National Measurement & Regulation Office

Electricity Meters – Disputed Meter Accuracy Report

Analysis of Electricity Meter Determinations Issued Between 2003 – 2014

June 2015

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1. Background

1.1 This report details the findings of electricity meter determinations performed between 1st January 2003 and 31st December 2014.

1.2 Schedule 7 of the Electricity Act 1989[1] requires all electricity meters used for billing purposes to be of an approved pattern or construction[2] and installed in an approved manner. This applies to both primary (i.e. supplier-consumer) and secondary (i.e. landlord-tenant) meters. The majority of electricity meters are also required to be certified[3] in accordance with the Act.

1.3 The approval and certification of electricity meters was previously carried out by Ofgem (the energy regulator - www.ofgem.gov.uk) although the statutory responsibility for the metrological performance of electricity (and gas) meters was transferred from Ofgem to the National Measurement and Regulation Office on 1st April 2009. The National Measurement and Regulation Office (NMRO) is an Executive Agency of the Department for Business, Innovation and Skills.

1.4 Prior to October 2006 the majority of electricity meters were approved under GB national legislation. Since this date meters may also be approved under the European Measuring Instruments Directive (MID). The MID enables a 'European Type Approval Certificate' to be issued, and the instrument can then be used in any EU Member State.

1.5 Meters must conform to prescribed accuracy limits for the operating life of the instrument.

1.6 There are obligations under Schedule 7 for suppliers to keep meters in proper order for correctly registering the quantity of electricity supplied. As such suppliers have a duty to ensure meters are accurate for billing purposes and should make arrangements to monitor their populations of meters and, if required, take action if meters no longer conform to the accuracy limits.

1.7 In the event of a dispute about the accuracy of an electricity meter, paragraph 7 of Schedule 7 provides for any person to request the meter be tested by an independent Electricity Meter Examiner, and this process is formally known as a “determination”.

1.8 The electricity meter testing service is currently outsourced to SGS (UK) Ltd (www.sgs.com). The Electricity Meter Examiners are employees of SGS although they are appointed by the Secretary of State (acting through NMRO) in accordance with paragraph 4 of Schedule 7 of the Electricity Act 1989.

[1] www.legislation.gov.uk/ukpga/1989/29/schedule/7

[2] Laboratory testing of a meter, often a prototype, to ensure it operates accurately in all working conditions (i.e. type approval).

[3] The checking of meters (either singularly or in batches), often at the premises of the manufacturer or repairer, to ensure they are accurate and identical to the model that was type approved.

2. Disputed Electricity Meter Findings – Key Points

2.1 The information within this report is not intended to represent the overall accuracy of electricity meters in Great Britain. The following points should be considered in this context:

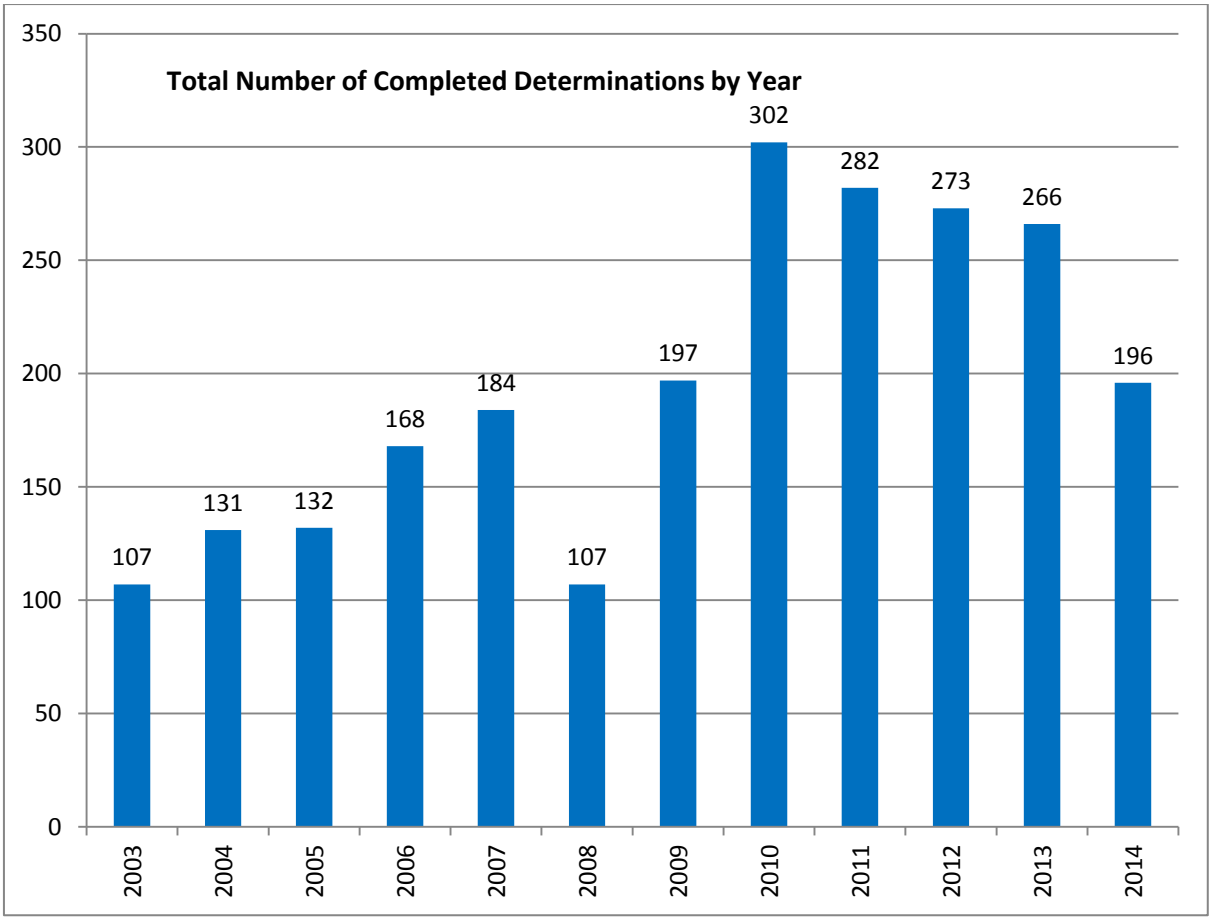
- It is a requirement under Schedule 7 of the Electricity Act 1989 that all electricity meters used for billing purposes be of an approved pattern or construction and installed in an approved manner;

- All domestic meters used for billing purposes by a licensed electricity supplier must also be certified to show they conform to the original pattern approval and operate within the prescribed statutory limits. MID meters are "deemed" to be certified if they conform to the prescribed accuracy limits while meters approved under GB national legislation are given a defined certification life.

- Certification lives are allocated by NMRO and listed on a statutory list known as "Schedule 4" (of The Meters (Certification) Regulations SI 1998/1566): www.gov.uk/government/publications/schedule-4-uk-nationally-approved-electricity-meters

- The meters tested were initiated by the consumer or the supplier in circumstances where it was suspected that the meter was measuring erroneously i.e. the sample is not representative of the whole meter population; and

- Only a relatively small number of determinations are performed annually and this needs to be considered against the overall population of electricity meters in Great Britain that is in excess of 28 million.


Total Number of Completed Determinations by Year
350
300
250
200
150
100
50
0
107
131
132
168
184
107
197
302
282
273
266
196
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

3. Prescribed Limits of Accuracy

3.1 The limits of meter accuracy for meters approved under GB national legislation are prescribed in The Meters (Certification) Regulations (SI 1998/1566)[4]. Unlike most other countries, there is no additional tolerance for electricity meters operating in-service and they are required to maintain the same limits of accuracy as when new.

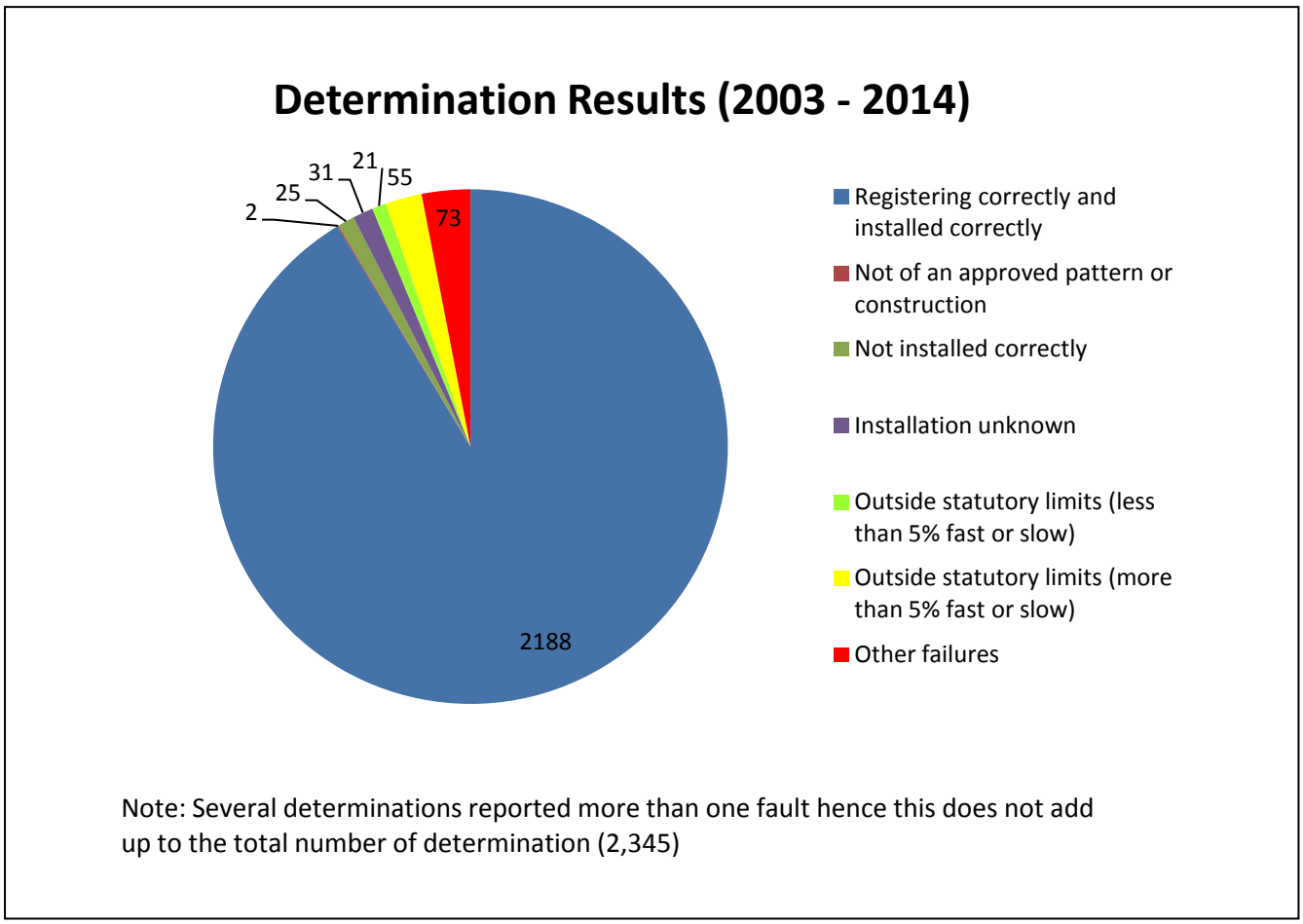
3.2 Electricity meters are considered "accurate" if the permitted margins of error do not exceed +2.5% to -3.5% throughout the entire load range at which the meter is designed to operate.

3.3 For MID meters the limits of accuracy at reference conditions are derived from the harmonised standard BS EN 50470-3:2006. The accuracy tests take into account the additional errors due to variation of influence conditions. However there are relatively few MID electricity meters installed in GB and, to date, only a handful have been submitted for determination.

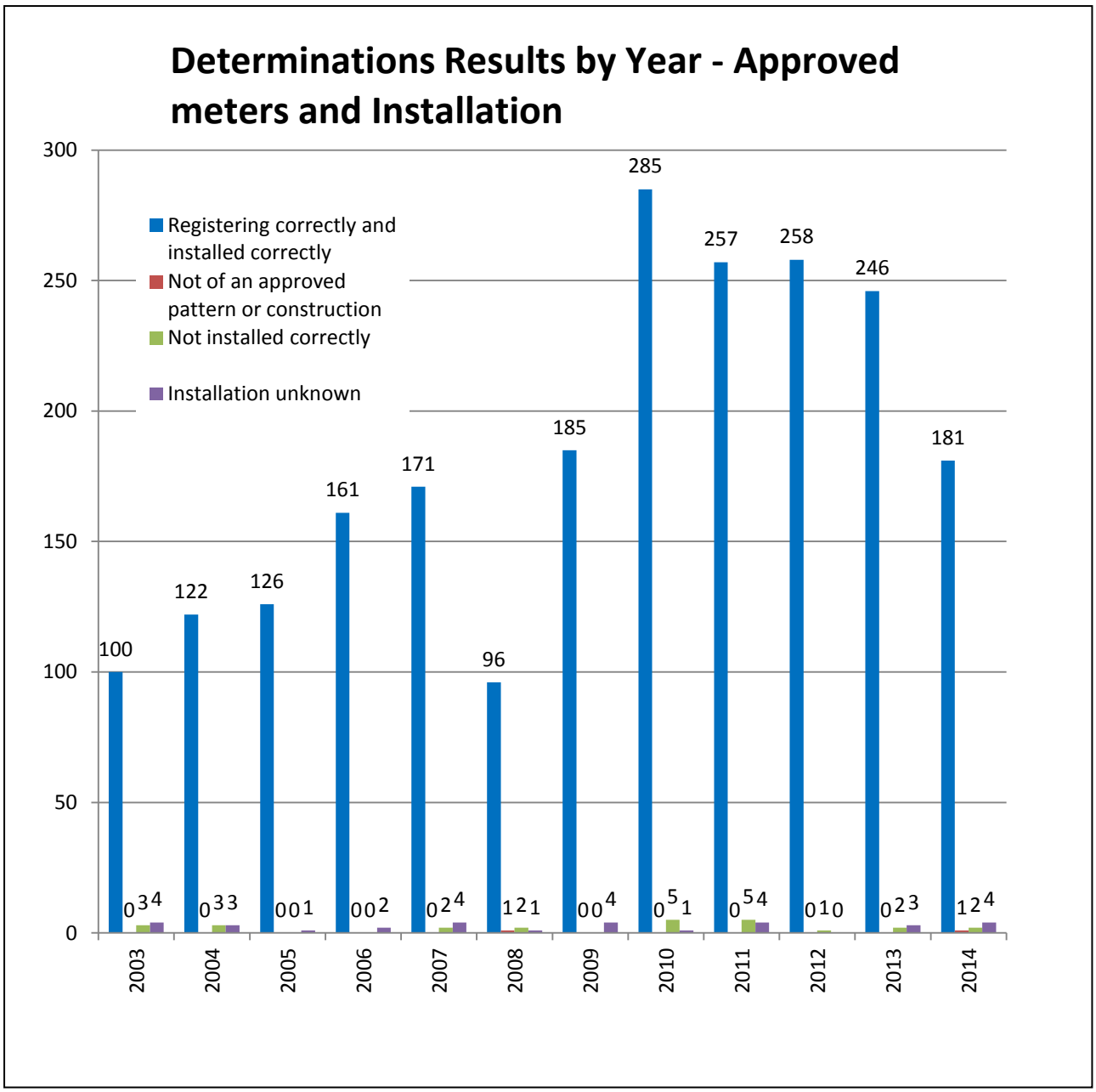
MID Accuracy Class	**Maximum Permissible Error Limits**
Electricity Meters (Class A)	±2.5% at minimum current flow;
	±2.0% at one fifth of maximum current flow; and
	±2.0% at the maximum current flow.
Electricity Meters (Class B)	±1.5% at minimum current flow;
	±1.0% at one fifth of maximum current flow; and
	±1.0% at the maximum current flow.
Electricity Meters (Class C)	±1.0% at both minimum current flow;
	±0.5% at one fifth of maximum current flow; and
	±0.5% at the maximum current flow.

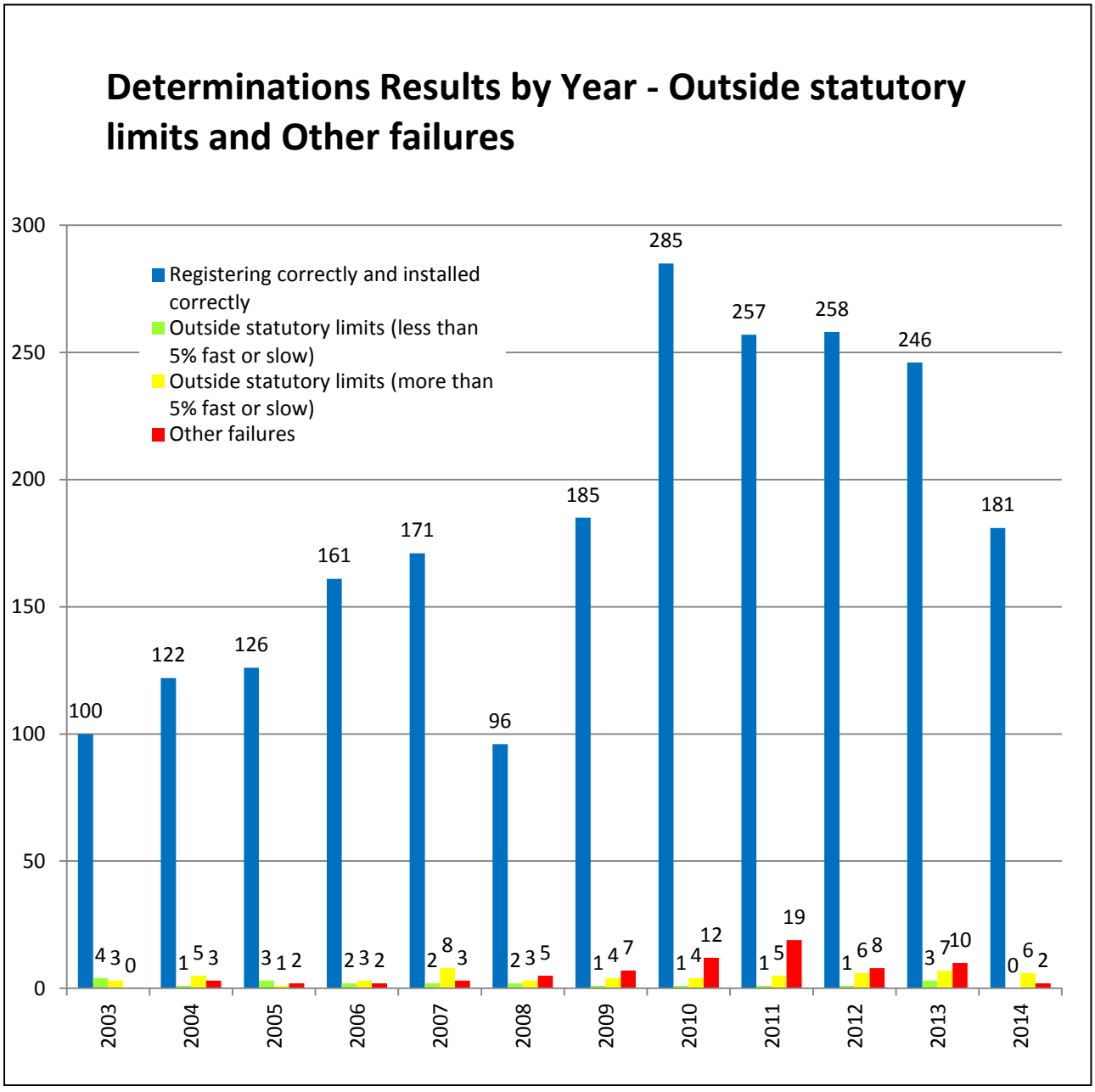
[4] www.legislation.gov.uk/uksi/1998/1566/made

4. Results



Note: Several determinations reported more than one fault hence this does not add up to the total number of determination (2,345)


Determinations Results by Year - Approved meters and Installation
Registering correctly and installed correctly
Not of an approved pattern or construction
Not installed correctly
Installation unknown
300
250
200
150
100
50
0
100
122
126
161
171
96
185
285
257
258
246
181
0 3 4
0 3 3
0 0 1
0 0 2
0 2 4
1 2 1
0 0 4
0 5 1
0 5 4
0 1 0
0 2 3
1 2 4
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


Determinations Results by Year - Outside statutory limits and Other failures
Registering correctly and installed correctly
Outside statutory limits (less than 5% fast or slow)
Outside statutory limits (more than 5% fast or slow)
Other failures
300
250
200
150
100
50
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
100
4 3 0
122
1 5 3
126
3 1 2
161
2 3 2
171
2 8 3
96
2 3 5
185
1 4 7
285
1 4 12
257
1 5 19
258
1 6 8
246
3 7 10
181
0 6 2

4.1 Summary of Determination Data

- A total of 2,345 meters were submitted for determination between 1st January 2003 and 31st December 2014. Of these, 2,188 meters (93%) were found to be registering correctly (i.e. of an approved or construction, certified and operating within statutory limits) and installed correctly.

- Two meters were found to be not of an approved pattern or construction.

- 25 meters (1%) were found to be not installed in an approved manner although 9 of these were registering correctly within the prescribed statutory limits. In 31 determinations the meter had already been removed hence the Examiner was unable to confirm if these had been installed correctly.

- 21 meters (0.9%) were found to be registering outside the statutory limits by less than 5% fast or slow. In some cases this only occurred when the meters were operating at lower loads and the errors were within the limits when the meters were operating under normal conditions of electricity consumption.

- 55 meters (2.3%) were found to be registering outside the statutory limits by more than 5% fast or slow.

- 73 meters (3.1%) were found to have other failures, which include faults with multiple registers, evidence of tampering, demagnetisation in induction meters and failure of components within circuits, etc.

- Several determinations reported more than one fault hence theses figures do not add up to the total number of determinations.

5. Conclusions

5.1 NMRO does not use this data for any formal purpose other than to initiate action with meter manufacturers and owners should Meter Examiners identify systematic faults with certain meter types. It is important that these factors are considered in context with the information provided.

5.2 NMRO will be working with all industry stakeholders with metering responsibility to ensure this important aspect is appropriately covered and that a proactive approach to monitoring the performance of meter populations continues as the competitive market evolves.

5.3 Moving forward, NMRO intends to publish the findings of meter dispute testing on an annual basis covering the same parameters as reported in this document.

5.4 Further information on electricity meter accuracy disputes is available from the NMRO website: www.gov.uk/electricity-meter-accuracy-and-disputes.

5.5 Any enquiries regarding this document should be addressed to:

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