



Australian Government

**National Measurement
Institute**



NITP 4.4
National Instrument Test Procedures for
Lubricating Oil Measures

© Commonwealth of Australia 2011

NMI V 15

First edition — December 2004

NITP 4.4

First edition — December 2011

National Measurement Institute
Bradfield Road, Lindfield, NSW 2070
PO Box 264, Lindfield, NSW 2070

T (61 2) 8467 3600
F (61 2) 8467 3610
W www.measurement.gov.au

PREFACE

On 30 June 2010 the uniform test procedures (i.e. relevant NMI V documents) were deemed to be national instrument test procedures (NITPs) for the purposes of section 18GG of the *National Measurement Act 1960* (Cth).

In 2011 the NITPs were renumbered to better align the numbers with the classes of pattern approval and servicing licensee. As a result this document (NMI V 15) became NITP 4.4.

The only changes that have been made to the latest edition of this document are it has been rebranded, renumbered, renamed and its cross-references have been updated. In all other respects it is identical with NMI V 15.

NMI's Chief Metrologist has determined that NITP 4.4 contains the test procedures for the verification of lubricating oil measures.

CONTENTS

Preface.....	ii
Explanation of Terms.....	iv
1. Scope.....	1
2. Equipment.....	1
3. Visual Inspection	1
3.1 Required Data	1
3.2 Characteristics of the Measure.....	2
4. Test Procedures.....	2
4.1 Accuracy	2
4.2 Batch Testing	3
4.3 Gravimetric Test Method.....	3
4.4 Volumetric Test Test Method	3
5. Suggested Sequence for Testing Procedures	4
Appendix A. Test Report	4
Appendix B. Histogram Form.....	7
Appendix C. Example Histogram.....	8
Appendix D. Test Proportion.....	9
Appendix E. Conversion from Mass to Volume.....	10
Appendix F. Density of Town Water.....	11
Appendix G. Density of Water	12

EXPLANATION OF TERMS

For explanations of other terms see *General Information for Test Procedures*.

Adjustment

Alteration of the measurement parameters to bring the instrument within the allowable MPEs for an instrument in use.

Calibration

The set of operations that (under specified conditions) establishes the relationship between the indicated or nominal value of an instrument and the corresponding known value of the measured quantity.

Certification

The examination of an instrument by a **certifier** (the holder, or an employee of the holder, of a servicing licence) in order to mark the instrument indicating that it conforms with the relevant test procedures.

- **Initial certification** is the certification of a new instrument by a certifier, which does not bear a verification or certification mark and has never been verified or certified before.
- **Subsequent certification** is any certification of an instrument by a certifier because the mark is no longer valid due to such reasons as:
 - repairs or adjustments have been made that affect metrological performance; or
 - the mark has been defaced or removed.

In-service Inspection

The examination of an instrument by an **inspector or certifier** to check that:

- the verification or certification mark is valid; and
- the errors do not exceed the MPEs permitted for in-service inspection.

In-service inspection does not permit the instrument to be marked with a verification or certification mark.

Verification

The examination of an instrument by an **inspector** in order to mark the instrument indicating that it conforms with the relevant test procedures.

- **Initial verification** is the verification of a new instrument by an inspector, which does not bear a verification or certification mark and has never been verified or certified before.
- **Subsequent verification** is any verification of an instrument by an inspector because the mark is no longer valid due to such reasons as:
 - repairs or adjustments have been made that affect metrological performance; or
 - the mark has been defaced or removed.
- **Re-verification** is the examination of an instrument by an inspector to check that:
 - the verification or certification mark is valid; and
 - the instrument has not been modified in any way since verification or certification;in order to mark the instrument indicating that it conforms with the relevant test procedures.

1. SCOPE

NITP 4.4 describes the test procedures for the verification, certification and in-service inspection of lubricating oil measures to ensure that they measure to within the maximum permissible errors specified in the National Measurement Regulations and that they comply with the certificate of approval.

Refer to general certificates of approval 4/2/0 and 4/2/0/A for all the metrological and technical requirements for lubricating oil measures. All measures must comply with the relevant Trade Measurement Act and Regulations.

Two test methods are described for lubricating oil measures:

- the **gravimetric** method (see clause 4.3); and
- the **volumetric** method (see clause 4.4);

Batch testing by the gravimetric method is the only practical method for batch testing lubricating oil measures, taking into consideration the size of the test proportion (see Appendix D). Individual measures may be tested either volumetrically or gravimetrically.

These test procedures supersede *Test Procedure No 12. Lubricating Oil Measures*, first edition, May 1990.

2. EQUIPMENT

1. Certificate of approval.
2. Batch test histograms detailing results of tests performed by or on behalf of the manufacturer or importer (batch testing only).
3. For gravimetric testing:
 - (a) Appropriate reference standards of measurement as follows:
 - standard test masses;
 - a weighing instrument suitable for determining the mass of a measured volume.
 - (b) A suitable pipette.
 - (c) A suitable thermometer.
4. For volumetric testing:
 - (a) An appropriate reference standard of measurement, namely a suitable volumetric measure for delivering a known volume of water.
 - (b) A suitable burette or pipette.
5. A supply of town water (see Appendix F).
6. A suitable test area with ample background light and at a convenient height to ensure that the capacity line of the measure is readily discernable.
7. Current Regulation 13 or Regulation 80 certificates for all reference standards of measurement. Uncertainties must be in accordance with the National Measurement Regulations and not greater than one-third of the maximum permissible error of the measure being tested. Consult the licensing authority for more information.
8. Test report (see Appendix A).

3. VISUAL INSPECTION

Visually inspect the measure and record details of the required data and characteristics of the measure on the test report.

3.1 Required Data

1. Test report reference number.
2. Date of test.
3. Type of test: verification, certification or in-service inspection (for in-service inspection ensure that the verification/certification mark is in place).
4. Name of owner/user.
5. Address of owner/user.
6. Name of submitter of the measures.
7. Address where the measures are located.
8. Manufacturer's identification.
9. Mould number or batch number.

10. Batch test mark.
11. Certificate of approval number.
12. Capacity or capacities.
13. Total number of measures in each batch for testing.
14. Number of measures of each denomination selected for testing.
15. The identification code applicable to the batch to be tested.
16. The verification or certification mark (only required for re-verification and in-service inspection).

3.2 Characteristics of the Measure

1. Does the measure comply with its certificate of approval?
2. Are all mandatory descriptive markings clearly and permanently marked or moulded on the measure in the prescribed location?
3. Is the measure made from a clear, colourless glass or plastic material?
 Note: Any plastic material shall have the same properties as glass.
4. Is the measure unbroken and free of defects?
5. Is the measure clean?
6. Does the measure stand firmly on its base?
7. Is the capacity line in a horizontal plane?
8. Is the measure of a capacity permitted in the certificate of approval?
9. Are correct units used for the capacity?
10. Does the capacity line:
 - (a) completely encircle the measure; or
 - (b) consist of two lines, diametrically opposed, not less than 50 mm long?

11. Is the capacity line located not less than 10 mm and not more than 15 mm from any properly attached top or spout?
12. Is an arrow marked on the measure vertically upwards and the tip of which is not more than 5 mm below the capacity line?
13. Does the measure bear the following statement 'fill to line indicated by arrow'?
14. Is the space between the line and the top or spout free of letters, numbers, marks and lines?

4. TEST PROCEDURES

The following series of test procedures determine if the measures meet the requirements.

Each test procedure is explained as a discrete test. However tests can be combined to expedite the testing procedure. A suggested sequence for testing is shown in clause 5.

4.1 Accuracy

- The maximum permissible error shall not exceed the limitation of error specified in Table 1 or as specified in the certificate of approval.
- If 2% or more of a batch is found to be incorrect, the whole of the batch being submitted for verification or certification is rejected.

Table 1

Capacity (mL)	Maximum permissible error (mL)
500	+20
1000	+30

4.2 Batch Testing

The gravimetric method should be used for batch testing measures. Select a test proportion of measures in accordance with Appendix D.

Measures in batches of 200 or less should **not** be batch tested.

Where the measures are not accompanied by a histogram detailing the results of the tests made by or on behalf of the manufacturer or importer concerned, the batch of measures being submitted will not be verified or certified.

4.3 Gravimetric Test Method

1. Install the weighing instrument in a suitable area with ample background light and at a convenient height to ensure that the capacity line of the measure is readily discernible.
2. Test the weighing instrument according to the relevant test procedure appropriate to its type and class in accordance with NITP 6.1 to 6.4.
3. Determine the temperature of the water ($^{\circ}\text{C}$).

Note: The observed temperature of the water should be monitored throughout the tests, as the density of the water will vary as the temperature of the water changes.

4. Place the measure on the load receptor of the weighing instrument.
5. Either:
 - (a) record the mass (m_1) to an accuracy of 0.1 g or better; or
 - (b) where the weighing instrument is fitted with a taring device, activate the tare ($m_1 = 0$).
6. Fill the measure with water to its capacity line.

Note: The measurement of capacity shall be taken as being when the bottom of the meniscus coincides with the top of the marked line.

7. Make use of a pipette to achieve the correct level.
8. Record the mass of the filled measure (m_2).
9. Calculate the mass of the water designated by the difference ($m_2 - m_1$), expressed as millilitres.

Where the tare device is used in step 5(b) the mass of the water will be the mass m_2 expressed as millilitres.

10. Remove the measure from the load receptor.
11. Calculate the volume of the water according to Appendix E.
12. Either:
 - (a) record the volume on a histogram (see Appendix B); or
 - (b) for individual measures record any variation between the volume of water in the measure and the capacity of the measure.
13. From the histogram, calculate the mean capacity and the standard deviation for the measures tested.
Compare these results with those shown on the histogram prepared by the manufacturer or the submitter.
14. Calculate the percentage of the batch of measures that meets the accuracy requirement and determine whether the batch has passed or failed.

4.4 Volumetric Test Test Method

Where measures are not batch tested, individual measures may be tested by the gravimetric method as outlined in clause 4.3 or by the volumetric method as follows:

1. Wet the inside of the measure with water.
2. Drain measure for 30 seconds and place the wetted measure on a level adjustable stand with the capacity line at eye level.

3. Deliver a quantity of water, equal to the nominal capacity of the measure, into the measure.
4. With the aid of a burette or pipette, determine any variation between the volume of water in the measure and the capacity of the measure.
5. Record any variation between the volume of water in the measure and the capacity of the measure.
6. Determine whether the measure has passed or failed.

5. SUGGESTED SEQUENCE FOR TESTING PROCEDURES

1. Determine the appropriate test to be conducted.
2. Make sure any electronic instrument has been allowed to warm up for about half an hour.
3. In respect to gravimetric tests ensure that the weighing instrument to be used is tested in accordance with NITP 6.1 to 6.4.
4. Check the certificate/s of approval for any additional tests required under test procedures in the certificate/s of approval.
5. Visually inspect the measures to be tested and make a note of the metrological characteristics.
6. Conduct the accuracy test. Use either the volumetric method or the gravimetric method.
7. Record the results.
8. Carry out any calculations.
9. Complete any documentation including histograms.
10. Conduct any additional tests that are required to complete the testing including if necessary any additional testing required by the certificate/s of approval.

11. Determine whether the measure(s) has passed or failed.
12. Complete the test report.
13. Carry out anything else you need to do to complete the procedure. This may include stamping the measure (for more information on stamping see *General Information for Test Procedures*).

APPENDIX A. TEST REPORT

Appendix A contains a test report form to record or check the following information:

- required data;
- checklist for characteristics;
- test results.

See Appendix B for a histogram form.

Although the format of the test report may vary according to the individual needs and requirements of trade measurement authorities and licensees, the following test report contains the minimum amount of information that must be recorded.

If the certificate of approval requires additional tests, attach pages that record the results of these tests.

Number each page of the test report in the style shown at the top of each page.

Test Report for Lubricating Oil Measures

Test report reference number Date of test

Type of test (tick one) Verification Certification In-service inspection

For in-service inspection record the verification/certification mark.....

Name of owner/user/submittor

Address of owner/user/submittor

Name of contact on premises

Address where the instrument is located.....

Description of the measure

Manufacturer's identification	
Mould number or batch number	
Batch test mark	
Certificate of approval number	
Capacity (mL or L)	
Total number of measures in each batch for testing	
Number of measures selected for testing	
The identification code applicable to the batch to be tested	
The verification or certification mark (only required for re-verification and in-service inspection)	

Characteristics of the Measure

Does the measure comply with its certificate of approval?	yes/no
Are all mandatory descriptive markings clearly and permanently marked or moulded on the measure in the prescribed location?	yes/no
Is the measure made from a clear, colourless glass or plastic material? Note: Any plastic material shall have the same properties as glass	yes/no
Is the measure unbroken and free of defects?	yes/no
Is the measure clean?	yes/no
Does the measure stand firmly on a level base?	yes/no
Is the measure of a capacity permitted in the certificate of approval?	yes/no
Are correct units used for the capacity?	yes/no
Does the capacity line: (a) completely encircle the measure; or (b) consist of two lines, diametrically opposed, not less than 50 mm long?	yes/no
Is the capacity line located not less than 10 mm and not more than 15 mm from any properly attached top or spout?	yes/no
Is an arrow marked on the measure vertically upwards and the tip of which is not more than 5 mm below the capacity line?	yes/no
Does the measure bear the following statement 'fill to line indicated by arrow'?	yes/no
Is the space between the line and the top or spout free of letters, numbers, marks and lines?	yes/no

Overall Test Result for Measures Tested Individually

Total number of measures passed

Total number of measures failed

/ /

Date

Inspector

APPENDIX B. HISTOGRAM FORM
Lubricating Oil Measures

Contact name
Name of owner/user
Address of owner/user

Number of measures submitted _____ Sample size _____

Maximum permissible error range _____

Nominal capacity _____

Actual capacity (mL)	Frequency (occurrences)	Number
Total number of measures tested		

Number of measures correct _____ %

Mean capacity of sample measures tested (mL) _____

Standard deviation of sample measures tested _____

Pass Fail

Batch test result

/ /

Date

Inspector

Note: The temperature of the water should be monitored throughout the tests, as the density of the water will vary as the temperature of the water changes.

APPENDIX D. TEST PROPORTION

From Regulation 16 of the Trade Measurement (Measuring Instruments) Regulations

Batch or lot size	Test proportion
201 to 280	50
281 to 500	80
501 to 1 200	125
1 201 to 3 200.	200
3 201 to 10 000	315
10 001 to 35 000	500
35 001 to 150 000	800
150 001 to 500 000	1 250
500 001 and over	2 000

Note 1: Batches of 200 or less should not be tested by the batch testing method.

Note 2: The size of the test proportion comparable with the sampling procedures in the standard of Standards Australia.

APPENDIX E. CONVERSION FROM MASS TO VOLUME

To determine the capacity of the measure record the temperature and the mass of the water in the measure as described in the test procedure.

By reference to Appendix G determine the density of the water at the observed temperature.

To calculate the capacity of the measure, divide the mass by the density of the water at the observed temperature. The result is the capacity of the measure at the observed temperature.

Example

The mass of the water in a 500 mL measure when filled to its capacity is 516.2 g and the observed temperature is 25.4°C. Calculate the capacity of the measure.

Mass of water	= 516.2 g
Observed temperature of water	= 25.4°C
Density of water at 25.4°C	= 0.996 942 g/mL
Volume of water at 25.4°C	= 516.2 / 0.996 942
	= 517.783 4
i.e. capacity of the measure	= 518 mL

The change in capacity of the measure due to cubical thermal expansion together with the effect of air buoyancy is minimal and need not be considered; therefore the capacity can be taken to be correct at 20°C.

APPENDIX F. DENSITY OF TOWN WATER

When testing measures for accuracy, the ideal situation would be to use distilled water and to apply a correction based on the table in Appendix G. However, as the use of distilled water is not always practicable, considering the number of measures being tested, recourse must be had to town water.

Experience has shown that in the major Australian centres the effect of dissolved salts and other impurities in the town water supply is such as to increase the density of the water by about one part in five or ten thousand above that of pure water. It follows then that the volumes calculated, when town water is used, will be in error (in excess) by an amount proportional to the increase in density.

If V_1 is the volume calculated using town water with a density of p_1 the true volume would be given by the formula:

$$V = V_1 \times p / p_1$$

where p is the density of pure water at the same temperature.

As a precision better than one part in five thousand is not required the density of the town water need not be determined and town water may be used instead of distilled water. However, corrections for temperature may be required.

APPENDIX G. DENSITY OF WATER

National Measurement Act 1960

Determination by the National Standards Commission (now known as the National Measurement Institute)

Recognised-value Standard of the Density of Water

In pursuance of paragraphs 8A(1)(a) and (b) of the *National Measurement Act 1960* the magnitude of the density of water d_t at a temperature t and a mean pressure p shall be a recognised-value standard of measurement, provided t lies within the range 0°C to 40°C and p lies within the range 2×10^4 Pa to 10^6 Pa.

For the purposes of this Determination:

- (a) When p is 101 325 Pa and t is one of the temperatures listed in Table 2 the magnitude of the density in kg.m^{-3} is as stated in the table, which is derived from the following formula:

$$d_t = 999.972 - (t - 3.984\ 9)^2 / 506.603\ 12 \times (t + 286.460\ 1) / (t + 67.760\ 1)$$

where d_t is the density in kg.m^{-3} and t is the temperature in °C;

- (b) When p is 101 325 Pa and t is between two adjacent values of temperature listed in the attached table then the magnitude of the density in kg.m^{-3} shall be determined from the table by linear interpolation;
- (c) When p differs from 101 325 Pa the magnitude of the density in kg.m^{-3} as stated in the attached table or derived there from in accordance with the above linear interpolation shall be algebraically increased by an amount equal to:
 $(5.061\ 9 - 0.030\ 9\ t + 0.000\ 361\ 4\ t^2) \times 10^{-7}(p - 101\ 325)$; and
- (d) If the value of t used in the attached table and the above equations does not differ from the true mean temperature of the water by more than 0.1°C, if the value of p used in the equation does not differ from the true mean pressure within the water by more than 1 000 Pa, and if impurities in the water do not exceed 1 part in 10^5 by mass, the chance is not more than one in one hundred that the density so ascertained differs from the true density by more than $0.05\ \text{kg.m}^{-3}$.

Table 2. The density of water in kilograms per cubic metre as a function of the temperature in degrees Celsius

TEMP	DENSITY														
0.0	999.839	5.0	999.964	10.0	999.700	15.0	999.100	20.0	998.204	25.0	997.045	30.0	995.647	35.0	994.032
0.1	999.846	5.1	999.962	10.1	999.691	15.1	999.084	20.1	998.183	25.1	997.019	30.1	995.617	35.1	993.998
0.2	999.853	5.2	999.960	10.2	999.682	15.2	999.069	20.2	998.163	25.2	996.993	30.2	995.587	35.2	993.963
0.3	999.859	5.3	999.958	10.3	999.673	15.3	999.054	20.3	998.142	25.3	996.968	30.3	995.556	35.3	993.929
0.4	999.865	5.4	999.956	10.4	999.663	15.4	999.038	20.4	998.121	25.4	996.942	30.4	995.526	35.4	993.894
0.5	999.871	5.5	999.954	10.5	999.654	15.5	999.023	20.5	998.100	25.5	996.916	30.5	995.495	35.5	993.859
0.6	999.877	5.6	999.952	10.6	999.645	15.6	999.007	20.6	998.078	25.6	996.889	30.6	995.465	35.6	993.824
0.7	999.883	5.7	999.949	10.7	999.635	15.7	998.991	20.7	998.057	25.7	996.863	30.7	995.434	35.7	993.790
0.8	999.888	5.8	999.946	10.8	999.625	15.8	998.975	20.8	998.036	25.8	996.837	30.8	995.403	35.8	993.755
0.9	999.893	5.9	999.943	10.9	999.615	15.9	998.959	20.9	998.014	25.9	996.810	30.9	995.372	35.9	993.719
1.0	999.898	6.0	999.940	11.0	999.605	16.0	998.943	21.0	997.992	26.0	996.784	31.0	995.341	36.0	993.684
1.1	999.903	6.1	999.937	11.1	999.595	16.1	998.927	21.1	997.971	26.1	996.757	31.1	995.310	36.1	993.649
1.2	999.908	6.2	999.934	11.2	999.585	16.2	998.910	21.2	997.949	26.2	996.730	31.2	995.279	36.2	993.614
1.3	999.913	6.3	999.930	11.3	999.574	16.3	998.894	21.3	997.927	26.3	996.704	31.3	995.248	36.3	993.578
1.4	999.917	6.4	999.927	11.4	999.564	16.4	998.877	21.4	997.905	26.4	996.677	31.4	995.216	36.4	993.543
1.5	999.921	6.5	999.923	11.5	999.553	16.5	998.860	21.5	997.883	26.5	996.650	31.5	995.185	36.5	993.508
1.6	999.925	6.6	999.919	11.6	999.542	16.6	998.843	21.6	997.860	26.6	996.623	31.6	995.153	36.6	993.472
1.7	999.929	6.7	999.915	11.7	999.531	16.7	998.827	21.7	997.838	26.7	996.595	31.7	995.122	36.7	993.436
1.8	999.933	6.8	999.910	11.8	999.520	16.8	998.809	21.8	997.816	26.8	996.568	31.8	995.090	36.8	993.400
1.9	999.936	6.9	999.906	11.9	999.509	16.9	998.792	21.9	997.793	26.9	996.541	31.9	995.058	36.9	993.365
2.0	999.940	7.0	999.902	12.0	999.497	17.0	998.775	22.0	997.770	27.0	996.513	32.0	995.026	37.0	993.329
2.1	999.943	7.1	999.897	12.1	999.486	17.1	998.757	22.1	997.748	27.1	996.486	32.1	994.995	37.1	993.293
2.2	999.946	7.2	999.892	12.2	999.474	17.2	998.740	22.2	997.725	27.2	996.458	32.2	994.962	37.2	993.257
2.3	999.949	7.3	999.887	12.3	999.463	17.3	998.722	22.3	997.702	27.3	996.430	32.3	994.930	37.3	993.221
2.4	999.952	7.4	999.882	12.4	999.451	17.4	998.704	22.4	997.679	27.4	996.403	32.4	994.898	37.4	993.184
2.5	999.954	7.5	999.877	12.5	999.439	17.5	998.687	22.5	997.656	27.5	996.375	32.5	994.866	37.5	993.148
2.6	999.956	7.6	999.871	12.6	999.427	17.6	998.669	22.6	997.632	27.6	996.347	32.6	994.834	37.6	993.112
2.7	999.959	7.7	999.866	12.7	999.415	17.7	998.650	22.7	997.609	27.7	996.318	32.7	994.801	37.7	993.075
2.8	999.961	7.8	999.860	12.8	999.402	17.8	998.632	22.8	997.586	27.8	996.290	32.8	994.769	37.8	993.039
2.9	999.962	7.9	999.854	12.9	999.390	17.9	998.614	22.9	997.562	27.9	996.262	32.9	994.736	37.9	993.002
3.0	999.964	8.0	999.848	13.0	999.377	18.0	998.596	23.0	997.538	28.0	996.234	33.0	994.703	38.0	992.965
3.1	999.966	8.1	999.842	13.1	999.364	18.1	998.577	23.1	997.515	28.1	996.205	33.1	994.670	38.1	992.929
3.2	999.967	8.2	999.836	13.2	999.352	18.2	998.558	23.2	997.491	28.2	996.177	33.2	994.638	38.2	992.892
3.3	999.968	8.3	999.830	13.3	999.339	18.3	998.540	23.3	997.467	28.3	996.148	33.3	994.605	38.3	992.855
3.4	999.969	8.4	999.823	13.4	999.326	18.4	998.521	23.4	997.443	28.4	996.119	33.4	994.572	38.4	992.818
3.5	999.970	8.5	999.816	13.5	999.312	18.5	998.502	23.5	997.419	28.5	996.090	33.5	994.539	38.5	992.781
3.6	999.971	8.6	999.810	13.6	999.299	18.6	998.483	23.6	997.394	28.6	996.062	33.6	994.505	38.6	992.743
3.7	999.971	8.7	999.803	13.7	999.286	18.7	998.463	23.7	997.370	28.7	996.033	33.7	994.472	38.7	992.706
3.8	999.972	8.8	999.795	13.8	999.272	18.8	998.444	23.8	997.346	28.8	996.003	33.8	994.439	38.8	992.669
3.9	999.972	8.9	999.788	13.9	999.258	18.9	998.425	23.9	997.321	28.9	995.974	33.9	994.405	38.9	992.632
4.0	999.972	9.0	999.781	14.0	999.244	19.0	998.405	24.0	997.297	29.0	995.945	34.0	994.372	39.0	992.594
4.1	999.972	9.1	999.773	14.1	999.230	19.1	998.386	24.1	997.272	29.1	995.916	34.1	994.338	39.1	992.557
4.2	999.972	9.2	999.766	14.2	999.216	19.2	998.366	24.2	997.247	29.2	995.886	34.2	994.304	39.2	992.519
4.3	999.971	9.3	999.758	14.3	999.202	19.3	998.346	24.3	997.222	29.3	995.857	34.3	994.271	39.3	992.481
4.4	999.971	9.4	999.750	14.4	999.188	19.4	998.326	24.4	997.197	29.4	995.827	34.4	994.237	39.4	992.444
4.5	999.970	9.5	999.742	14.5	999.173	19.5	998.306	24.5	997.172	29.5	995.797	34.5	994.203	39.5	992.406
4.6	999.969	9.6	999.734	14.6	999.159	19.6	998.286	24.6	997.147	29.6	995.768	34.6	994.169	39.6	992.368
4.7	999.968	9.7	999.725	14.7	999.144	19.7	998.266	24.7	997.121	29.7	995.738	34.7	994.135	39.7	992.330
4.8	999.967	9.8	999.717	14.8	999.130	19.8	998.245	24.8	997.096	29.8	995.708	34.8	994.101	39.8	992.292
4.9	999.965	9.9	999.708	14.9	999.115	19.9	998.225	24.9	997.071	29.9	995.678	34.9	994.066	39.9	992.254
5.0	999.964	10.0	999.700	15.0	999.100	20.0	998.204	25.0	997.045	30.0	995.647	35.0	994.032	40.0	992.215