) do you apply to your cold-water meters for non-clean water? Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

Please respond (by 21 May) to Pete Floyd at pete@rpaltd.co.uk or by fax to +44 1508 520758.

If you have any questions regarding RPA, feel free to contact Daniel Hanekuyk (daniel.hanekuyk@ec.europa.eu) who is the Project Manager for this study at the European Commission.

Please note that all responses will be treated in confidence.

A3.2 Water Meters -Questionnaire for Users

As for A3.1 but with following questions:

1) Does your company use cold-water flow meters for non-clean water?
2) What are the main uses for your cold-water meters for non-clean water?
3) How many cold-water meters for non-clean water do you have in use?
4) What is the typical lifetime of such a meter?
5) What standards (national and/or international) do you apply to your new cold-water meters for non-clean water?
6) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.3 Water Meters -Questionnaire for Authorities

As for A3.1 but with following questions:

1) Are there requirements within your country/region to use cold-water meters for monitoring the flow of non-clean water?
2) If YES, what are the main uses where cold-water meters for non-clean water are required?
3) For these main uses, what standards (national and/or international) are applied to new cold-water meters for non-clean water?
4) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.4 Alcohol Meters -Questionnaire for Manufacturers/Suppliers

RPA is undertaking a study for the European Commission (DG Enterprise & Industry) looking at policy options for a range of 'old approach' measuring Directives including **76/765/EEC relating to alcoholometers and alcohol hydrometers and 76/766/EEC relating to alcohol tables**.

Directive 76/765/EEC defines **alcoholometers** as glass instruments which indicate alcoholic strength (by mass or volume) and **alcohol hydrometers** as glass instruments designed to measure the density of a mixture of water and ethanol. We refer collectively to these meters as 'traditional glass alcohol meters', but distinguish between them where necessary.

Our initial research suggests that there is a large number of suppliers of traditional glass alcohol meters to home brewers, and a number of suppliers of alcohol meters (traditional and alternatives) to the alcoholic drinks industry. However, it is not clear how much Directive 76/765/EEC influences the market.

We would be most grateful if you could assist us with the following:

1) Does your company/organisation manufacture and/or supply traditional glass alcohol meters?

2) If YES, who are the main customers for traditional glass alcohol meters (retailers, wineries, distilleries, householders, authorities, etc)? (If NO go to Qn 7).

3) Please estimate how many
   - alcoholometers
   - alcohol hydrometers

   you sell/supply per year, and the typical price of each.

4) Please estimate your share (approximate percentage) of your national market for traditional glass alcohol meters.

5) If known, please estimate your share of the EU market for traditional glass alcohol meters.

6) What standards (national and/or international) do you apply to your traditional glass alcohol meters?

7) Does your company/organisation manufacture and/or supply other kinds of alcohol meters - such as pycnometers, electronic densimetry using frequency oscillators, refractometry, etc?

8) If YES, is the value of your sales for these meters larger/smaller than for the traditional glass alcohol meters? (If NO, go to Qn 10).

9) What standards (national and/or international) do you apply to these other kinds of alcohol meters?

10) Have you had any particular problems with (or disputes about) the standards applied to conventional glass alcohol meters (or alcohol meters more generally) that could be addressed by an improved/simplified EU Directive? Please explain.

Please respond (by 24 June) to Pete Floyd at pete@rpaltd.co.uk or by fax to +44 1508 520758. If you have any questions regarding RPA, feel free to contact Daniel Hanekuyk (daniel.hanekuyk@ec.europa.eu) who is the Project Manager for this study at the European Commission.

Thank you for your time. Please note that all responses will be treated in confidence.

A3.5 Alcohol Meters -Questionnaire for Users - *As for A3.4 but with following questions:*

1) Does your company/organisation use traditional glass alcohol meters?

2) If YES, what are the main reasons for using them? (If NO, go to Qn 5)

3) Are there any standards or requirements within your country/region to use traditional glass alcohol meters as defined in Directive 76/765/EEC?

4) Do you use alcohol tables as defined in Directive 76/766/EEC when using your traditional glass alcohol meters? If YES, for what purpose?

5) We have become aware that technological development has provided alternatives to the traditional glass alcohol meters defined in Directive 76/765/EEC. Do you use any alternative alcohol meters (such as pycnometers, electronic densimetry using frequency oscillators, refractometry, etc)?

6) What standards (national and/or international) apply to these other kinds of alcohol meters?

7) Have you had any particular problems with (or disputes about) these standards or requirements that could be addressed by an improved/simplified EU Directive?

A3.6 Alcohol Meters -Questionnaire for Authorities - *As for A3.4 but with following questions:*

1) Are there any requirements within your country/region to use traditional glass alcohol meters (as defined in Directive 76/765/EEC) with EEC initial verification marks, for calibration or verification purposes?

2) If YES, what are these requirements in terms of:
   - alcoholometers?
   - alcohol hydrometers?

3) If you are involved with the verification/calibration of traditional glass alcohol meters, do you ever refer to alcohol tables as defined in Directive 76/766/EEC? If YES, for what purpose?

4) We have become aware that technological development has provided alternatives to the glass alcohol meters defined in Directive 76/765/EEC. Do you use/verify any alternative alcohol meters?

5) What standards (national and/or international) apply to traditional glass alcohol meters and alternative alcohol meters?

6) Have you had any particular problems with (or disputes about) these standards that could be addressed by an improved/simplified EU Directive?

A3.7 Weights -Questionnaire for Manufacturers/Suppliers

RPA is undertaking a study for the European Commission (DG Enterprise & Industry) looking at policy options for a range of 'old approach' measuring Directives including:

- 71/317/EC relating to 5 to 50 kilograms medium accuracy rectangular bar weights and 1g to 10 kilogramme medium accuracy cylindrical weights, and;
- 74/148/EC relating to weights of from 1 mg to 50 kg of above-medium accuracy.

Our initial research suggests that:

- the medium accuracy weights are equivalent to the OIML M2 classifications, and are intended for use in the verification or calibration of class M3 weights and for use in general commercial transactions and with weighing instruments of medium accuracy class III; and

- the above-medium accuracy weights are also known as standard weights, and are equivalent to the OIML classifications of E1, E2 , F1, F2, and M1. These weights are used in the inspection of weighing machines.

We would be most grateful if you could assist us with the following:

1. Does your company manufacture/supply either medium or above-medium accuracy weights? If YES, what are the main uses for each of the following:
   - medium accuracy weights (1g to 50 kg)? and
   - above medium accuracy weights (1mg to 50 kg)?

2. Please estimate how many medium accuracy and above medium accuracy weight sets you sell/ supply per year. Please include the typical price of a set of each category of weights, as follows:
   - medium accuracy weights (1g to 50 kg); and
   - above medium accuracy weights (1mg to 50 kg).

3. Please estimate the percentage of these weights sold which are for use in the European Union:
   - for medium accuracy weights (1g to 50 kg); and
   - for above medium accuracy weights of (1mg to 50 kg).

4. Please estimate your share (approximate percentage) of your national market. Also if known, provide an indication of your share of the EU market:
   - for medium accuracy weights (1g to 50 kg); and
   - for above medium accuracy weights (1mg to 50 kg)

5. What standards (national and/or international) do you apply to your medium accuracy and above-medium accuracy weights? Have you had any particular problems with (or disputes about) these standards which could be addressed through an improved/simplified EU Directive?

Please respond (by 23 May) to Pete Floyd at pete@rpaltd.co.uk or by fax to +44 1508 520758 .

If you have any questions regarding RPA, feel free to contact Daniel Hanekuyk (daniel.hanekuyk@ec.europa.eu) who is the Project Manager for this study at the European Commission.

Please note that all responses will be treated in confidence.

A3.8 Weights -Questionnaire for Users - ***As for A3.7 but with following questions:***

1. Does your company/organisation use either medium accuracy or above-medium accuracy weights with the EEC initial verification marks? If YES, what are the main uses for:
   - medium accuracy weights (1g to 50 kg)? and
   - above medium accuracy weights (1mg to 50 kg)?

2. If relevant, how many certificates of competency (following inspection of public weighing and measuring equipment) do you issue per year using weights with the EEC initial verification marks?

3. Please estimate how many medium accuracy and above medium accuracy weight sets you have in use:
   - medium accuracy weights (1g to 50 kg); and
   - above medium accuracy weights (1mg to 50 kg).

4. What is the typical lifetime of each of the weights categories?
   - medium accuracy weights (1g to 50 kg); and
   - above medium accuracy weights of (1mg to 50 kg).

5. Are there additional costs for maintenance and calibrations of these weights categories? If YES, please estimate an average expenditure (€/year) for these services over the past ten years:
   - for medium accuracy weights (1g to 50 kg); and
   - for above medium accuracy weights (1mg to 50 kg)

6. What standards (national and/or international) do you apply to your medium accuracy and above-medium accuracy weights?

7. Have you had any particular problems with (or disputes about) these standards which could be addressed through an improved/simplified EU Directive?

A3.9 Weights -Questionnaire for Authorities - ***As for A3.7 but with following questions:***

1. Are there requirements within your country/region to use medium accuracy or above-medium accuracy weights with EEC initial verification marks for calibration or verification purposes?

2. If YES, what are the main uses for:
   - medium accuracy weights (1g to 50 kg)? and
   - above medium accuracy weights (1mg to 50 kg)?

3. If relevant, how many certificates of competency (following inspection of public weighing and measuring equipment) do you issue per year using weights with the EEC initial verification marks?

4. Please estimate how many medium accuracy and above medium accuracy weight sets you have in use:
   - medium accuracy weights (1g to 50 kg); and
   - above medium accuracy weights (1mg to 50 kg).

5. What standards (national and/or international) do you apply to your medium accuracy and above-medium accuracy weights?

6. Have you had any particular problems with (or disputes about) these standards which could be addressed through an improved/simplified EU Directive?

A3.10 Tyre Pressure Gauges - Questionnaire for Manufacturers/Suppliers

RPA is undertaking a study for the European Commission (DG Enterprise & Industry) looking at policy options for a range of 'old approach' measuring Directives including 86/217/EEC relating to tyre pressure gauges for motor vehicles. This Directive is focused on the mechanical gauges found on air-lines in commercial garages, petrol stations and tyre fitting shops. The Directive specifically excludes gauges which are digital and those fitted with pre-setting devices.

Our initial research suggests that:

- mechanical gauges are being replaced by digital machines in which the pressure can be pre-set; and
- gauges are often certified against other standards - such as those based on EN 12465:1998 (*Pressure gauges - apparatus for inspection of pressure and/or inflation of tyres for motor vehicles - metrology, requirements and testing*).

We would be most grateful if you could assist us with the following:

1) Does your company manufacture/supply tyre pressure gauges for motor vehicles which are intended to be used in commercial garages, petrol stations and tyre fitting shops?

2) Please estimate how many such gauges you sell/supply per year. Please estimate the percentage which are for use within the EU.

3) What percentage of your gauges are mechanical (as opposed to digital machines)?

4) What is the typical price of a mechanical gauge?

5) Please estimate your share (approximate percentage) of your national market for tyre pressure gauges (all types) in commercial garages, petrol stations and tyre fitting shops. Also, if known, provide an indication of your share of the EU market.

6) What standards (national and/or international) do you apply to your tyre pressure gauges (all types) for motor vehicles? Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

Please respond (by 4 June) to Pete Floyd at pete@rpaltd.co.uk or by fax to +44 1508 520758.

If you have any questions regarding RPA, feel free to contact Daniel Hanekuyk (daniel.hanekuyk@ec.europa.eu) who is the Project Manager for this study at the European Commission.

Please note that all responses will be treated in confidence.

A3.11 Tyre Pressure Gauges - Questionnaire for Users

As for A3.10 but with following questions:

1) How many tyre pressure gauges (all types) does your company/organisation have in use? Also, what percentage are mechanical (as opposed to digital machines)?

2) What is the typical lifetime of tyre pressure gauges at your facilities?

3) Are the tyre pressure gauges inspected by the authorities? If YES, how often?

4) What standards (national and/or international) do you apply to new tyre pressure gauges?

5) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.12 Tyre Pressure Gauges - Questionnaire for Authorities

As for A3.10 but with following questions:

1) Does your organisation test or inspect tyre pressure gauges for motor vehicles (as found in commercial garages, petrol stations and tyre fitting shops)?

2) If YES, how many such gauges are tested/inspected each year? Also, what are the main reasons for these tests/inspections (for example: certification of new machines, checking compliance with national requirements, insurance cover, etc.)?

3) What standards (national and/or international) do you apply to the testing/inspection of:
   - 3.1 'mechanical' tyre pressure gauges found on air-lines?
   - 3.2 digital machines in which the pressure can be pre-set?

4) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.13 Mass of Grain - Questionnaire for Manufacturers/Suppliers

RPA is undertaking a study for the European Commission (DG Enterprise & Industry) looking at policy options for a range of 'old approach' measuring Directives including 71/347/EEC relating to the measuring of the standard mass per storage volume of grain. This Directive describes a piece of equipment and associated procedures for weighing 20 litres of grain and expressing the result in terms of kilogrammes per hectolitre.

Our initial research suggests that:

- various methods are used to measure the bulk density (or specific weight) of grain including use of machines which weigh much smaller volumes of grain (one litre of less); and
- reference is sometimes made to the standard: ISO 7971-2 Cereals - determination of bulk density.

We would be most grateful if you could assist us with the following:

1) Does your company manufacture/supply machines for determining the bulk density of grain (in kg per hectolitre)? If YES, who are the main customers (farmers, grain merchants, food processors, etc)?

2) Please estimate how many such machines you sell/supply per year. Also, what percentage use a balance and weights (as opposed to an electronic load cell)?

3) What is the typical price of such machines?

4) Please estimate the percentage of these meters which are for use within the EU.

5) Please estimate your share (approximate percentage) of your national market. Also, if known, provide an indication of your share of the EU market.

6) What standards (national and/or international) do you apply to your machines for determining the bulk density of grain? Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

Please respond (by 27 May) to Pete Floyd at pete@rpaltd.co.uk or by fax to +44 1508 520758.

If you have any questions regarding RPA, feel free to contact Daniel Hanekuyk (daniel.hanekuyk@ec.europa.eu) who is the Project Manager for this study at the European Commission.

Please note that all responses will be treated in confidence.

A3.14 Mass of Grain - Questionnaire for Users

As for A3.13 but with following questions:

1) Does your company/organisation use machines for determining the bulk density (specific weight) of grain?

2) What are the main reasons for using such machines (for example: setting price of grain, checking grain quality, calibration of other machines, etc.)?

3) How many such machines do you have in use? Also, what percentage use a balance and weights (as opposed to an electronic load cell)?

4) What is the typical lifetime of machines for determining the bulk density (specific weight) of grain?

5) What standards (national and/or international) do you apply to your new machines for determining the bulk density (specific weight) of grain?

6) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.15 Mass of Grain - Questionnaire for Authorities

As for A3.13 but with following questions:

1) Are there requirements within your country/region to use machines for determining the bulk density (specific weight) of grain?

2) If YES, what are the main reasons for using such machines (for example: setting price of grain, checking grain quality, calibration of other machines, etc.)?

3) For these main uses, what standards (national and/or international) do you apply to machines for determining the bulk density (specific weight) of grain?

4) Have you had any particular problems with (or disputes about) these standards which could be addressed by an improved/simplified EU Directive?

A3.16 Calibration of Ship Tanks - Example e-mail to Inspection Agencies and Authorities

I work for Risk and Policy Analysts Ltd (UK). We are currently doing some work for the European Commission on various metrology directives. My particular area of interest is on Directive 71/349/EC, concerning calibration of tanks of inland waterway and coaster vessels.

I am trying to find out how often tanks have been calibrated (over the past 10 years or so) according to Directive 71/349/EC, and whether this is the main (or indeed only?) standard used for tank calibration in the EU.

In addition, I wonder if you could tell me how many calibration certificates and how many calibration plates have been issued by your agency to these categories of vessel (again over 10 years or as far back as records go, if possible).

Finally, I am interested in finding out whether there is a common definition for a 'coaster' and an 'inland waterway vessel'. Does your organisation have a definition for these types of vessels, and if so, what is it?

Many thanks in advance for your assistance with this enquiry.

Yours sincerely

Sarah Gelpke

Annex 4

Consultees

RPA would like to thank the following organisations for their assistance with the study (and any omissions are accidental):

Companies (Manufacturers/Suppliers/Users)

Anglian Water (UK)
Anton Paar (Austria)
Arcus-Gruppen (Norway)
Branca (Italy)
Chopin (France)
Diageo (UK)
Elster Group (Luxembourg)
Exatherm (Czech Republic)
Fengrain (UK)
Foss (Denmark)
Gelsenwasser (Germany)
Grainfarmers (UK)
Leo Kübler (Germany)
Mettler Toledo (Switzerland)
Montenegro (Italy)
MWA Technology (UK)
Prapopoulos (Greece)
Ryme (Spain)
Sartorius Mechatronics (Germany)
Sensus (USA)
Stevenson-Reeves (UK)
Tampere Water (Finland)
Zenner (Germany)
Zweibel (France)

Industry Organisations (including Testing Services)

Algosystems (Greece)
AQUA (European Water Meters Trade Association)
BNIC (Cognac Producers Association)
Brewing Institute Prague (Czech Republic)
Campden (UK)
CEPS (European Spirits Organisation)
Corelab/Saybolt (USA & the Netherlands)
DANAK (Denmark)
Institute of Marine Engineering Science & Technology (UK)
Institute of Shipping Economics and Logistics (Germany)
INTERTANKO (Norway)
Lloyds Register Fairplay (UK)
Verispect (Netherlands)

National/Regional Authorities and Organisations

Bayerisches Landesamt für Maß und Gewicht (Germany)
Biroul Roman de Metrologie Lagala (BRML, Romania)
Bundeamt für Eich- und Vermessungswesen (BEV, Austria)
Bureau de la Métrologie (France)
Centro Español de Metrologia (Spain)
Comunidad Autónoma de Cataluña (Spain)
Comunidad Autónoma de la Rioja (Spain)
Dansk Metrologi (Denmark)
Eichdirektion Nord (Germany)
Environment Agency (UK)
EURAMET
Glówny Urząd Miar (GUM, Poland)
Hellenic Institute of Metrology (Greece)
Maritime and Coastgurad Agency (UK)
Ministerie van Economische Zaken (Netherlands)
National Standards Authority (Ireland)
National Weights & Measures Laboratory (UK)
Norfolk CC Trading Standards (UK)
OIML
Physikalisch-Technische Bundesanstalt (PTB, Germany)
Technilise Järelevalve Amet (TJA, Estonia)
Swedac (Sweden)
Úřad Pro Technickou Normalizaci, Metrologii a Státní Zkušebnictví (UNMZ, Czech Republic)
Urad RS za Meroslovje (MIRS, Slovenia)
Valstybine Metrologijos Tranyba (VMT, Lithuania)