THE INSTITUTE
OF PETROLEUM

STANDARD METHODS

FOR ANALYSIS AND TESTING OF PETROLEUM AND RELATED PRODUCTS AND BRITISH STANDARD 2000 PARTS

2001

Methods IP 1–339

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SAFETY PRECAUTIONS

The methods in this book do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these methods to establish appropriate safety and health practises and determine the applicability of regulatory limitations.

In addition manufacturers guidelines and recommendations for the use of chemicals and equipment shall be consulted.

Notice to Users

It has been assumed by the compilers that all users of this book will, if not themselves fully trained, at least be under the supervision of a responsible trained person who will be familiar with all normal laboratory practice, and engineering practice as appropriate, and safety precautions, and that all such precautions will be observed. It is the responsibility of users to ensure that the requirements of the Health and Safety at Work etc. Act, 1974 are fully complied with.

It has also been assumed that reagents of adequate purity will be used, along with apparatus and equipment of correct specification, properly maintained. Specification for reagents, apparatus and equipment are given in manufacturers' catalogues and various standards, specifications, etc.

There are numerous handbooks on first aid, and on laboratory safety such as that issued by the Royal Society of Chemistry. Refer also to the current issue of "Guidance Note EH40 Occupational Exposure Limits" issued by the Health and Safety Executive in the UK (or the latest publication of "Documentation of Threshold Limit Values for Substances in Workroom Air" published by the American Conference of Governmental Industrial Hygienists).

Where the compilers considered that a special hazard exists, attention has been drawn to this in the text. It cannot be too strongly emphasized that prompt first aid, decontamination, or administration of the correct antidote can save life, but that incorrect treatment can make matters worse.

It is emphasized that both supervisors and operators should be familiar with emergency procedures before starting an operation involving any degree of hazard. Should any accident involving chemical contamination of the skin, ingestion or inhalation be such that medical attention is necessary, a doctor consulted should be made fully aware of the chemical composition of the contaminant and given any other relevant information which would assist him in deciding what specific treatment should be given. Such information might be obtained from technical data sheets from the supplier or from the label on the chemical container.

FOREWORD

1. STANDARD METHODS FOR ANALYSIS AND TESTING OF PETROLEUM AND RELATED PRODUCTS

This is produced in two volumes and contains over 250 Full and 17 Proposed Methods for the analysis and testing of petroleum and related products. Of these Full methods over 80 are issued as joint IP/ASTM methods.

The Full methods appear in numerical order followed by the Proposed Methods and appendices.

The separate publications of IP Standard Methods Part II Methods for Rating Fuels – Engine Tests, Part III Assessing Performance of Engine and Automotive Transmission Lubricants – Engine and Axle Tests and Part IV Methods for Sampling have been discontinued. Details of the methods previously found in Parts II and III may be found on page xxxv.

For the sampling methods reference should be made to ISO 3170 and ISO 3171, BS 3195 Part 3 and ISO 4257 or ASTM D3700.

2. DESCRIPTION OF TERMS

The terms 'Determination', 'Result', 'Reproducibility' and 'Repeatability' are defined in IP 367/ISO 4259 and 'Determinability' is defined in Appendix E. The meaning of certain other terms used in IP Standards requires clarification as follows:

Method of Test–The terms 'Method of Test' or 'Method' are to be understood as applying to the whole of the information, description, and instructions in all of the various sections included under the Title and Serial Designation.

Procedure–The term 'Procedure' is used here in a special sense, and relates to the series of operations described in the Section of the method bearing this heading.

Test–A test is the process of submitting a sample to one or more determinations as described in the method of test.

3. CRITERIA FOR TEST METHOD SUITABILITY

The following criteria are considered, as appropriate, in assessing the suitability of a method of test as an IP Standard; they are reviewed occasionally as work on the methods proceeds.

Where the method clearly fails to meet specific criteria, consideration is given to either:

3.1. Rejecting the method,

3.2. Carrying out further work before standardization, or

3.3. Inserting an appropriate comment in the 'SCOPE' clause.

It must be appreciated, however, that overriding considerations may require the adoption of a method despite failure to meet some of the criteria. For example, in the interests of international standardization, it may be necessary to adopt a method even though a perfectly satisfactory IP equivalent already exists.

3.4. *Criteria*

3.4.1. *Significance of Test*

3.4.1.1. Consider the nature of the property it is desired to measure in as fundamental terms as possible. Call this property 'A'.

3.4.1.2. Is there a strong practical requirement to assess property 'A'? (e.g. is property 'A' clearly correlated with an important service performance factor?).

3.4.1.3. Does some other existing test already provide adequate information on property 'A'?

3.4.1.4. Does the proposed test measure property 'A' or does it measure some other property 'B' which is not sufficiently correlated with property 'A'? (e.g. Property 'A' may be molecular weight and the test under consideration may be the distillation test. Although boiling point is related to molecular weight, it is also influenced by molecular structure. The test could, therefore, be rejected for the purpose of measuring molecular weight.)

3.4.2. *Reliability of Results*

3.4.2.1. Has the precision of the test been assessed statistically?

3.4.2.2. Does the method show a bias against any other methods assessing the same property?

3.4.2.3. Is the reproducibility smaller than the smallest difference in levels of property 'A' which it is necessary to distinguish?

3.4.3. *Economic Considerations*

3.4.3.1. Consider the cost of equipment and materials.

3.4.3.2. Consider the manpower involved in carrying out the test.

3.4.3.3. Consider the elapsed time of the test (i.e. the total time from the start of the test to the production of the result).

3.4.4. *Future Developments*

3.4.4.1. If the method is not automated, is an automated form desirable for laboratory, field or on-line use?

3.4.4.2. If so, does the test readily lend itself to automation at a later date?

4. METHOD DESIGNATION

4.1. *Standard Methods*

These are methods which are firmly established. They will normally include precision statements which have been obtained by statistical examination of inter-laboratory test results, or where this is not possible, contain a statement of reliability.

4.2. *Proposed Methods*

These are methods which are published for information and comment, and may not include a precision statement.

They remain as proposed methods for a period of not more than 3 years, unless an extension of a further 3 years is approved by the Standardization Committee. After this they are either advanced to a full standard or withdrawn.

4.3. *Joint IP/ASTM Methods*

These are standard methods which have been developed in conjunction with the ASTM D2 Committee. They are recognised as being technically equivalent and are dual numbered with an IP and ASTM number in IP number sequence.

The ASTM number is followed by a figure which indicates the year in which the method was adopted as approved. A number in parentheses indicates the year in which the method was reapproved.

4.4. *ISO Methods*

ISO Standards and ISO/DIS's are reproduced in this volume with agreement of ISO, the International Organization for Standardization. Single copies of these standards can be obtained from ISO members or from the Central Secretariat, PO Box 56, CH-1211 Geneva 20.

4.5. *European Norms (ENs)*

These are standards which have either been produced by, or ISO Standards endorsed by, CEN. It is mandatory that they are adopted as British Standards.

4.6. *BS 2000 Series methods*

Many IP test methods have been accorded the status of a British Standard. These methods have been developed in accordance with BSi procedures which includes making the methods available for public comment. These methods form parts of the BS 2000 series.

4.7. *Method Revision*

4.7.1. *Standard Methods*

These shall be reviewed 5 years after publication and thereafter every 5 years. However there is provision for an earlier revision should technical and/or editorial alteration be required.

4.7.2. *Proposed Methods*

These shall be reviewed after 3 years of publication and if approval is given for an extension, after a further 3 years.

4.8. *Method Numbering*

4.8.1. *Standard Methods*

These are arranged in numerical order with a figure after the solidus indicating the year in which the method was adopted or last revised.

Where methods have not required revision for several years but have been studied and reapproved, the year of the reapproval shall be shown in the Numerical List of the IP Methods by the addition of the last two digits of the reapproval year in brackets.

4.8.2. *Proposed Methods*

These are given a pair of designation letters following the words IP Proposed Method. The designation letters are given in sequence starting AA and the methods arranged in this alphabetical order, with a figure after the solidus indicating the year in which the proposed method was adopted.

4.8.3. *ISO Methods*

These are dual numbered with the IP numbering as in 4.6.1. above. They are arranged in IP number sequence.

4.8.4 *European Norms*

These are dual numbered as BS EN XXXX. In addition they are adopted as IP test methods and are thus numbered IP YYY and BS 2000 : Part YYY.

4.8.5 *BS 2000 Series*

These are dual numbered IP ZZZ, BS 2000: Part ZZZ: 199X.

4.9. *Method Withdrawal*

4.9.1. *Standard Methods*

A notice of withdrawal shall be given at the beginning of the method and its number and withdrawal date included in the Notice of Withdrawal of Method section 2 years prior to the proposed withdrawal date.

4.9.2. *Proposed Methods*

As 4.7.1.

Note should also be taken of section 4.2. wherein the lifetime of a proposed method is defined.

5. METHOD FORMAT AND PRESENTATION

5.1 *General Principles*

It is intended that IP Methods remain in the forefront of international methodology, both in terms of their content, and in terms if their overall integrity. This means that there shall be strict adherence to the relationship between Scope and Precision, and where possible, all methods shall have procedures laid down for Calibration, Verification, and/or Instrument Monitoring,

5.2 *Format*

IP methods shall be prepared in accordance with ISO Directives Part 3 : 1997, with the symbol for litre '1' and the 'comma' as the

decimal marker. However some existing IP methods which are not called up in specifications may not be presented strictly in accordance with these requirements.

ISO and CEN test methods adopted as IP methods will have been prepared in accordance with: ISO directives – Part 3: 1989 Drafting and presentation of International Standards; and CEN Internal Regulations, Part 3 : 1990 Rules for the drafting and presentation of European Standards; respectively.

Copies of BS 0, ISO Directives – Part 3 and CEN Internal Regulations, Part 3 can be obtained from BSI and are also available for study at the IP.

5.3 *Normative references*

Included in the majority of IP Test Methods. These are standards or documents that form an integral part of the Test Method and shall be referenced by the user in order to claim compliance. Normative references may be other IP Test Methods, ISO, CEN or ASTM Standards.

Where IP Test Methods are listed under Normative references, the symbol ≡ adjacent to an ISO or EN Standard number indicates that the IP method listed is identical to this Standard.

6. MATHEMATICAL STYLE AND EQUATION LAYOUT

6.1 *General*

The primary aim is to achieve maximum clarity, and thus aid comprehension. Simple forms of notation and layout often achieve this. Avoidance of elaborate expressions built over several lines can enhance the typographical appearance of the printed page.

This standard is based on BS 5775 : Part 0 : 1993 (which is equivalent to ISO 31/0-1992), BS 0: Part 3: 1991 section 18 and IEC/ISO — Drafting and presentation, 1989 section 4.6.

6.2 *Symbols and Numbers*

Symbols for quantities are generally single letters of the Latin or Greek alphabets, sometimes with subscripts or other modifying signs. These symbols are printed in italic (sloping) type. A subscript that represents a symbol for a physical quantity is printed in italics, e.g. *qm* for mass flow rate. Other subscripts are printed in roman (upright) type, e.g. *E*k for kinetic energy. Numbers, including those in subscripts and superscripts, are printed in roman type. Each group of three digits reading to the left or to the right of the decimal sign shall be separated by a small space from preceding or following digits, except for four-digit numbers designating years and standard numbers.

6.3 *Multiplication and Decimal Signs*

The preferred multiplication sign is a cross (×), and that for the decimal sign is a comma on the line (,). The symbol *x* should be avoided in an equation, though if it is used (e.g. a standard symbol for a physical quantity) it should be in italic.

6.4 *Equations*

Equations should be expressed in a mathematically complete form, dimensionally balanced and unambiguous. Series of equations should be indented consistently and aligned wherever possible on the '=' sign. Except in a standard that contains a large number of equations making repeated use of several symbols (in which case these should be explained at the outset in a separate 'symbols and abbreviations' clause), the meanings of the symbols used in an equation should be explained in a formal, consistent style immediately below the equation in which they appear. See Example 1.

Example 1

$$\frac{p_1}{p_2} = 1 + \eta\left(\frac{T_2 - T_1}{T_1}\right)^{\gamma/(\gamma - 1)}$$

where

p_1 is the intake pressure, in pascal;
p_2 is the delivery pressure, in pascal;
η is the isentropic efficiency;
T_1 is the inlet temperature, in kelvin;
T_2 is the outlet temperature, in kelvin;
γ is the ratio of specific heat capacities.

The names of units are spelt out in full when they are not preceded by a numerical value, as in 'the SI unit of pressure is a pascal', but '1 Pa = 1 N/m^2'.

No space is to be inserted between symbols that together represent a product of the individual symbols or between a number and the symbol it multiplies. A small space is used on either side of a mathematical sign.

In a standard containing more than a few isolated equations, all of them are numbered sequentially throughout the standard, including appendices, using arabic numerals in parentheses ( ).

When the resultant value to be calculated from an equation is expressed in terms of a unit of measurement or a percentage, this should be explained in the sentence that introduces the equation, as in Example 2, to avoid confusing the unit symbol with the content of the equation.

Example 2

The value of F (in N) is calculated from the equation:

$$F = ma$$

The value of d, expressed as a percentage, is calculated from the equation:

$$d = (a/b) \times 100$$

If it is necessary to break an equation that is too long for the text line, the break should be made at one of the following points:

(a) at $=$, $>$, $\sim$ and similar signs, the sign appearing only at the beginning of the 'turn-over' line;
(b) at $+$, $-$, $\times$, $/$, signs, the sign appearing at the end of the first line and again at the beginning of the second;
(c) between adjacent brackets, in which case a multiplication sign is inserted at the end of the first line and again at the beginning of the second. See Example 3.

Example 3

$$f(t) = s\left[1 + \frac{1}{PD}\{E_1(b+t_2) - E_2(b+t_3)\} \times \right.$$

$$\left. \times \{4E_2(1+t_3) + 4E_3(1+t_4)\}\right]$$

6.5 *Brackets*

The commonly used term 'brackets' applies to several differently-named signs, three of which are most frequently used in mathematical expressions. These are parentheses ( ), braces { } and brackets [ ]. When brackets within brackets are required in equations and formulae occupying text of single-line depth, the normal order is [( )] when two sets are needed and [{ ( ) }] when three sets are needed. The size (depth) of a pair of brackets depends upon the maximum vertical space occupied by the terms enclosed and should always be sufficiently large to enclose the term of greatest depth. Pairs of brackets that enclose others should always be at least as large as any of the pairs within. Brackets of equivalent size should be of similar weight (density) to avoid giving unwarranted prominence to any one pair. Where brackets extend to a depth of two or more lines of print, [ ] are preferred to either ( ) or { }.

6.6 *Solidus*

The use of a solidus (/) can effect the reduction of some displayed two-line expressions to single lines, this being of particular value in text. See Example 4. The size of the solidus should be sufficient to ensure instant recognition. When using the solidus, care is essential in the use of brackets, and the order in which individual terms are placed. See Example 5.

Example 4

$\frac{a}{b}$ can be expressed as a/b

$A = \frac{a-b}{c+d}$ can be expressed as $A = (a-b)/(c+d)$

$0 < e < \frac{1}{n+z}$ can be expressed as $0 < e < 1/(n+z)$

Example 5

The expression $\frac{a}{b} + c$ could be expressed as $(a/b) + c$.

Without the use of the brackets, $a/b+c$ could be read as $\frac{a}{b+c}$

The use of the double solidus in an expression may be ambiguous and should always be avoided. Thus $a/b/c$ should be expressed as $a/(bc)$ or ac/b, whichever is correct.

6.7 *Bar (Vinculum)*

Provided that the context makes it clear, the root sign does not require the addition of the vinculum to indicate the value it applies to, this being expressed instead, where appropriate, by brackets. See Example 6.

Example 6

$\sqrt{(a^2+b^2+c^2)}$ is preferred to $\sqrt{a^2+b^2+c^2}$

6.8 *Integral and Summation Signs*

The limits associated with an integral sign $\int$ and the values of the summation sign $\sum$ can be printed in small type to the right of the respective signs. If this is done, the signs are not overshadowed by the associated notation and can be set in a smaller size, often within single-line depth, thus saving on vertical space and avoiding additional composition problems. See Example 7.

Example 7

$\int_b^a$ is preferred to $\int_b^a$

$\sum_{i=1}^{n} \frac{1}{i}$ is preferred to $\sum_{i=1}^{n-1}$

6.9 *Subscripts and Superscripts*

For fractional indices, the solidus is used. Care is essential in the sizing and location of superscripts, especially outside brackets. See Example 8.

Example 8

$y^{a/b}$, $t^{1/2}$, $\left(\frac{a-b-c}{6}\right)^{\pi/2}$

For expressions in which superscripts appear above subscripts, it is acceptable to have the superscript to the right of the subscript rather than immediately above it. This does not apply to primes, which should always be immediately next to the term they relate to. See Example 9.

Example 9

d_3^2 and $d_3{}^2$ are both acceptable, and d_3' is correct.

Symbols having subscripts or superscripts which themselves have subscripts or superscripts shall be avoided, wherever possible. The most frequent cases occur with subscripts to subscripts and these can generally be placed on the same line as the main subscript, separated if necessary by a comma. See Example 10.

Example 10

$y_{t(n+1)}$ is preferred to $y_{t_{n+1}}$

6.10 *Exponentiation*

In exponentiation functions, the abbreviation 'exp' followed by the exponent on the same line is preferred to 'e' followed by the exponent as a superscript. This is particularly helpful when the exponent is lengthy or complex, as in Example 11.

Example 11

$\exp(ax^2+bxy-cy^2)$ is preferred to $e^{ax^2+bxy-cy^2}$

6.11 *Logarithms*

The mathematical symbol for a logarithm is $\lg_a$, where a is the base. The base value should always be written.

Example 12

$\lg_e y$ and $\lg_{10} T$

7. PATENTED AND REGISTERED APPARATUS

The best equipment of wide availability is used for IP methods, irrespective of patents or registrations. Manufacturers are advised to ascertain whether patents or registrations apply to the equipment used, as the Institute of Petroleum cannot accept responsibility in this regard.

The Standardization Committee would be grateful if readers and users of this book would kindly inform the Institute of any errors which have been identified.

NUMERICAL LIST OF IP TEST METHODS AND PANELS RESPONSIBLE FOR THEM

* IP-ASTM Joint Method.

a These methods appear in the ASTM Standards Volume 05.05 Methods for Rating Motor, Diesel and Aviation Fuels.

b These methods are published by the CEC.

c These methods are published by EEMUA

d These Standards are published as part of the IP Petroleum Measurement Manual.

e These Standards are published separately as Parts of the BS 2000 Bitumen Test Methods.

The number in parentheses indicates the year the method was reapproved.

IP Method number	*Method title*
1/94	Acidity (ST-C-4)
2/98*	Aniline and Mixed Aniline Point (ST-B-10)
3	*obsolete*
4/96*	Ash (ST-G-3)
5	*obsolete*
6	*superseded by IP 143*
7	*superseded by IP 143*
8	*obsolete*
9	*superseded by IP 129, 130*
10/94	Kerosine Burning Characteristics – 24 Hour Method (ST-B-10)
11	*obsolete*
12/79(01)	Specific Energy (ST-B-2)
13/94*	Carbon Residue – Conradson Method (ST-B-10)
14/94*	Carbon Residue – Ramsbottom Method (ST-C-4)
15/95*	Pour Point (ST-C-4)
16/98	Freezing Point of Aviation Fuels (ST-B-7)
17/52(94)	Colour - Lovibond Tintometer Method (ST-B-10)
18	*obsolete*
19/01	Demulsibility Characteristics of Lubricating Oil (ST-C-4)
20	*obsolete*
21	*obsolete*
22	*obsolete*
23/2000*	Gasoline Engine Crankcase Oil Fuel Dilution (ST-C-4)
24	*obsolete*
25	*obsolete*
26	*superseded by IP 123*
27/74(88)*	Distillation Characteristics of Cutback Bitumen (ST-E-2)
28	*superseded by IP 123*
29	*superseded by IP 191*
30/92	Doctor Test (ST-B-10)
31	*obsolete*
32	*obsolete*
33	*obsolete*
34/99*	Closed Flash Point – Pensky–Martens Method (ST-B-4)
35/63(01)	Open Flash and Fire Point – Pensky–Martens Method (ST-B-4)
36/01*	Open Flash and Fire Point – Cleveland Method (ST-B-4)
37/85(92)	Acidity and Alkalinity of Lubricating Grease (ST-C-6)
38	*obsolete*
39	*obsolete*
40/97*	Oxidation Stability of Gasoline – Induction Period Method (ST-B-8)
41/99*	Ignition Quality of Diesel Fuel by the Cetane Engine Method (ST-B-1)
42	*obsolete*
43	*superseded by IP 150*
44	*superseded by IP 236*
45/58(92)	Loss on Heating of Bitumen and Flux Oil (ST-E)
46	*obsolete*
47/01e	Solubility of Bituminous Binders (ST-E)
48/97	Oxidation Characteristics of Lubricating Oil (ST-C-2)
49/01e	Needle Penetration of Bituminous Material (ST-E)
50/88(01)*	Cone Penetration of Lubricating Grease (ST-C-6)
51	*obsolete*
52	*superseded by IP 136*
53/2000*	Crude Petroleum and Fuel Oils – Determination of Sediment-Extraction Method (ST-B-3)
54	*obsolete*
55/77(83)*	Melting Point of Wax – Cooling Curve Method (ST-C-7)
56	*obsolete*
57/95(01)	Smoke Point (ST-B-10)
58/01e	Softening Point of Bitumen – Ring and Ball Method (ST-E)
59	*obsolete*
60	*obsolete*
61/99*	Sulfur – High Pressure Combustion Method (ST-G-5)
62	*superseded by IP 107*
63	*obsolete*
64	*superseded by IP 154*
65	*obsolete*

IP Method number	*Method title*
66	*superseded by IP 61*
67	*obsolete*
68	*obsolete*
69/94	Vapour Pressure – Reid Method (ST-B-9)
70	*obsolete*
71 Section 1/97*	Kinematic Viscosity and Calculation of Dynamic Viscosity (ST-C-3)
71 Section 2/95*	Specifications and operating instructions for glass capillary kinematic viscometers (ST-C-3)
72/86(92)	Viscosity of Cutback Bitumen (ST-E)
73	*superseded by IP 226*
74/2000*	Water Content of Petroleum Products – Distillation Method (ST-B-3)
75	*obsolete*
76/70(95)*	Congealing Point of Waxes and Petrolatum (ST-C-7)
77/72(96)	Salt Content – Extraction and Volumetric Titration Method (ST-G-3)
78	*obsolete*
79	*obsolete*
80/01e	Breaking Point of Bitumen – Fraass Method (ST-E)
81	*obsolete*
82	*obsolete*
83	*superseded by IP 118*
84/93	Iodine Value – Iodine Monochloride Method (ST-G-2)
85	*obsolete*
86	*obsolete*
87	*obsolete*
88	*obsolete*
89	*obsolete*
90	*obsolete*
91/01e	Residue on Sieving of Bitumen Emulsions (ST-E-4)
92	*obsolete*
93	*obsolete*
94	*obsolete*
95	*obsolete*
96	*obsolete*
97	*superseded by IP 131*
98	*obsolete*
99	*superseded by IP 136*
100	*superseded by IP 213*
101	*obsolete*
102	*obsolete*
103/88(01)	Hydrogen Sulphide – Cadmium Sulphate Method (ST-G-5)
104	*obsolete*
105	*obsolete*
106	*superseded by IP 162*
107/86(01)*	Sulphur – Lamp Combustion Method (ST-G-5)
108	*obsolete*
109	*obsolete*
110/82(01)	Barium Content of Lubricating Oil – Ashing, Extraction and Gravimetric Method (ST-G-3)
111/82(01)	Calcium Content of Lubricating Oil – Ashing, Extraction and Volumetric Method (ST-G-3)
112/56(92)	Corrosive Substances in Lubricating Grease – Copper Strip Method (ST-C-6)
113	*obsolete*
114	*obsolete*
115	*superseded by IP 148,149*
116	*obsolete*
117/82(01)	Zinc Content of Lubricating Oil – Ashing, Extraction and Gravimetric Method (ST-G-3)
118	*obsolete*
119/96*	Knock Rating – Supercharge Method (ST-B-1)
120	*obsolete*
121/75(92)	Oil Separation Characteristics of Lubricating Grease – Pressure Filtration Method (ST-C-6)
122	*obsolete*
123/01	Distillation Characteristics of Petroleum Products (ST-B-9)
124	*obsolete*
125/01	Cast Iron Corrosion Characteristics of Petroleum Products (ST-C-5)
126	*superseded by IP 237*
127	*obsolete*
128	*obsolete*
129/93(98)	Bromine Number – Colour-Indicator Titration Method (ST-G-2)
130/98*	Bromine Number – Electrometric Method (ST-G-2)
131/99*	Gum Content of Light and Middle Distillate Fuels – Jet Evaporation Method (ST-B-8)
132/96*	Dropping Point of Lubricating Grease (ST-C-6)
133/79(01)*	Drop Melting Point of Wax and Petroleum (ST-C-7)
134	*obsolete*
135/93*	Rust Preventing Characteristics of Steam Turbine Oil in the Presence of Water (ST-C-4)
136 Section 1/98*	Saponification Number – Colour Indicator Titration Method (ST-G-2)
136 Section 2/99*	Saponification Number – Potentiometric Titration Method (ST-G-2)
137/82(94)	Oil Content of Water Mix Metalworking Oil Dilutions (ST-C-5)
138/2000*	Oxidation Stability of Aviation Fuel – Potential Residue Method (ST-B-8)
139/98*	Acid or Base Number – Colour Indicator Titration Method (ST-C-4)
140	*superseded by IP 162*
141	*obsolete*
142/85(92)*	Oxidation Stability of Lubricating Grease – Oxygen Bomb Method (ST-C-6)
143/01	Asphaltenes (Heptane Insolubles) (ST-B-5)
144	*obsolete*

NUMERICAL LIST OF METHODS

IP Method number	*Method title*
145	*obsolete*
146/2000*	Foaming Characteristics of Lubricating Oils (ST-C-4)
147	*obsolete*
148	*obsolete*
149/93*	Phosphorus in Lubricating Oils and Additives – Quinoline Phosphomolybdate Volumetric Titration Method (ST-G-3)
150	*superseded by IP 236*
151	*obsolete*
152	*obsolete*
153	*obsolete*
154/2000*	Corrosiveness to Copper – Copper Strip Method (ST-B-10)
155	*obsolete*
156/97*	Hydrocarbon Types – Fluorescent Indicator Adsorption Method (ST-G-2)
157/96	Oxidation Stability of Inhibited Mineral Oils (TOST test) (ST-C-2)
158/69(01)*	Oil Content of Waxes – Gravimetric Method (ST-C-7)
159	*obsolete*
160/99*	Density of Crude Oils and Liquid Petroleum Products – Hydrometer Method (PM-B-4)
161	*superseded by IP 410*
162	*obsolete*
163/96*	Sulphated Ash of Lubricating Oils and Additives (ST-G-3)
164	*obsolete*
165	*obsolete*
166/77(92)	Load Carrying Capacity of Lubricants – IAE Gear Machine Method (ST-C-1)
167	*obsolete*
168/95	Rolling Bearing Performance of Lubricating Grease (ST-C-1)
169	*superseded by IP 264*
170/99	Flash Point – Abel Closed Cup Method (ST-B-4)
171	*obsolete*
172	*superseded by IP 237*
173	*obsolete*
174	*obsolete*
175/69(83)b	Engine Cleanliness Petter AVI Compression – Ignition Test Engine (ST)
176/69(83)b	Oil Oxidation and Bearing Corrosion – Petter SI Spark-Ignition Test Engine (ST)
177/96*	Weak and Strong Acid Number – Potentiometric Titration Method (ST-C-4)
178	*obsolete*
179/79(95)*	Cone Penetration of Petrolatum (ST-C-7)
180	*obsolete*
181	*obsolete*
182/82(01)	Inorganic Acidity of Petroleum Products – Colour Indicator Titration Method (ST-C-4)
183/79(92)	Evaporation Loss of Lubricating Grease (ST-C-6)
184	*superseded by IP 264*
185/65(85)*	Odour of Petroleum Wax (ST-C-7)
186/93	Low Temperature Torque of Lubricating Grease (ST-C-1)
187	*obsolete*
188	*obsolete*
189-190/98	Density – Graduated Bicapillary Pyknometer Method & Capillary Stoppered Pyknometer Method (PM-B-4)
191/83*	*Incorporated into IP 123 as Group 0*
192	*superseded by IP 160*
193	*obsolete*
194	*obsolete*
195/98*	Distillation Characteristics of Volatile Organic Liquids (ST-B-9)
196/97*	Determination of colour (ASTM scale) (ST-B-10)
197	*obsolete*
198	*obsolete*
199	*obsolete*
200/80(90)*	Petroleum Measurement Tables (PM-C-2) (Published separately)
212/92	Viscosity of Bitumen Road Emulsions (ST-E-4)
213/82(88)	Neutralization Value of Bitumen - Colour Indicator Titration Method (ST-E)
214	*obsolete*
215/93	Water Washout Characteristics of Lubricating Grease (ST-C-6)
216/97*	Particulate Contaminant of Aviation Turbine Fuels (ST-B-11)
217	*obsolete*
218	*obsolete*
219/94*	Cloud Point of Petroleum Products (ST-B-7)
220/98	Rust Prevention Characteristics of Lubricating Greases (ST-C-6)
221	*obsolete*
222/01e	Absolute Viscosity of Bitumen – Vacuum Capillary Viscometer Method (ST-E)
223/68(92)	Ash of Petroleum Products Containing Mineral Matter (ST-E)
224/68(96)	Lead Content of Light Petroleum Distillates – Dithizone Extraction Colorimetric Method (ST-G-3)
225/76(01)	Copper in Light Petroleum Distillates – Spectrophotometric Method (ST-G-3)
226/91(95)*	Calculation of Viscosity Index from Kinematic Viscosity (ST-B-2)
227	*obsolete*
228/72(96)*	Lead Content of Gasoline – X-ray Spectrometry Method (ST-G-3)
229/93	Oxidation Stability of Steam Turbine Oils – Rotating Bomb Method (ST-C-2)
230	*obsolete*
231/69(01)	Engine Cleanliness – Caterpillar High Speed Supercharged Compression Ignition Engine Method (ST)
232/69(92)	Performance of Hypoid Oils under High Torque at 107.2°C and 275°C (ST-C-1)
233	*obsolete*
234/69(92)	Performance of Hypoid Oils in Axles of Passenger Cars with Non-automatic Transmission – Mira High Speed Shock Method (ST-C-1)
235/86(92)	Density of Light Hydrocarbons – Pressure Hydrometer Method (PM-B-4)

NUMERICAL LIST OF METHODS

IP Method number	*Method title*
236/87a*	Test for Knock Characteristics of Motor and Aviation Type Fuels by the Motor Method (ST-B-1)
237/87a*	Test for Knock Characteristics of Motor Fuels by the Research Method (ST-B-1)
238/82(88)a*	Test for Knock Characteristics of Liquefied Petroleum (LP) Gases by the Motor (LP) Method (ST-B-1)
239/97	Extreme Pressure and Antiwear Properties of Lubricants – Four Ball Machine Method (ST-C-1)
240/84(92)	Extreme Pressure Properties of Lubricating Fluids – Timken Method (ST-C-1)
241	*obsolete*
242/83(01)	Sulphur Content of Petroleum Products – Flask Combustion Method (ST-G-5)
243/94	Sulfur Content of Petroleum Products – Wickbold Combustion Method (ST-G-5)
244/71(95)	Chlorine Content of Petroleum Products – Flask Combustion Method (ST-G-3)
245/81(95)	Phosphorus Content of Petroleum Products – Flask Combustion Method (ST-G-3)
246/69(78)b	Ford Cortina High Temperature Test (ST)
247/69(01)	Engine Cleanliness and Wear – Merit Rating System Method (ST)
248	*obsolete*
249/79(92)	Density – Bingham Pyknometer Method (PM-B-4)
250	*obsolete*
251/76d	Static Measurement of Refrigerated Hydrocarbon Liquids (Published as Part XII Section 1 of the PMM)
252/76d	Fidelity and Security of Measurement (Published as Part XIII Section 1 of the PMM)
261	*obsolete*
262	*obsolete*
263/70(94)	Stability of Water Mix Metal Working Fluids (ST-C-5)
264/72(01)*	Composition of LPG and Propylene Concentrates – Gas Chromatography Method (ST-G-6)
265/01	Total Salts Content of Crude Oil – Conductivity Method (ST-G-3)
266	*obsolete*
267/84	Low Temperature Viscosity of Automotive Fluids – Brookfield Viscometer Method (ST-C-6)
268	*obsolete*
269	*obsolete*
270/96	Lead Content of Gasoline – Iodine Monochloride Method (ST-G-3)
271/70(96)	Barium Content of Lubricating Oil Additive Concentrates – Sulphuric and Nitric Acid Oxidation Method (ST-G-3)
272/2000	Mercaptan Sulfur and Hydrogen Sulphide Content of LPG – Electrometric Titration Method (ST-G-5)
273	*obsolete*
274/99*	Electrical Conductivity of Aviation and Distillate Fuels (ST-B-8)
275	*obsolete*
276/95*	Base Number – Perchloric Acid Potentiometric Titration Method (ST-C-4)
277	*obsolete*
278/72(88)	Seal Compatibility Index of Petroleum Oils (ST-C-6)
279/72b	Engine Cleanliness – Petter AVB Supercharged Compression Ignition Test Engine (ST)
280/99	Oxidation Stability of Inhibited Mineral Turbine Oils (ST-C-2)
281/80(88)	Anti-wear Properties of Hydraulic Fluids – Vane Pump Method (ST-C-6)
282	*obsolete*
283	*obsolete*
284/92(98)	Saponifiable and Unsaponifiable Matter in Oils, Fats and Waxes (ST-G-2)
285/79(96)	Nickel and Vanadium – Spectrophotometric Method (ST-G-3)
286	*obsolete*
287/94	Rust Prevention Characteristics of Water Mix Metal Working Fluids Chip/Filter Paper Method (ST-C-5)
288/74(95)	Nickel, Sodium and Vanadium – Atomic Absorption Spectroscopy Method (ST-G-3)
289/97	Water Reaction of Aviation Fuels (ST-B-11)
290/84(96)	Stability of Water in Oil Emulsions at Ambient Temperature (ST-C-6)
291/01e	Water Content of Bitumen Emulsions – Distillation Method (ST-E-4)
292/01e	Particle Charge of Bitumen Emulsions (ST-E-4)
293	*obsolete*
294/99	Shear Stability of Polymer-containing Oils – Diesel Injector Rig Method (ST-C-1)
295/83(99)	Electric Strength of Insulating Oils (ST-C-4)
296	*obsolete*
297	*obsolete*
298/92(98)	Quinizarin – Extraction Spectrophotometric Method (ST-G-2)
299/92(98)*	Bromine Index – Electrometric Titration Method (ST-G-2)
300	*obsolete*
301	*This number not used*
302	*This number not used*
303 Part 1/01	Flash Point Rapid Equilibrium Method (ST-B-4)
303 Part 2/01	Flash/No Flash Rapid Equilibrium Method (ST-B-4)
304 Part 1/01	Flash Point Closed Cup Equilibrium Method (ST-B-4)
304 Part 2/01	Flash/No Flash Closed Cup Equilibrium Method (ST-B-4)
305	*obsolete*
306/94	Oxidation Stability of Straight Mineral Oil (ST-C-2)
307/93	Oxidation Stability of Mineral Insulating Oil (ST-C-2)
308/85(96)	Barium, Calcium, Magnesium and Zinc in Unused Lubricating Oils – Atomic Absorption Method (ST-G-3)
309/99	Cold Filter Plugging Point of Diesel and Domestic Heating Fuels (ST-B-7)
310/84(92)*	Cone Penetration of Grease – One-quarter and One-half Scale Cone Method (ST-C-6)
311/74(94)	Thermal Stability of Water Mix Metal Working Fluids (ST-C-5)
312/74(94)	Frothing Characteristics of Water Mix Metal Working Fluids (ST-C-5)
313/01	Air Release Value of Hydraulic, Turbine and Lubricating Oils (ST-C-4)
314	*obsolete*
315/98*	Electrical Insulating Oils – Detection of Corrosive Sulfur (ST-C-4)
316/93(99)	Total Solids in Used Engine Oils (ST-C-4)
317/95*	Liquefied Petroleum Gas Residues at 38°C (ST-B-5)

NUMERICAL LIST OF METHODS

IP Method number	*Method title*
318/75(95)	Characterization of Pollutants – High Resolution Gas Chromatography Method (ST-G-6)
319/01e	Kinematic Viscosity of Bitumens (ST-E)
320	*obsolete*
321	*obsolete*
322	*obsolete*
323/2000*	Determination of thermal oxidation stability of gas turbine fuels – JFTOT method (ST-B-8)
324	*obsolete*
325/82(92)	Preparation of Distillate for Front End Octane Number (RON 100°C) of Motor Gasoline (ST-B-10)
326/83(01)*	Extreme Pressure Properties of Grease – Timken Method (ST-C-1)
327	*obsolete*
328/89(01)	Oxidation Stability of Mineral Turbine Oils During Use (ST-C-2)
329	*obsolete*
330	*obsolete*
331	*obsolete*
332	*obsolete*
333	*obsolete*
334	*obsolete use CEC L-07-A-095*
335/93	Oxidation Stability of Inhibited Mineral Insulating Oils (ST-C-2)
336/95	Sulphur – Energy Dispersive X-ray Fluorescence Method (ST-G-5)
337/78(95)	Composition of Non-associated Natural Gas – Quantitative Gas Chromatography Method (ST-G-6)
338/98*	Hydrogen Content of Aviation Turbine Fuels – Low Resolution Nuclear Magnetic Resonance Spectrometry Method (ST-B-11)
339/79(92)	Total Metals in Unused Lubricating Oils and Additives – Complexometric Titration Method (ST-G-3)
340/82c	IP Code of Practice for Calibrating and Checking Process Analysers – A General Guide to the Principles and Methods Used (ST)
341/82c	IP Code of Practice for Calibrating and Checking Process Analysers – Capillary-type Viscosity Analysers (ST)
342/2000*	Determination of thiol (mercaptan) sulfur in light and middle distillate fuels – Potentiometric Method (ST-G-5)
343/01	2,4-Dimethyl-6-tertiary-butylphenol Content of Aviation Turbine Fuel – High Performance Liquid Chromatography Method (ST-G-2)
344/95	Light Hydrocarbons in Stabilized Crude Oils – Gas Chromatography Method (ST-G-6)
345	*obsolete*
346/92(98)	Polycyclic Aromatics in Unused Lubricating Base Oils and Asphaltene Free Petroleum Fractions – Dimethyl Sulphoxide Extraction Refractive Index Method (ST-G-2)
347/82c	IP Code of Practice for Calibrating and Checking Process Analysers – Cloud Point Analysers (ST)
348/82c	IP Code of Practice for Calibrating and Checking Process Analysers – Distillation Analysers (ST)
349/82c	IP Code of Practice for Calibrating and Checking Process Analysers – Flash Point Analysers (ST)
350	*obsolete*
351	*obsolete*
352/2000	Lead Content of Automotive Gasoline – Energy-dispersive X-ray Fluorescence Spectrometry Method (ST-G-3)
353/82c	IP Code of Practice for Calibrating and Checking Process Analysers – Gas Chromatography Analysers (ST)
354/98*	Total Acidity of Aviation Turbine Fuel – Colour Indicator Titration Method (ST-B-11)
355/01	Calculation of Net Specific Energy of Aviation Turbine Fuels, using Hydrogen Content Data (ST-B-2)
356/99*	Water Content of Crude Oil – Potentiometric Karl Fischer Titration Method (ST-B-3)
357/92	Permittivity of Bitumen (ST-E)
358/97*	Crude petroleum – Determination of water – Distillation method
359	*obsolete*
360/96a*	Research and Motor Method Octane Ratings using On-line Analysers (ST-B-1)
361/82(88)a*	Knock Characteristics of Motor Fuels by the Distribution Octane Number (DON) Method (ST-B-1)
362/93	Total Lead Content of Gasoline – Atomic Absorption Spectroscopy Method (ST-G-3)
363	*obsolete*
364	*obsolete*
365/97	Density – Oscillating U-tube Method (PM-B-4)
366	*obsolete*
367/96	Application of Precision Data (ST)
368/01	Hydrocarbon Types in Lubricating Oil Basestocks – Preparative High Performance Liquid Chromatography Method (ST-G-2)
369/84(01)*	Composition of Oil Soluble Petroleum Sulphonates – Liquid Chromatography Method (ST-G-2)
370/85(01)	Dynamic Viscosity – High Shear Viscometer Method (ST-C-1)
371/85(95)	Drop Point of Petrolatum (ST-C-7)
372/85(99)	Carbon Number Distribution of Paraffin Wax – Gas Chromatography Method (ST-G-6)
373/99	Sulphur Content – Microcoulometry (Oxidative) Method (ST-G-5)
374/01	Coumarin Content – Fluorimetric and High Performance Liquid Chromatography Methods (ST-G-2)
375/99*	Total Sediment in Residual Fuel Oils and Distillate Blends – Filtration Method (ST-B-5)
376/86(95)	Needle Penetration of Petroleum Wax (ST-C-7)
377/95	Aluminium and Silicon Content of Fuel Oil – Inductively Coupled Plasma Emission and Atomic Absorption Spectroscopy Methods (ST-G-3)
378/87(01)*	Storage Stability at 43°C of Distillate Fuel (ST-B-5)
379/88(01)*	Organically Bound Trace Nitrogen – Oxidative Combustion and Chemiluminescence Method (ST-G-5)
380/98*	Calculation of Cetane Index (ST-B-1)

NUMERICAL LIST OF METHODS

IP Method number	*Method title*
381/97*	Aviation fuels – Estimation of net specific energy (ST-B-1)
382/88(99)	Carbon Number Distribution of Paraffins, Naphthenes and Total Aromatic Content of Light Saturated Hydrocarbons – Gas Chromatography Method (ST-G-6)
383/94	Apparent Viscosity of Motor Oils between −30°C and −5°C – Cold Cranking Simulator Method (ST-C-1)
384	*obsolete*
385/99	Viable aerobic microbial content of fuels and fuel components boiling below 390°C – Filtration and culture method (Microbiology)
386/99*	Water Content of Crude Oil – Coulometric Karl Fischer Titration Method (ST-B-3)
387/97	Filter Blocking Tendency of Gas Oils and Distillate Diesel Fuels (ST-B-5)
388/97*	Oxidation Stability of Middle-distillate Fuels (ST-B-5)
389/93	Wax Appearance Temperature of Middle Distillate Fuels – Differential Thermal Analysis or Differential Scanning Calorimetry Methods (ST-G-9)
390/94	Thermal and Chemical Ageing of Residual Fuel Oils (ST-B-5)
391/01	Aromatic Hydrocarbon Types in Diesel Fuels and Distillates – High Performance Liquid Chromatography Refractive Index Detection Method (ST-G-2)
392/90(01)	Aromatic Hydrogen and Carbon Contents – High Resolution Nuclear Magnetic Resonance Spectroscopy Method (ST-G-4)
393/96	Volatility of Automotive Lubricating Oils – Thermogravimetric Method (ST-G-9)
394/99	Air Saturated Vapour Pressure (ST-B-9)
395/98*	Dryness of Propane – Valve Freeze Method (ST-B-5)
396/96	Dropping Point of Lubricating Grease – Automatic Method (ST-C-6)
397/93	Recovery of Bitumen Binders – Dichloromethane Rotary Film Evaporation Method (ST-E)
398/96	Carbon Residue (Micro Method) (ST-B-10)
399/94	Hydrogen Sulphide Content of Fuel Oils (ST-G-5)
400/01	Base Number – Conductimetric Method (ST-C-4)
401/95	Hydrogen Sulphide in LPG Lead Acetate Method (ST-G-5)
402/94	Reid Vapour Pressure – Wet Method (ST-B-9)
403/94	Open Flash and Fire Point – Cleveland Method (ST-B-4)
404/94	Closed Flash Point – Pensky-Martins Method (ST-B-4)
405/94	Propane and Butane Analysis by GC (ST-G-6)
406/99	Boiling Range of Products – GC Method (ST-G-6)
407/95	Barium, Calcium, Phosphorus, Sulfur and Zinc Wavelength Dispersive X-ray (ST-G-3)
408/98	Oxygenates and Total Oxygen in Unleaded Petrol – GC, O-FID Method (ST-G-6)
409/99	Absolute Vapour Pressure of Gasoline at 40°C and 100°C (ST-B-9)
410/99	Liquefied Petroleum Gases – Gauge Vapour Pressure – LPG Method (ST-B-9)
411/99	Liquefied Petroleum Gases – Corrosiveness to Copper – Copper Strip Test (ST-B-10)
412/96	Water Separability of Petroleum Oils and Synthetic Fluids (ST-C-4)
413/96	Low Levels of Vanadium in Liquid Fuels – Flameless Atomic Absorption Spectrometry after Ashing (ST-G-3)
414/96	Industrial Quenching Oils – Cooling Characteristics – Nickel-alloy Probe Test Method (ST-C-5)
415/2000	Determination of particulate content of middle distillate fuels – Laboratory filtration method (ST-B-5)
416/96	Sulfate and Nitrate in Diesel Particulate Filters (ST-G-10)
417/96	Base Number – Potentiometric Titration Method (ST-C-4)
418/96	Relative Volatility of Automotive Lubricating Oils by Isothermal Thermogravimetry (ST-G-9)
419/96	Simulated Filter Plugging Point (SFPP) of Distillate fuels (ST-B-7)
420	*Superseded by IP 432*
421/96	Evaporation Loss of Lubricating Oils using Noack Evaporative Tester (ST-C-4)
422/96	Filter Flow of Aviation Turbine Fuels at Low Temperatures (FFLT) (Simulated Freezing Point) (ST-B-7)
423/99*	Particulate Contaminant of Aviation Turbine Fuels by Laboratory Filtration (ST-B-11)
424/96	Fuel System Icing Inhibitor in Aviation Turbine Kerosines by High Performance Liquid Chromatography (ST-G-2)
425/01	Benzene Content by Gas Chromatography (ST-G-6)
426/98	Oil Content of Effluent Water – Extraction and Infra-red Spectrometric Method (ST-G-2)
427/97	Oily Residues – High-temperature Method (ST-B-5)
428/97	Petrol – Low Lead Concentrations by Atomic Absorption Spectrometry (ST-G-3)
429/97	Petrol – Benzene Content by Infra-red Spectrometry (ST-G-6)
430/98	Alkyl Nitrate in Diesel Fuels – Spectrometric Method (ST-G-2)
431/98	Acid Number – Semi-micro Colour Indicator Titration Method (ST-C-4)
432/2000	Liquefied Petroleum Gases – Calculation Method for Density and Vapour Pressure (ST-B-1)
433/2000	Vanadium and Nickel Content – Wavelength-dispersive X-ray Fluorescence Spectrometry (ST-G-3)
434/98*	Freezing Point of Aviation Turbine Fuels - Automated Optical Method (ST-B-7)
435/98*	Freezing Point of Aviation Turbine Fuels – Automatic Phase Transition Method (ST-B-7)
436/01	Aromatic Hydrocarbon Types in Aviation Fuels and Petroleum Distillates – High Performance Liquid Chromatography Method with Refractive Index Detection (ST-G-2)
437/98	Additive Elements in Unused Lubricating Oils and Additive Packages by Inductively Coupled Plasma Atomic Emission Spectrometry (ST-G-3)
438/01	Water Content by Coulometric Karl Fischer Titration Method (ST-B-3)
439/01	Water Content by Potentiometric Karl Fischer Titration Method (ST-B-3)
440/99	Liquid Petroleum Products – Contamination in Middle Distillates (ST-B-5)
441/99	Pour Point of Crude Petroleum (ST-B-7)
442/99	Fuel and Oil-derived Hydrocarbons in Diesel Particulates on Filters – GC Method (ST-G-10)
443/99	Soluble Organic Fraction (SOF) of Diesel Particulates on Filters – Soxhlet Extraction Gravimetric Method (ST-G-10)
444/99	Cloud Point – Automatic Stepped Cooling Method (ST-B-7)
445/99	Cloud Point – Automatic Linear Cooling Rate Method (ST-B-7)
446/99	Cloud Point – Automatic Constant Cooling Rate Method (ST-B-7)
447/99	Sulphur Content-Wavelength-dispersive X-ray Fluorescence Spectrometry Method (ST-G-5)
448S2/99	Filterability of Lubricating Oils – Part 2: Procedure for Dry Oils (ST-C-4)
449/2000	Determination of acid number – Non-aqueous potentiometric titration method (ST-C-4)

NUMERICAL LIST OF METHODS

IP Method number	*Method title*
450/2000	Diesel fuel – Assessment of lubricity using the high-frequency reciprocating rig (HFRR) – Part 1: Test method (ST)
451/2000	Aromatic Carbon Content of Lubricant Mineral Base Oils - Infrared Spectroscopy Method (ST-G-2)
452/2000	Water Shedding Property (WASP) of Aviation Kerosine (ST-B-8)
453/2000	High Temperature Foaming Characteristics of Lubricating Oils (ST-C-4)
454/2000	Phosphorus in Gasoline – Spectrophotometric Method (ST-G-3)
455/2000	Manganese in Gasoline – Atomic Absorption Spectrometry (AAS) Method (ST-G-3)
456/2000	Potassium in Gasoline – Atomic Absorption Spectrometry (AAS) Method (ST-G-3)
457/01e	Bitumen Characterisation of Perceptible Properties (ST-E)
458/01e	Recovered Binder and Oil from Bitumen Emulsions by Distillation (ST-E)
459 Part 1/ 01e	Bitumen Paraffin Wax Content by Distillation (ST-E)
459 Part 2/ 01e	Bitumen Paraffin Wax Content by Extraction (ST-E)
460 Part 1/ 01e	Bitumen Resistance to Hardening RTFOT (ST-E)
460 Part 2/ 01e	Bitumen Resistance to Hardening TFOT (ST-E)
460 Part 3/ 01e	Bitumen Resistance to Hardening RFT (ST-E)
461/01e	Bitumen Preparation of Test Samples
462/01	PCBs Separation by GC ECD (ST-G)
463	This Standard has not yet been published
464/01	Sodium by AAS (ST-G-3)
465/01	Nickel and Vanadium by AAS (ST-G-3)
466/01	Oxygenates and Organically Bound Oxygen GC (ST-G-2)
467/01	High Temperature Stability of Middle Distillate Fuels (ST-B-5)
468/01	Freezing Point of Aviation Fuels Automatic Optical Method (ST-B-7)
469/01	Saturated, Aromatic and Polar Compounds TLC FID (ST-G-2)