



National  
Measurement  
Office

**Legal Metrology**  
**Practical and Oral Examinations**  
**NMO Guidance Notes 2014**

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## **Introduction**

The importance of legal metrology to the United Kingdom economy and the Trading Standards profession cannot be underestimated. Over £12 billion of goods, services and utilities are weighed or measured in the United Kingdom every week. The National Measurement Office (NMO) ensures that the United Kingdom's systems of weights and measures are fair, accurate and legal in order that consumers and businesses have confidence whenever they buy and sell by quantity.

The NMO also plays a key role in maintaining integrity and confidence in measurement processes through its role in overseeing the National Measurement System. The National Measurement System supports and stimulates good measurement practice and enables business to make accurate and traceable measurements, for the benefit of the nation and trade within Europe and abroad. The UK "measurement system" is delivered through maintaining and developing the and maintaining the primary standards and disseminating them throughout the UK. The system also strives to support and represent the UK internationally, enabling fair and safe competition and trade and providing support for innovation both here and overseas.

It is therefore essential that prospective Trading Standards Officers and Inspectors of Weights and Measures have the necessary knowledge and skills to regulate the marketplace and advise business on their legal obligations whilst facilitating compliance. The Legal Metrology Practical and Oral examinations aim to ensure that the necessary level of expertise and skill is met before candidates are deemed suitable to take up this role.

Responsibility for the Legal Metrology Practical and Oral examinations rests with the NMO. The examinations provide a unique and challenging test for candidates. By their very nature as practical and oral examinations they are unlike other examinations that candidates tend to be familiar with.

The examination timetables are fairly detailed because they need to encompass both the practical and oral examinations in one day for several candidates. It is therefore important that candidates spend the appropriate amount of study time preparing for these examinations to ensure that they present themselves well and confidently on the day. These Guidance Notes are intended to provide candidates with an opportunity to prepare for the examinations.

## **Purpose of the Guidance Notes**

The purpose of these Guidance Notes is to try to provide candidates with information for their Practical and Oral examinations. In particular, to provide information and assistance on the following points:

- the syllabus for the examinations
- the assessment criteria for the Practical and Oral examinations
- the format of the Practical and Oral examinations
- tips to prepare for the Practical and Oral examinations, including general good practice

## **TSI Practical and Oral examination syllabus**

The Practical and Oral examinations, in conjunction with the other elements that make up the Legal Metrology Service Delivery Module (namely legal metrology technology and legal metrology law) provide the Secretary of State for Business, Innovation and Skills with the necessary information to ascertain whether a candidate possesses sufficient competencies for the proper performance of the functions of an Inspector of Weights and Measures and for the grant, under Section 73 of the Weights and Measures Act 1985, of statutory certificates of qualification.

The general syllabus encompasses all weighing and measuring equipment and processes that are controlled by the Weights and Measures Act 1985 and subordinate Regulations and Orders as well as European legal metrology legislation as it is implemented by United Kingdom legislation. The examinations focus in general on equipment and processes that are currently in use for trade in the United Kingdom and might be expected to be encountered by candidates during their future careers.

## **Format of the Practical and Oral examinations**

The Practical and Oral examinations are divided into two separate examinations, one for the Practical and one for the Oral. The format of each examination is different.

The Practical examination requires candidates to demonstrate their ability to apply legislative provisions to weighing or measuring equipment and instruments. The examination focuses on both equipment and instruments used by Inspectors as standards and testing equipment, as well as trade equipment and instruments.

This examination is written. It is divided into two, one hour sessions. It usually incorporates four individual questions. The questions may ask candidates to:

- perform certain tests
- evaluate information supplied
- construct a process and to draw conclusions from those activities about the suitability of the equipment, packages or processes in question

The questions in the Practical examination use a combination of test articles and simulated testing to draw out the candidates' knowledge and skill. There will be a number of candidates in the examination room at the same time and there are usually a number of items of weighing or measuring equipment or instruments for candidates to be examined on.

The Oral examination requires candidates to demonstrate their ability to visually identify weighing or measuring equipment and instruments and discuss the relevant legislation applicable to the equipment and instruments, any non-compliant equipment they spot (and why) and general "fit for purpose" identification of what they are looking at.

**The Legal Metrology oral examinations will have a longer duration of 30 minutes from and including the November 2014 examination cycle.**

Candidates will rotate around 4 or 5 different stations spending 5 or 6 minutes at each station, changing examiners as they move around the room. This is highly beneficial to candidates as each examiner will be stationed at their post of expertise. This will enable candidates to get a well rounded, standardised set of questions at each station, by a variety of examiners, giving individuals the chance to shine and demonstrate their knowledge of the items, equipment and artefacts on display.

Examples of four possible exam stations would include:

- NAWI and weighing
- AWI weighing, taxi meters, packaged goods
- CSMs, tapes (length), beer dispensers
- Water meters, fuel, LPG and road-tankers

The assessment categories are as follows:

- Knowledge of legislation and enforcement powers
- Technical Knowledge
- Information obtained and practical solutions
- Communication

The logistics for the practical examinations will remain the same for the 2014 cycle. There will be some different questions being introduced, which is the usual process for examinations.

Please note, that in addition to physical equipment, the candidates could be shown:

- a variety of pictures
- paperwork and legislation documents
- physical items of weighing and measuring equipment

Thereafter candidates will be asked to demonstrate their technical, legal and practical skills in relation to the information supplied. Candidates may also encounter scenarios related to the information supplied and be expected to apply their knowledge to develop a practical solution or legal outcome.

## Tips to prepare for the Practical examination

1. Exam format – as stated above, in the Practical examination candidates will be expected to demonstrate their ability to carry out a number of tests on weighing or measuring equipment and instruments and make an assessment of their suitability and ability to measure accurately.

2. Examiners' comments – examiners provide a summary of the examination results with relevant comments on the standard achieved by candidates on an annual basis. These are an invaluable study aid to ensure that candidates are aware of the most common errors made in previous exams. These are freely available from TSI. The most recent Examiners' comments can be accessed at:

<http://www.tradingstandards.gov.uk/quals/pastexamsandreports.cfm>

3. Always read the question fully – whilst this may seem like a very basic tip marks are often lost by candidates who fail to answer what has been asked. Too often candidates answer a question based on what they know rather than what they are being asked.

4. Try and prepare well – NMO has a vast range of standards, equipment and instruments at its disposal for examination use. Therefore do not assume that standards, equipment or instruments that have featured in previous examinations will feature in future examinations. Also, do not assume that because standards, equipment or instruments belong to NMO that they will be accurate or, indeed, they are inaccurate. The results of your test will determine whether standards, equipment or instruments pass or fail.

5. Standard “pre-prepared” answers – do not assume that learning standard answers will work. All the NMO equipment used on the day of the exams is identified and tested prior to the examinations taking place. Consequently, it is obvious to examiners whether candidates have tested equipment correctly or not.

6. Identifying equipment – an essential part of any legal metrology test is to ensure that the results achieved can be easily linked to the equipment tested. It is imperative that the equipment under test and any other equipment used in the testing process, such as standards, are identified by the candidates prior to commencing any tests. The majority of equipment will contain a unique serial or reference number which should be identified. In the event that any equipment is not identified a suitable description of the equipment will suffice. Candidates will lose marks by failing to adequately identify equipment.

7. Suitability of equipment – prior to any test taking place an Inspector would be required to ensure certain aspects of the equipment are in order and comply with various requirements. For example, is the balance level, are the weights damaged, is the equipment clean and complete? Candidates would be expected to comment on these areas as part of the testing process.

8. Methodology – the practical examination is a test of the candidates' ability to carry out certain metrological tests on equipment. A clear description of the methodology employed by candidates is therefore critical to demonstrate to the examiner that all necessary steps have been taken throughout the test. Typically candidates might lose marks if they fail to identify important aspects of the test within the methodology. No assumptions can be made about whether steps have been taken by the candidate. Simply put - no marks will be awarded if a methodology is not written down.

9. Rounding of answers – many of the examination questions will require the candidate to state answers to a number of required decimal places. This proves to be a difficult task for some. Always ensure that the answer is stated to the required number of decimal places. Similarly, do not quote answers to accuracy levels that are not required. In addition do not round the answers till the end of the equations or important values may be lost in the final answer.

10. Stating conclusions – candidates may be required to state a conclusion based on test results. It is absolutely essential that this is done. This allows the examiner to assess the ability of the candidate to make judgements based on their results and assess the appropriateness of decisions.

11. Scientific calculators – candidates will be required to bring a suitable scientific calculator to the examination in order to perform certain calculations, such as additions, subtractions, multiplications, standard deviations, averages, etc. Many candidates find themselves in the position of never having actually performed some of these calculations before the examination and consequently find themselves wasting time during the examination trying to work out how to use their calculators. Please bring a suitable scientific calculator and more importantly be aware of how to use it.

12. Diagrams – candidates may be required to produce diagrams to explain their results in more detail. It is good practice for candidates to use coloured pencils to distinguish different results or points on the diagrams. Scales in diagrams or graphs should be appropriate and clearly marked, as should legends and labels.

13. Reference materials – candidates will be provided with reference materials which relate to the appropriate tests as required. These materials should be used for the purpose supplied, for example use of formulae, maximum permissible errors, etc.

14. Practice – the practical examination creates a stern challenge for candidates due to many factors. However the main challenge is completing the tests in the time limit given. Candidates should continue to practice the tests as often as possible prior to the examination in order to ensure that they can produce detailed and accurate methodologies and results within the time limits given. It is a reasonable guide to allocate around 30 minutes to each question.

## **Tips to prepare for the Oral examination**

1. Exam Format – as stated above, in the Oral examination candidates will be expected to identify typical weighing or measuring equipment and instruments found in use for trade. They may be asked to apply appropriate regulations and error limits and discuss opinions and solutions to typical scenarios an Inspector may encounter on a daily basis in relation to the equipment and instruments. Or, they may be expected to identify why a particular set of instruments are compliant or non-compliant.
2. Listen to the examiner – the examiner will have a number of questions to ask to assess the level of knowledge of each candidate. For some equipment this may require answers on testing, for some it may require information on application of the legislation to assess suitability. The examiner expects to hear the answer to the question asked, not a scatter gun approach that tells the examiner everything the candidate knows about, for example, liquid fuel measuring instruments, whether relevant or not.
3. Legislation and terminology – It is essential that candidates are aware of the correct title and year for the legislation they are applying to specific pieces of equipment or instruments. For example, the Measuring Instruments (Capacity Serving Measures) Regulations 2006 should not be quoted as “The Capacity Measures Regulations” because there are different regulations governing different types of equipment and instruments which vary dependent on the legislative system of control governing the equipment or instruments in question. Furthermore, use the correct terminology when referring to equipment or instruments. For example, try not to use the word “optic” when referring to a spirit measuring instrument and do not use “pint glass” when referring to a capacity serving measure, and so on.
4. Equipment and instruments – Candidates will be expected to handle the equipment and instruments and examine some for suitability. Do not try and make an assessment on the suitability of equipment and instruments without picking it up where possible and carrying out a proper examination. It is important that you clearly explain to the examiner what your thought process is and on what basis you are coming to your conclusion. Standing in silence will not gain candidates any marks.
5. Confidence – Many candidates find the Oral part of the examination process particularly daunting. It is important that candidates are confident and have good communication skills to show the examiner that they are capable of fulfilling a number of responsibilities as an Inspector of Weights and Measures, including the provision of advice to traders on legislation and / or applying practical solutions to what may be difficult and testing scenarios. Good eye contact with the examiner, clear and concise explanations and a smart appearance will improve the examiner’s perception of the candidate.





Please note: These are the **assessment criteria** used by NMO for the 2014 Oral examinations will be as follows:

- **Knowledge of legislation and enforcement powers**
- **Technical Knowledge**
- **Information obtained and practical solutions**
- **Communication**

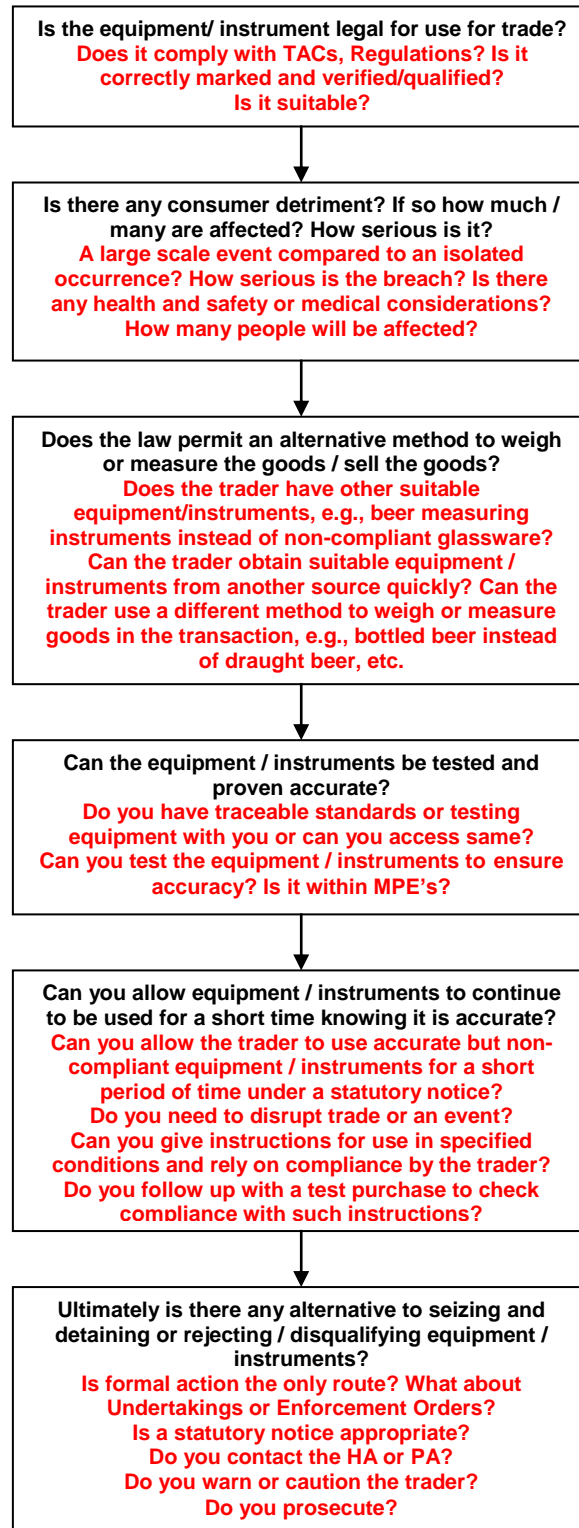
Candidates might also find the following example scenario helpful.

**EXAMPLE: Scenario-based questions in the Oral examination**

As stated above, the examiners in the Oral examination often assess candidates' knowledge and understanding by posing practical scenarios to candidates. The purpose of doing so is not only to assess candidates' knowledge of legislation but also their knowledge of enforcement powers, decision-making abilities, communication skills and ability to adopt a flexible approach to differing circumstances and arrive at an appropriate conclusion.

Candidates should therefore be mindful of a range of issues that should be borne in mind when answering practical scenario-based questions in the Oral examination. The following issues have been included for illustrative purposes only. Candidates should be aware that the following range of issues is not intended to be exhaustive.

Continued.....



## **Conclusion**

We hope you have found this guide useful.

We also provide Open Days at NMO to allow candidates the opportunity to visit the premises of the examinations in advance and sometimes meet some of the examiners or have an expert on hand to answer some common questions about the whole exam process.

Previous candidates that have attended the Open Days have commented on how useful it has been and how it immediately put them at ease as they were already familiar with the environment and processes well in advance of the exams.

So please do keep an eye on the NMO and TSI websites to register your interest in the NMO Open Days.