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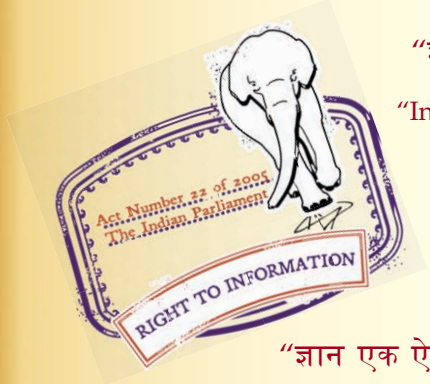

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SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

UDC 621·43·044·3 : 629·113·066

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Indian Standard

SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

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Indian Standard

SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 19 March 1981, after the draft finalized by the Automotive Electric Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 The ignition coil is a pulse transformer and is designed to step up low primary voltage as received from the battery or generator to high voltage for ignition operation.

0.3 This standard was first published in 1963 incorporating the basic mechanical and electrical requirements and methods of tests for 6, 12 and 24 volts ignition coils for use in automobiles and two wheelers with battery-coil ignition systems. This revision has been undertaken with a view to updating the contents and elaborating the test requirements.

0.4 This revision introduces five types of coils (*see* 3) depending on the nature of duty and construction. This categorization also keeps in view the most common types of ignition coils available in the country and demanded by the vehicle manufacturers.

0.5 This revision also includes additional tests for endurance and loaded performance.

0.6 Considering the importance of achieving interchangeability of similar ignition coils, this standard lays down overall and mounting dimensions also, in addition to the performance requirements and methods of tests of such coils. At present, the mounting dimensions specified do not include those for coils intended for two wheelers and three wheelers.

0.7 In preparing this standard, assistance has been derived from the following:

JIS/D 5121-1957 Ignition coils for automobile. Japanese Industrial Standards Committee.

SMMT EL 60-1/2 Ignition coils. Society of Motor Manufacturers and Traders, United Kingdom.

SAE Hand Book, Society of Automotive Engineers, USA, J 9730-1978.

1. SCOPE

1.1 This standard covers the basic mechanical and electrical requirements and methods of test for 6, 12 and 24 V ignition coils along with the mounting dimensions for use with automobiles with battery as source (with or without a ballast resistance in the primary circuit).

1.2 This standard does not cover ignition coils of the vibration type.

1.3 This standard does not cover energy transfer ignition coils and magneto-ignition systems used on two wheelers and three wheelers.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Ignition Coil — It is a pulse transformer designed to step up the low primary voltage as available from the battery or generator to the high tension voltage required to jump the spark plug gap located in the combustion chamber.

2.2 Rated Voltage — Rated voltage is the primary voltage at which the ignition coil is designed to operate in the system.

2.3 Mounting — The means of fixing the ignition coil.

2.4 Type Tests — Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of ignition coil.

2.5 Acceptance Tests — Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

2.6 Routine Tests — Tests carried out on each ignition coil to check whether the ignition coil is satisfactory in regard to certain essential requirements which are likely to vary during production.

2.7 Primary Terminals — Terminals providing means of connection of the ignition coil to the battery or generator and contact breaker.

2.8 High Voltage — A voltage normally exceeding 650 V.

3. TYPES OF COILS

3.1 Depending on the nature of duty, coils are classified as given below:

a) *Type A* — This has adequate performance to meet standard 4/6 cylinder passenger car applications under the following conditions:
   i) Compression ratio up to 7·2,
   ii) Spark plug gap maintained at 0·584 to 0·635 mm, and
   iii) Regular maintenance of the spark plug, contact breaker, and other ignition components as recommended.

b) *Type B* — This has a higher performance than Type 'A' coil at lower speeds when ignition components (contact breaker, spark plug, etc) are regularly maintained as recommended. It is not recommended for engines tending to foul plugs frequently.

c) *Type C* — These coils generally have a higher performance than Types A and B. With a circuit incorporating a special starting switch, these coils can give a higher output while starting and are particularly suitable for multi-cylinder engined passenger and commercial vehicles, requiring cold starting on vehicles in service which tend to foul plugs at frequent intervals.

d) *Type D* — These are coils smaller in size than Types A, B and C normally used on single cylinder applications working on 12 V system.

e) *Type E* — These are coils smaller in size than types A, B and C normally used on single cylinder applications working on 6 V system.

NOTE — The five types referred to above are a general classification covering the entire range of coils used on automotive applications. In special cases, coils specially made to suit customer requirement which may not strictly fall under the types referred to above are not outside the purview of this standard.

3.2 Each of the types of coils given in **3.1** can be further classified depending on construction as:

a) Ballasted; and

b) Non-ballasted.

3.2.1 A ballasted coil is one in which a ballast resistance is included in series with the primary winding and the system voltage is applied across the winding and resistance through a contact breaker in series.

NOTE — While starting, the ballast resistor may be short circuited by a separate external device to provide a higher output.

3.2.2 A non-ballasted coil is one in which the system voltage is directly applied across the primary through a contact breaker in series.

4. CONSTRUCTION

4.0 All materials used in the construction of ignition coils shall be of good quality conforming to the relevant Indian Standards.

4.1 In general, an ignition coil comprises the following:

a) a primary winding,
b) a secondary winding,
c) a core,
d) a shield,
e) an insulating base,
f) a container,
g) an insulated top or cover,
h) primary and secondary terminals, and
j) an insulating medium in which the coil is placed inside the container.

4.2 Dimensions — The mounting dimensions of ignition coils shall be as given in Fig. 1.

4.3 Terminations

4.3.1 *Primary* (*Low Tension*) *Terminals* — Coils may be provided with screw-type or blade-type connectors in accordance with IS : 8395 (Part I)-1977*.

4.3.2 *Secondary* (*High Tension*) *Terminals* — The high tension termination may be push-in type as shown in Fig. 2 or any other type as agreed upon between the manufacturer and the purchaser.

5. INTERCHANGEABILITY

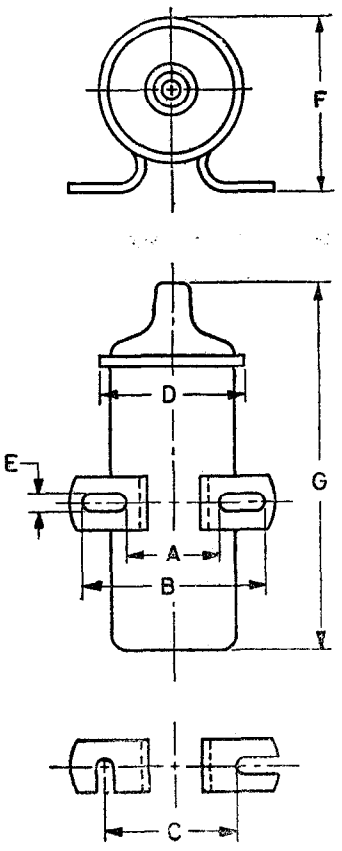
5.1 A particular model and type shall be interchangeable.

6. MARKING

6.1 Each ignition coil shall be suitably marked with the following information:

a) Name or trade mark of manufacturer,
b) Type of coil,
c) Nominal voltage,
d) Plus and minus for the primary terminals,
e) Country of manufacture, and
f) Month and year of manufacture.

*Specification for cable terminations for automobile wiring: Part I Blade type connectors (male and female).

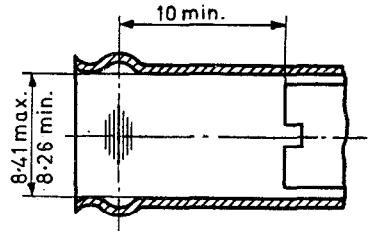


A, *Max* = 54
B, *Min* = 82
C, *Max* = 63·5
D, *Max* = 70

E = 9 ± 0·1
F, *Max* = 85
G, *Max* = 180

All dimensions in millimetres.

FIG. 1 DIMENSIONS FOR IGNITION COILS



All dimensions in millimetres.

FIG. 2 PUSH IN TYPE HIGH TENSION TERMINATION

6.1.1 The ignition coils may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. TESTS

7.0 Classification of Tests

7.0.1 *Type Tests* — The following shall constitute type tests:

a) Visual examination (*see* **7.1**),
b) Dimensional check (*see* **7.2**),
c) Insulation resistance test (*see* **7.3**),
d) Salt spray test (*see* **7.4**),
e) Performance test (*see* **7.5**),
f) Open circuit test (*see* **7.6**),
g) Test for moisture resistance (*see* **7.7**),
h) Vibration test (*see* **7.8**),
j) Oil leak test (*see* **7.9**),
k) Hermetic sealing test (*see* **7.10**), and
m) Endurance test (*see* **7.11**).

7.0.2 *Criteria for Approval* — Six samples selected at random shall be submitted for testing with the relevant data. The testing authority shall issue a type approval certificate if the ignition coils are found to comply

with the requirements of the tests. In case of failure in any one type test, the testing authority may, at its discretion, call for fresh samples not exceeding twice the number of original samples and subject them to test(s) in which failure occurred. If in repeat test(s) no failure occurs, the tests may be considered to have been satisfied.

7.0.3 The sequence of type test of samples for approval shall be as given in Appendix A.

7.0.4 *Acceptance Tests* — The following shall constitute acceptance tests:

a) Visual examination (*see* **7.1**),

b) Dimensional check (*see* **7.2**),

c) Performance test (*see* **7.5**), and

d) Hermetic sealing test (*see* **7.10**).

NOTE — Number of samples for acceptance test shall be as agreed upon between the purchaser and the manufacturer. However, a recommended plan of sampling is under consideration.

7.0.5 *Routine Tests* — The following shall constitute routine tests:

a) Visual examination (*see* **7.1**),

b) Insulation resistance test (*see* **7.3**), and

c) Loaded performance test (*see* **7.5.4**).

7.1 Visual Examination — The ignition coil assembly shall be examined visually for correct assembly and finish and shall be free from injurious flaws or damages.

7.2 Dimensional Check — The mounting dimensions for ignition coil shall be in accordance with Fig. 1.

NOTE — Figure 1 covers dimensions of ignition coils other than those intended for two wheelers and three wheelers.

7.3 Insulation Resistance (Dry) Test

7.3.1 This test shall be carried out at the prevailing atmospheric temperature and humidity.

7.3.2 The insulation resistance shall be measured between the coil primary terminal and the outer casing by the application of a dc voltage of 500 V for 1 minute.

7.3.3 The insulation resistance value, thus measured, shall be not less than 10 megaohms.

7.4 Salt Spray Test — The ability of the ignition coil (with its coil top and terminal arrangements) to withstand corrosion due to atmospheric conditions shall be assessed by the test as given in Appendix B.

7.4.1 *Assessment of Results* — After removal from the salt spray, within a duration of not more than 2 hours after draining, the ignition coil shall satisfy the performance tests as specified in **7.5**.

NOTE — The appearance of this coil shall not prejudice assessment of results.

7.5 Performance Test

7.5.1 The coil shall be fitted in the vertical position and tested with an appropriate distributor or contact breaker (conforming to the relevant ISS) for operation at high temperature and low voltage and loaded performance test as specified in **7.5.2, 7.5.3** and **7.5.4.**

The test set-up and the spark gaps shall be as given in Fig. 3A and 3B. Under these conditions, the permitted percentage of missings shall not be more than that specified in the respective clauses.

a) *Power Supply* — The supply voltage at coil primary terminal shall be as given below:

For 6 V type	$6 \pm 0{\cdot}05$ V
For 12 V type	$12 \pm 0{\cdot}1$ V
For 24 V type	$24 \pm 0{\cdot}2$ V

NOTE — Ripple content of source in the case of rectified main supply shall not be greater than 0·1 percent (peak to peak).

b) *Lead Resistance*

i) Between coil and distributor — 10 000 ohms.

NOTE — This resistance shall not be required when the associated distributor has a built-in resistor of 10 000 ohms.

ii) Between distributor and spark gap (3 electrodes) — 10 000 ohms.

iii) When tested with contact breaker alone — 20 000 ohms (between coil and 3 electrodes spark gap).

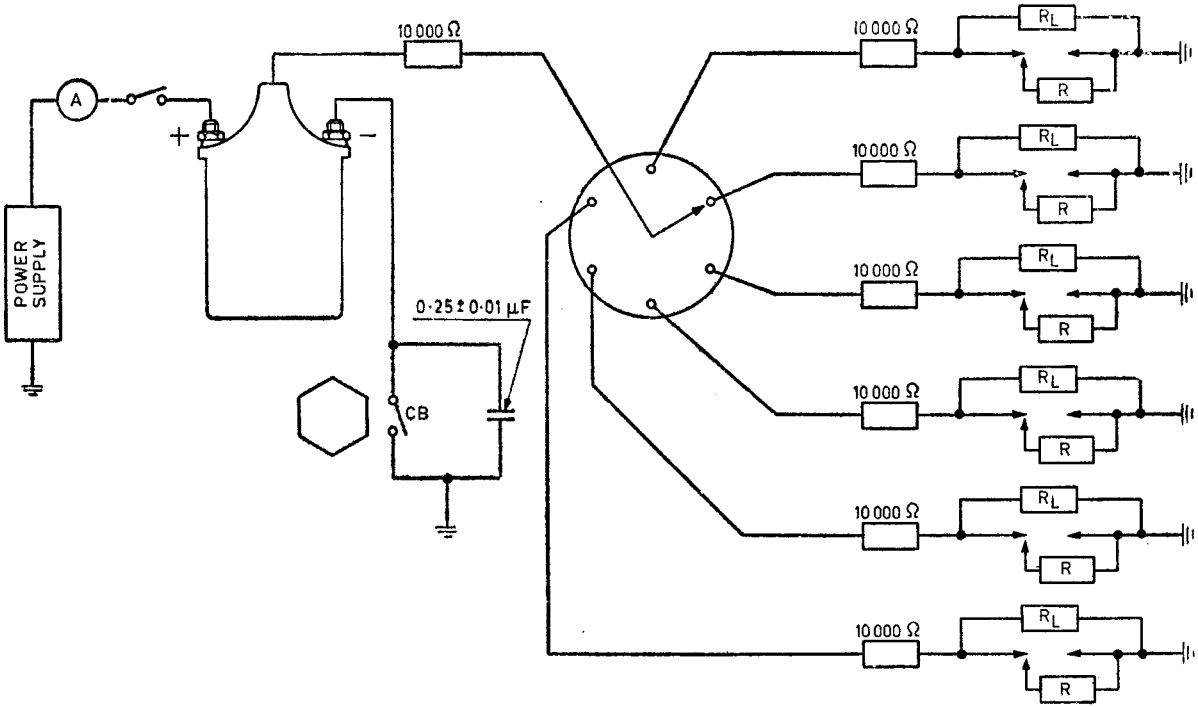
c) *Spark Gap* — Three point gap shall be set for Type A, Type B, Type C, Type D and Type E as indicated in Fig. 3B and Table 1.

TABLE 1 THREE POINT GAP AND LOAD RESISTANCE FOR PERFORMANCE TESTS

(*Clauses* 7.5, 7.6, 7.8 *and* 7.9)

TYPE OF COIL	DISTRIBUTOR SPEED			
	150 rev/min		1 000 rev/min	
	3 Point Gap (G) mm	Load Resistance (RL) ohms	3 Point Gap (G) mm	Load Resistance (RL)* ohms
(1)	(2)	(3)	(4)	(5)
A	8·5	None	4·7	300
B	10	None	4·7	400
C	9·5	None	4·7	250
D	9·0	None	4·7	250
E	8·0	None	4·7	500

*Insulation resistance of resistance board should be more than 50 MΩ.



NOTE 1 — Contact breaker close period shall be set to
a) 39 ± 0·5° for 6 lobe cam
b) 57 ± 0·5° for 4 lobe cam

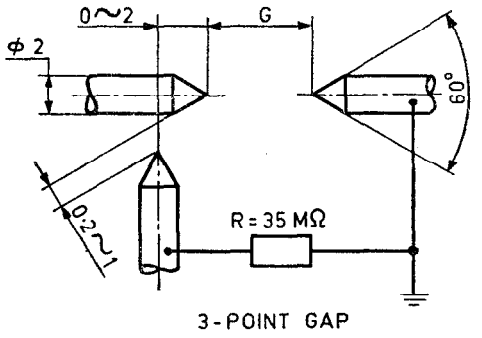
NOTE 2 — Power supply shall be as specified in the relevant clause.

NOTE 3 — The coil shall be held in the vertical position with the terminals upwards.

NOTE 4 — 4 or 6 lobe cam of associated distributor shall be used for the test.

3A Schematic Diagram of Test Set-Up

FIG. 3 PERFORMANCE TEST — *Contd*



NOTE — For values of G, *see* Table 1.

All dimensions in millimetres.

3B Spark Gap with Three Electrodes

FIG. 3 PERFORMANCE TEST

7.5.2 *Test for Operation at High Temperature* — The coil shall be kept in air at 90°C for not less than 60 minutes. Immediately after removal from the oven the test for operation at high temperature shall be done under the following conditions:

a) Power supply	Same as given in **7.5.1**(a)
b) Lead resistance	Same as given in **7.5.1**(b)
c) Three point gap	As in Table 1
d) Rotation speed of distributor/ contact breaker	150 rev/min
e) Duration of test	15 seconds
f) Missing permitted	5 percent

7.5.3 *Test for Operation at Low Voltage* — This test shall be done under the following conditions in the prevailing atmospheric temperature and humidity:

a) Power supply	4, 8 and 16 V for 6, 12 and 24 V coils respectively
b) Lead resistance	Same as given in **7.5.1**(b)
c) Three point gap	6 mm
d) Rotation speed of distributor/ contact breaker	150 rev/min
e) Duration of test	15 seconds
f) Missing permitted	5 percent

7.5.4 *Loaded Performance Test* — This test shall be done under the following conditions in the prevailing atmospheric temperature and humidity:

a) Power supply	Same as given in **7.5.1**(a)
b) Lead resistance	Same as given in **7.5.1**(b)
c) Three point gap	As in Table 1
d) Rotation speed of distributor/ contact breaker	1 000 rev/min
e) Duration of test	15 seconds
f) Load resistance (R^L)	The load resistance for different types of coils shall be as given in Table 1
g) Missing permitted	5 percent

7.6 Open Circuit Test — After keeping the coil at 90°C in air for not less than 60 minutes, the open circuit test shall be conducted with the set-up shown in Fig. 3A. The coil shall be able to withstand at least for 1 minute the voltage at its secondary terminal under the conditions specified below. When an insulator is put in the gap, there shall be no failure of the dielectric material or flashover from the high tension connection:

a) Power supply	7·2, 14·4 and 26·8 V for 6, 12 and 24 V coils respectively
b) Lead resistance	Same as given in **7.5.1**(b).
c) Three poin tgap	As in Table 1
d) Rotation speed of distributor/ contact breaker	1 000 rev/min

7.7 Test for Moisture Resistance — The coil shall be kept at a temperature between 50 and 60°C in a humidity chamber with a relative humidity not less than 95 percent for a period of 48 hours. After this, the coil shall be removed from the humidity chamber and kept for 10 minutes at the prevailing ambient temperature and then subjected to a performance test as follows:

a) Power supply	Same as given in **7.5.1**(a)
b) Lead resistance	Same as given in **7.5.1**(b)
c) Three point gap	As in Table 1
d) Rotation speed of distributor/ contact breaker	150 rev/min
e) Duration of the test	15 seconds

When tested under these conditions, there shall be no missing.

7.8 Vibration Test — The test piece with mounting bracket, after being rigidly mounted on a suitable vibrating machine constructed to produce simple harmonic motion (a total lift of 1·5 mm) shall be subjected to

vibrations through a frequency range of 10-55-10 Hz in a period of 1 minute at room temperature. With continuously varying frequencies, the vibration shall be applied for not less than 1 hour with the coil fitted vertically and the terminals facing upwards. At the end of the test, the coil shall be examined for any evidence of damage and shall be subjected to a performance test as follows:

a) Power supply	Same as given in **7.5.1**(a)
b) Lead resistance	Same as given in **7.5.1**(b)
c) Three point gap	As given in Table 1
d) Rotation speed of distributor/ contact breaker	150 rev/min
e) Duration of test	15 seconds

When tested under these conditions, there shall be no missing.

7.9 Oil Leak Test — The primary coil shall be connected to the rated voltage for not less than the duration mentioned below:

Type of Coil	*Duration (hours)*
A	3
B	8
C	8
D	3
E	8

At the end of this period, the coils shall be examined for any leakage and shall pass performance test (*see* **7.5.1** to **7.5.4**).

7.10 Hermetic Sealing Test — The object of this test is to determine the effectiveness of the hermetic sealing of ignition coil filled with liquid.

NOTE — This test is also applicable if the filling is solid matter at normal temperature but turns liquid at the test temperature.

7.10.1 *Conditioning* — The ignition coil, with its seals downwards, shall be placed in an oven with circulating hot air and heated until the container temperature is 101 to 105°C and shall be maintained at this temperature for 1 hour.

The ignition coil shall then be removed from the oven and allowed to stand for 10 minutes in the prevailing ambient temperature.

Ignition coils with seals on more than one face shall be rotated so that each such face is in a downward position and the entire procedure laid down above shall be repeated for each position.

7.10.2 The sample shall be examined for liquid seepage and there shall be no seepage as determined by visual examination.

NOTE — During this test, it is cautioned that ovens shall be explosion proof. Heating elements which are placed on the sides shall not be exposed. During the test, fire-fighting equipment shall be available.

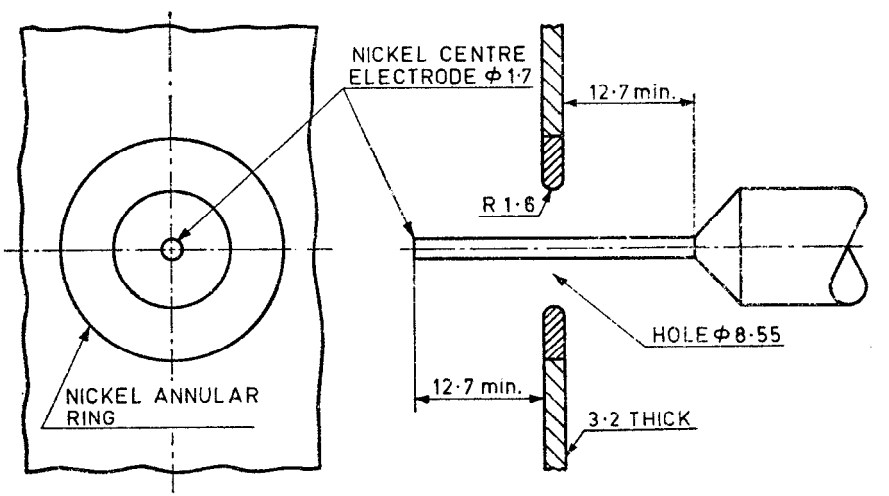
7.11 Endurance Test — Coils shall be tested for endurance with appropriate distributor or contact breaker conforming to the relevant Indian Standards, as follows:

a) Power supply	6·75, 13·50 and 27·00 V for 6, 12 and 24 V coils respectively
b) Distribution/contact breaker speed	1 600 rev/min
c) Test ambient temperature	85°C
d) Secondary spark gap	10 kV annular gap (*see* Fig. 4)
e) Duration	As given below:

Type of Coil	*Duration (hours)*
A	250
B	500
C	500
D	250
E	500

After the endurance test, the coil shall meet the performance test (**7.5.2**) with a permissible missing of 7 percent.

NOTE — The place where tests specified **in 7.9, 7.10** and **7.11** are conducted shall have adequate protection to staff against **bursting** coils, protection for eyes, fire extinguishers, and first-aid kit for skin burns **and eyes** due to hot oil.



All dimensions in millimetres.

FIG. 4 DETAILS OF 10 kV ANNULAR SPARK GAP

APPENDIX A

(*Clause* 7.0.3)

TEST SEQUENCE FOR TYPE APPROVAL

Test	*Sequence*					
	1	2	3	4	5	6
Visual examination (**7.1**)	×	×	×	×	×	×
Dimensional check (**7.2**)	×	×	×	×	×	×
Insulation resistance test (**7.3**)		×				
Salt spray test (**7.4**)			×			
Performance test (**7.5**) :						
Operation at high temp (**7.5.2**)	×	×				
Operation at low voltage (**7.5.3**)			×	×		
Loaded performance test (**7.5.4**)					×	×
Open circuit test (**7.6**)				×		
Test for moisture resistance (**7.7**)					×	
Vibration test (**7.8**)	×					
Oil leak test (**7.9**)				×		
Hermetic sealing test (**7.10**)						×
Endurance test (**7.11**)		×				

× Sample to be tested.

APPENDIX B

(*Clause* 7.4)

TEST FOR CORROSION RESISTANCE

B-1. PROCEDURE

B-1.0 The ability of the equipment with its cover and terminals in position to withstand corrosion due to atmospheric conditions shall be assessed by the following test.

B-1.1 The chamber for this test shall be so constructed that the salt spray is produced in the lower part of the chamber, in the upper part of which the parts to be exposed are suspended.

B-1.2 The spray shall be produced by an atomiser employing compressed air free from all impurities.

B-1.3 The ceiling, the walls and all other parts of the chamber shall be so constructed and the parts under test so arranged that no condensate can drip on the test specimen.

B-1.4 The salt solution shall be a 5 percent solution of sodium chloride in water.

B-1.5 The device shall be sprayed in such a chamber at the standard temperature 27°C, for a cycle of 50 hours consisting of two periods of 24 hours each and 1 hour drain.

B-1.6 After removal from the salt spray chamber, the parts shall not show any sign of corrosion or electrolytic action.

B-1.7 In general, a salt spray chamber as described below would be suitable. Details of such chamber and the spraying mechanism are shown in Fig. 5 and 6 respectively:

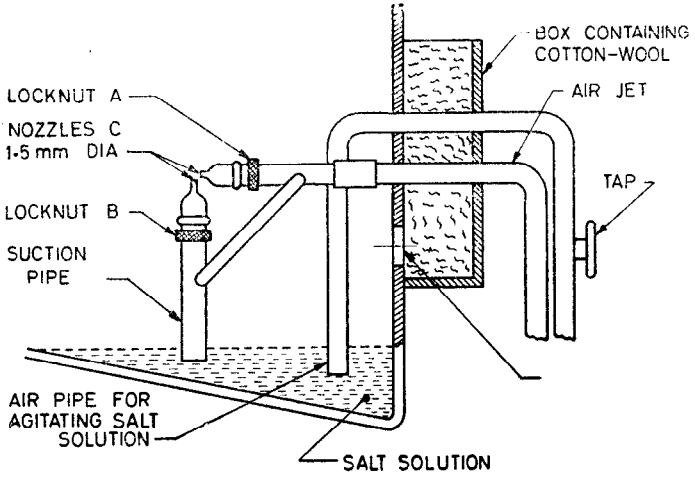
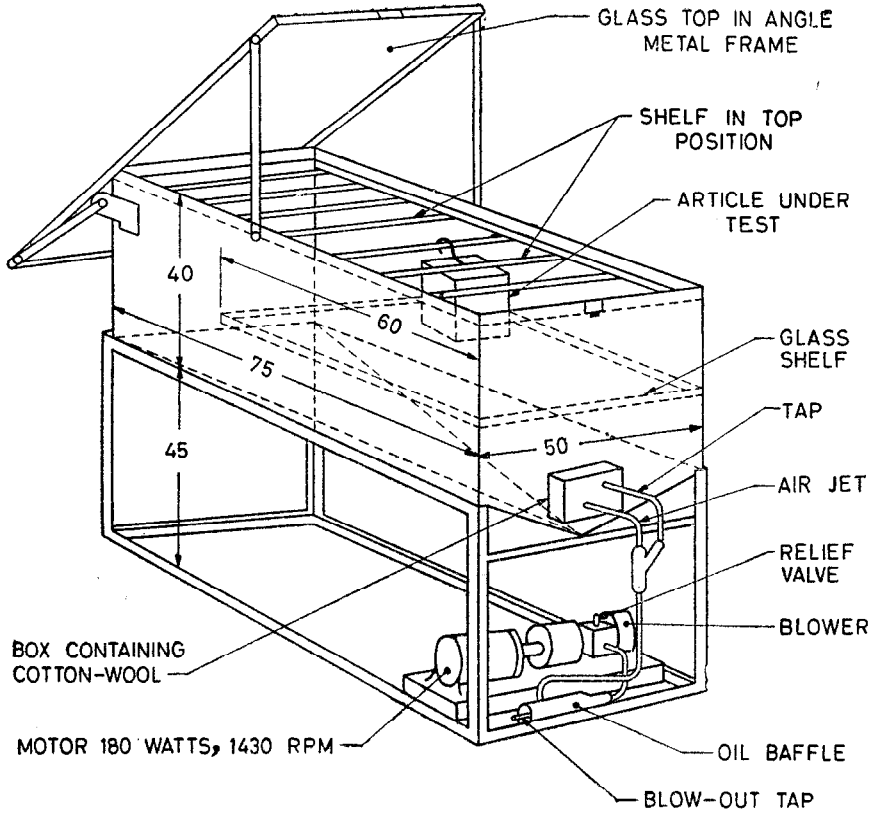


FIG. 5 SALT SPRAY CHAMBER



All dimensions in millimetres.

FIG. 6 DETAILS OF SPRAYING ARRANGEMENT

a) The cabinet shall approximately be of the dimensions shown, and the cabinet and its internal fittings shall be made of monel metal or other suitable material. A shelf is required, which should be capable of being fitted in the upper or lower part of the cabinet;

b) The air used for atomizing the salt solution shall be clean. The pressure during the tests shall be between 29 and 35 Pa. The pressure may be adjusted by a relief valve or by the pressure outlet of the blower;

c) The nozzle for atomizing the salt solution shall be adjusted for maximum amount of spray. This adjustment may be carried out by unscrewing the bottom locknut B, on the lower nozzle C, and

adjusting this nozzle into position until maximum spray occurs. The diameter of the nozzles shall be 1·5 mm. A tap and second branch in the air line is available for agitating the salt solution as required;

d) The spraying apparatus shall be capable of atomizing not less than 1 450 ml salt solution per hour. The quantity of solution sprayed per cubic metre capacity of the test of chamber shall be approximately 177 ml per minute;

e) The container filled with cotton wool acts as a breather and provides an outlet for the air which is constantly being pumped into the chamber, the cotton wool acting as a filter and preventing salt mist from being discharged into the atmosphere.

INDIAN STANDARDS

ON

AUTOMOBILE ELECTRICAL EQUIPMENT

IS:

1062-1963 Methods of test for sparking plug (*revised*)
1063-1963 14 mm sparking plugs (*revised*)
1884-1970 Automobile electric horns (*first revision*)
2077-1962 Automobile electric horn relays
2081 (Part I)-1976 Taper terminal cable connectors for automobile batteries: Part I Brass type connectors (*first revision*)
2325-1963 Ignition coils
2577-1974 Cartridge fuse-links for automobiles (*first revision*)
2646-1964 Generators (dynamos) for automobiles
3105-1980 General requirements for automobiles lighting and signalling devices
3141-1965 Starters for automobiles
3563-1974 Automobile headlights (replaceable lamp type) (*first revision*)
3628-1966 Sidelights, tail-lights, parking lights, stop lights and direction indicators for automobile use
4050-1976 Methods of tests for horn switches for automobiles (*first revision*)
4060-1978 Flashers for direction indicators for automobiles (*first revision*)
4061-1967 Headlight switches for automobiles
4062-1967 Foot-operated headlight dip switches for automobiles
4063-1967 Fuse box for automobiles
4086-1967 Methods of test for distributors
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4370-1967 Code of practice for the use of lighting and signalling devices on cars and commercial vehicles
4373-1967 Hydraulically operated stop light switches for automobiles
4815-1968 Self-cancelling direction indicator switches for automobiles
5439-1978 Oil pressure switches for automobiles (*first revision*)
5545-1977 Fog lights for automobiles (*first revision*)
5546-1970 Distributor caps for automobiles
5562-1970 Fuel gauges for automobiles
5577-1970 Ammeters for automobiles
5977-1971 Regulators for automobile dc generators (dynamos)
7471-1974 Recommendation for polarity of earth connections and marking of electrical equipment for automobiles
7528-1974 Porcelain (moulded) fuselinks for automobiles
7827 (Part I)-1975 Electrical wind screen wipers: Part I Wiper system
7827 (Part II)-1975 Electrical wind screen wipers: Part II Wiper motors
7953-1976 Horn rings for automobiles
7998-1976 Contact breakers for two wheelers, three wheelers and stationary spark ignition engines
8395 (Part I)-1977 Cable terminations for automobile wiring: Part I Blade type connectors (male and female)
8395 (Part II)-1977 Cable terminations for automobile wiring: Part II Bullet and tube type connectors
8415-1977 Mounting dimensions of headlights for automobiles
8416-1977 Mounting dimensions of fog lights for automobiles
8925-1978 Alternators for automobiles
9264 (Part I)-1979 Interior lighting of motor vehicle: Part I General requirements and recommendations
9432-1980 Ignition switches for automobiles
9433-1980 Piano type switches for use in automobiles
9500-1980 360° rotary emergency light
9521-1980 Push button type switches for automobile vehicles

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg. m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Printed at Delhi Printers, Delhi, India

AMENDMENT NO. 1 JULY 1983

TO

IS : 2325-1981 SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

Alteration

(*Page* 9, *clanse* **7.0.4**, *Note*) — Delete.

Addenda

(*Page* 9, *clause* **7.0.4**) — Add the following new clause after **7.0.4**:

'**7.0.4.1** *Sampling plan* — A recommendatory sampling plan and criteria for acceptance of lot is given in Appendix C. '

[*Page* 19, *clause* **B-1.7**(e)] — Add the following new Appendix after **B-1.7**(e):

'APPENDIX C

(*Clause* 7.0.4.1)

SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

C-1. LOT

C-1.1 In any consignment, the ignition coils of the same type and size manufactured from the same material in the same factory under similar conditions of production shall be grouped together to constitute a lot.

C-2. SCALE OF SAMPLING

C-2.1 For judging the conformity of the lot to the requirements of the specification, tests shall be done for each lot separately. For this purpose, the number of ignition coils to be selected at random from a lot shall be in accordance with col 1 and 2 of Table 1.

TABLE 1 SCALE OF SAMPLING AND ACCEPTANCE NUMBER

(*Clauses* C-2.1, C-3.1 *and* C-3.2)

Lot Size	For Visual and Dimensional Requirements		For Performance and Hermetic Sealing Tests	
	Sample Size	Acceptance Number	Sample Size	Acceptance Number
(1)	(2)	(3)	(4)	(5)
Up to 150	13	0	3	0
151 „ 300	20	1	5	0
301 „ 500	32	2	8	0
501 „ 1 000	50	3	13	0
1 001 and above	80	5	20	1

C-2.1.1 These coils shall be selected from the lot at random. In order to ensure the randomness of selection, procedures given in IS : 4905-1968* may be followed.

C-3. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 Each of the ignition coils selected in the sample in accordance with col 1 and 2 of Table 1 shall be subjected to visual examination and dimensional requirements. An ignition coil failing to satisfy either of the requirements shall be termed as ' defective '. The lot shall be considered as conforming to these requirements if the number of defectives found in the sample is less than or equal to the corresponding acceptance number (*see* col 3 of Table 1), otherwise the lot shall be considered as not conforming to these requirements.

C-3.2 The lot which has been found as conforming to the above requirements shall then be subjected to performance test and hermetic sealing test. For this purpose, a sample size and the corresponding acceptance numbers are given in col 4 and 5 of Table 1.

C-3.3 The lot shall be considered as conforming to the requirements of acceptance tests if **C-3.1** and **C-3.2** are satisfied, otherwise the lot shall be rejected.'

*Methods for random sampling.

(ETDC 14)

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AMENDMENT NO. 2 APRIL 1984

TO

IS:2325-1981 SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

Alteration

(*Page 10, Table 1, col 3 and 5, heading*) - Substitute 'kilo ohms' *for* 'ohms'.

(ETDC 14)

Reprography Unit, ISI, New Delhi, India

AMENDMENT NO. 3 JANUARY 1992

TO

IS 2325 : 1981 SPECIFICATION FOR IGNITION COILS FOR BATTERY-COIL IGNITION SYSTEMS FOR AUTOMOBILES

(First Revision)

(*Page* 4, *clause* **1.1**) — Substitute the following for the existing clause:

'**1.1** This standard covers the basic mechanical and electrical requirements, methods of test and mounting dimensions for 6 V, 12 V and 24 V for use with automotives using contact breaker ignition systems with battery as source.'

(*Page* 4, *clause* **1.2**) — Substitute the following for the existing clause:

'**1.2** This standard does not cover the following types:

a) Vibration, and

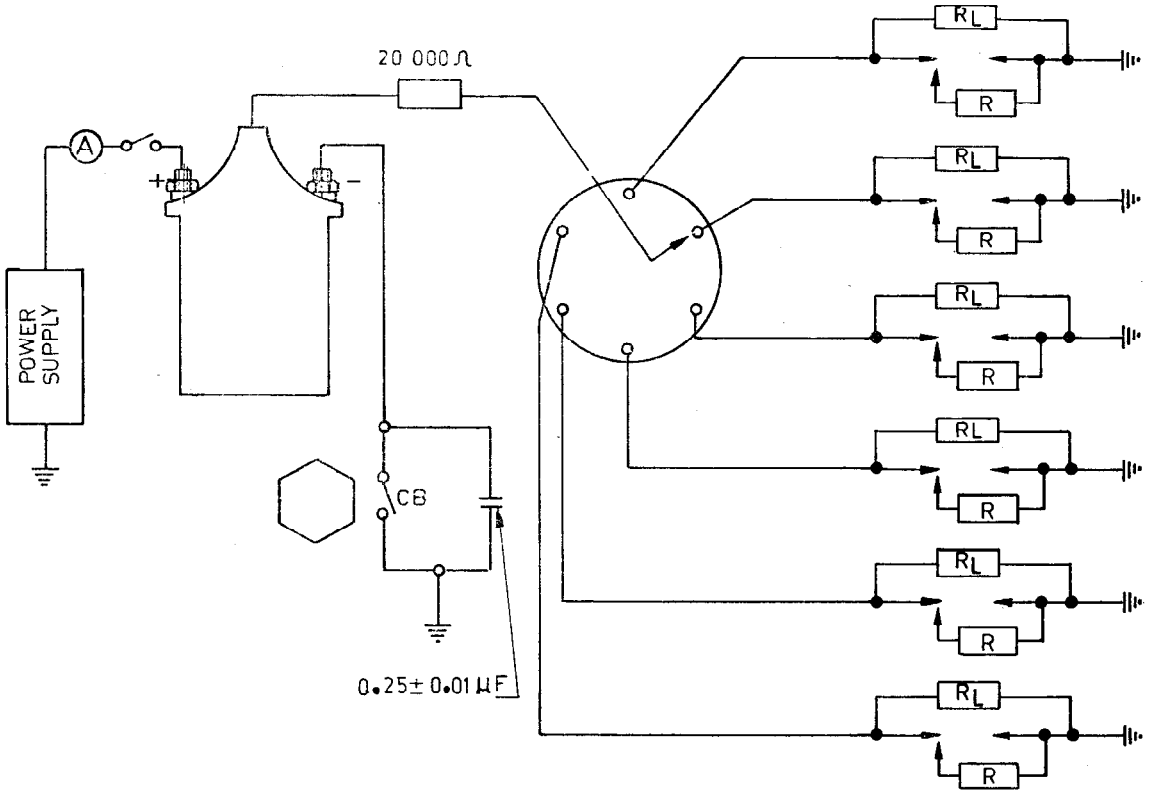
b) Electronic ignition.'

[*Page* 10, *clause* **7.5.1** (b) (i), (ii) *and* (iii)] — Substitute the following for the existing matter:

'**7.5.1** b) *Lead Resistance*

For performance testing a total of 20 000 ohms may be included in between coil and distributor as shown in Fig. 3.'

(*Page* 11, *Fig.* 3A) — Substitute the following for the existing figure:



NOTE 1 — Contact breaker close period shall be set to:
a) 39 ± 0·5° for 6 lobe cam
b) 57 ± 0·5° for 4 lobe cam
NOTE 2 — Power supply shall be as specified in the relevant clause.
NOTE 3 — The coil shall be held in the vertical position with the terminals upwards.
NOTE 4 — 4 or 6 lobe cam of associated distributor shall be used for the test.

3A Schematic Diagram of Test Set-Up

FIG. 3 PERFORMANCE TEST — *Contd*

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