



**PRODUCT MANUAL FOR
PERFORMANCE REQUIREMENTS FOR
SMALL SIZE SPARK IGNITION ENGINES FOR AGRICULTURAL WATER
PUMPS, SPRAYERS, TILLERS, REAPERS AND
OTHER SIMILAR APPLICATIONS
ACCORDING TO IS 7347:1974**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 7347 :1974
	Title	:	Performance Requirements for Small Size Spark Ignition Engines for Agricultural Water Pumps, Sprayers, Tillers, Reapers and other Similar Applications
	No. of Amendments	:	3
2.	Sampling Guidelines:		
a)	Raw material	:	—
b)	Grouping guidelines	:	Each variety of engine shall be tested to cover that particular variety.
c)	Sample Size	:	One engine along with a set of design of the engine.
3.	List of Test Equipment	:	Please refer ANNEX – A
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – B
5.	Possible tests in a day	:	All tests except Endurance Test
6.	Scope of the Licence :		Please refer ANNEX – C

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ANNEX A**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sl. No.	Tests used in with clause reference	Test equipment
1	Strip Examination (clause 8.1 and 9.8)	a) Go & No-Go Plug Gauges and Snap gauge b) Ring Gauges c) Thread (Plug and Ring) Gauges d) Height gauges and Depth Gauges e) Micrometer (Inside and Outside) f) Vernier Calipers g) V-Block & Magnetic Stand h) Dial Gauges i) Feeler Gauges j) Slip Gauge Set k) Comparator l) Dial Bore Gauges and Master Rings m) Surface Plates
2	In process Control Equipments	a) Hardness Tester b) Spring Tester c) Crack Detector (recommendatory only) d) Carburetor Test Bench e) Lub-Oil Pump Tester f) Fly-wheel Balancing Equipment(s) g) Cam-Detail Checking Equipment h) Hydraulic Pressure Testing Equipment i) Connecting Rod Alignment & Twist Checking Rig j) Crankshaft Alignment & Pin Parallelism Checking Rig k) Balances (Preferably Self-indicating type) l) High Pressure Fuel Pipe Flushing Equipment m) Torque Wrenches n) Compression Pressure Tester o) Gear Marking Apparatus p) Valve Timing Apparatus q) Arrangement for Checking Bumping Clearance

3	Tests (Clause 9)	<ul style="list-style-type: none"> a) Test bed(s) with suitable dynamometer(s) and loading arrangements b) Pressure Gauges c) Barometer d) Hydrometer / Humidity Indicator (or dry & wet bulb thermometers with humidity chart) e) Tachometer / Stroboscope (instantaneous type) f) Fuel Measuring Apparatus g) Stop Watch h) Thermometers / Pyrometer(s) temperature gauges i) Hygrometer(s) for Specific Gravity of Fuel & Lub Oil. j) Exhaust back pressure gauge / Manometer k) Suitable water circulation arrangements for water cooled engine for rope brake drum (in case of rope brake dynamometer) / Hydraulic dynamometer etc. for maintaining consistency in working temperatures. l) Equipment for governing test m) Equipment for determination of mechanical efficiency (recommendatory) n) Arrangement for determination of calorific value of fuel. o) Apparatus for determination of lubricating oil consumption.
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The above list is indicative only and may not be treated as exhaustive.

ANNEX B

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – – In addition to the requirements of IS 7347:1974, the following shall also be legibly and indelibly marked on the engine:

- (a) Grades of Lubricating Oil to be used
- (b) Specific Fuel Consumption

4. LEVELS OF CONTROL - The tests as indicated in column 1 of [Table 1](#) and the levels of control in column 3 of [Table 1](#), shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

4.1 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

5. DESIGN:

5.1 The manufacturer shall submit and obtain approval of the design details and drawing of each type and rating of engine from BIS when first offered at the time of GoL and whenever there is any functional change in the engine.

5.2 Various critical components as given in Annex- I, shall be obtained from manufacturers whose quality has been established. In case of any change in the quality of components and source of supply it shall be brought to the notice of BIS and used for the production of ISI marked engines only after approval of the BIS.

5. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

(1)			(2)	(3)			
Test Details			Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control			
Cl.	Requirement	Test Methods		No. of Sample	Frequency	Remarks	
		Clause	Reference				
9	TESTS						
(a)	Rating Test including Fuel Consumption Test	9.2	IS 7347	R	One	These tests shall be carried out on engines when first offered and whenever there is any change in design of the engine or when asked by BIS for specific reasons at any time.	
(b)	Governing Test (for engine with governor)	9.3	IS 7347	R			
(c)	No load and low speed test (for engines without governor)	9.4	IS 7347	R			
(d)	Starting Test	9.5	IS 7347	R			
(e)	Endurance Test	9.6	IS 7347	R			
(f)	Rating Test after Endurance Test	9.7	IS 7347	R			
(g)	Strip Examination for checking of various components	8.1, 9.8	IS 7347	R			
(h)	Re-assembly, Starting Test and no load running	9.9	IS 7347	R			

ROUTINE TESTS						
Rating Test including Fuel Consumption Test	9.2	IS 7347	R	One engine of each rating (out of every 100 engines or once in a week whichever is earlier)	Result of these tests shall be recorded in the Format given in Annex –II.	
Governing Test (for engine with governor)	9.3	IS 7347	R			
No load and low speed test (for engines without governor)	9.4	IS 7347	R			
Starting Test	9.5	IS 7347	R	Each Engine		

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note- 2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

ANNEX- I

List of critical components

1. Piston, Piston rings and oil rings.
2. Valves.
3. Connecting rod, crank shaft and tappet.
4. Main bearing big end and bush.
5. Gaskets.
6. Studs and bolts.
7. Cylinder head.
8. Cam Shaft.
9. Gears.
10. Crank Case.
11. Carburetor.
12. Spark plug.
13. Oil seals.

ANNEX – II

Engine manufacturer:		Sheet No.	
Place of test and Altitude:		Date:	
Type & Model:		Serial No.	
Bore and Stroke (in mm.):		Cubic capacity (in liter) :	
No. of cylinders:		Normal compression ratio:	
Rated r.p.m.		Constants:	
Dynamometers' Type and Arm length:			
Fuel specification (including calorific value and specification):			
Lubricating Oil Specification:			
Testers		Observers:	

		Air Temperature (°C)						Engine parameters				Fuel Consumption					
Time	Barometer mm of Hg	Wet Bulb	Dry Bulb	Engine Intake	Exhaust Temp *	Relative Humidity	Total Correction Factor	Observed rpm	Brake load in kg	Calculated Brake Power	Corrected Brake Power	Fuel Consumption rate (g/h)	Specific Fuel Consumption rate (g/h)/kW	Cooling Water Temperature (°C)		Lubricating Oil Temperature (°C)	Lubricating Oil Pressure kN/m ²
														Inlet	Outlet		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)

*Exhaust temperature to be measured at the center of pipe approximately 300 mm from engine

ANNEX C**Scope of the Licence**

Licence is granted to use Standard Mark as per IS 7347:1985 with the following scope:

Name of Product	Performance Requirements for Small Size Spark Ignition Engines for Agricultural Water Pumps, Sprayers, Tillers, Reapers and other Similar Applications
Model No	
Rated output in kW	
Type of IS rating	
Rated speed in rev/min	
Specific fuel consumption (g/h)/kW	
Class of governing	
Grades of oil and fuel to be used	
Number of cylinders	
Mechanical efficiency	
Lubricating oil consumption	
Method of cooling	
No. of stroke	
Type of Engine	