



PRODUCT MANUAL FOR OPENWELL SUBMERSIBLE PUMPSETS ACCORDING to IS 14220:2018

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 14220 : 2018
	Title	:	Openwell Submersible Pumpsets
	No. of Amendments	:	One
2.	Sampling Guidelines:		
a)	Raw material	:	Materials for Components – Clause. 7.1 of IS 14220 Gaskets, Seals and Packings – Clause. 5.2 of IS 5120
b)	Grouping guidelines	:	Each Type of openwell Submersible pump sets shall be tested for GoL/CSoL. However, models with only aesthetic changes need not be tested separately if the design technical parameters remain same.
c)	Sample Size	:	One Pump set
3.	List of Test Equipment	:	Please refer <u>ANNEX – A</u>
4.	Scheme of Inspection and Testing	:	Please refer <u>ANNEX – B</u>
5.	Possible tests in a day	:	All tests
6.	Scope of the Licence	:	Please refer <u>ANNEX – C</u>

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ANNEX - A
List of Test Equipments

Guidance list of major test equipment required to test as per the Indian Standard

Sl. No.	Test Equipment	Tests used in with Clause Reference
1	Dial Vernier Calliper	Clause. 7 of IS 9283
2	Outside Micrometer 0 – 25 mm	
3	Outside Micrometer 25 – 50 mm	
4	Bore Gauge With Dial Gauge.	
5	Fixture for run-out concentricity & face run-out	
6	Dial Indicator (Lever Type Dial)	
7	Dynamic Balance Machine	Clause. 10.5 of IS 14220
8	Auto Transformer	Clause. 16.1 (d, f, g, h, j, k) of IS 9283 & 16 of IS 14220
9	High Voltage Tester	Clause. 16.1 (b), 16.2 (b) of IS 9283
10	Mili Ohm Meter	Clause 16.1 (c) of IS 9283
11	Thermometer	Clause. 14.6 of IS 14220
12	Insulation Tester	Clause. 16.1 (a), 16.2 (a) of IS 9283
13	Torque Testing Set up with Spring Balance	Clause. 16.2 (d) of IS 9283
14	Hydrostatic Test unit	Clause. 9.1 & 9.2 of IS 11346
15	Pressure Gauge	Clause. 16 of IS 14220
16	Digital Flow Meter	
17	Digital Flow Meter	
18	Multi Meter	
19	Tachometer	
20	Digital Power Panel	
21	Surface Roughness Comparator	Clause. 5.5 of IS 9283 & Clause 10.4 of IS 14220
22	Measuring tape	Clause 16 of IS 14220
23	Water Sump	

The above list is indicative only and may not be treated as exhaustive.

ANNEX – B

Scheme of Inspection and Testing

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit i.e. Batch and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4 below.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 **Levels of Control:** For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.2 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in-house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer, and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in-house as “R” or other tests which can be sub-contracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) also is optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. LABELLING AND MARKING – As per the requirement of IS 14220:2018. The Standard Mark, as given in the Schedule of the licence, shall be marked on each Pumpset provided always that the product thus marked conforms to all the requirement of the specification. In addition, the licence no. CM/L-_____ and details of BIS website shall be marked at an appropriate place on product or package as follows: “For details of BIS certification please visit www.bis.gov.in”.

4. REJECTION - All the production which conforms to the Indian Standard and covered under scope of the licence shall be marked with Standard Mark. 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

Table 1

(1)				(2)	(3)		
Test Details				Test equipment requirement	Levels of Control		
Cl.	Requirement	Test Methods		R: required (or) S: Sub-contracting permitted	No. of Sample	Frequency	Remarks
		Clause	Reference				
7	Material of Construction	7.1	IS 14220	S	One	Each consignment	Conformity to the relevant Indian Standard may be established
	Gaskets, Seals and Packings	7.2	IS 14220				
10	GENERAL REQUIREMENTS						
10.1	General Requirements	17	IS 5120 IS 9283	R	Manufacturer shall exercise adequate levels of control to ensure that entire production should conform to the Standard. Appropriate records of testing indicating conformity shall be maintained		
10.2	Casing	15.5	IS 14220	R	Every Pump Casing		
10.4	Shaft	10.4.2	IS 14220 IS 3073	S	One shaft from each consignment for each size, subject to number of shafts not exceeding 100		If more than 100 shafts are received in one consignment then one more sample per each 100 shafts to be tested
10.5	Balancing	10.5	IS 14220	S	One Rotor/ Impeller from each consignment for each size, subject to number of Rotors/ Impellers not exceeding 100		If more than 100 Rotor/ Impeller are received in one consignment then one more sample per each 100 Rotors/ Impellers to be tested

10.6	Provision for Earthing	10.6	IS 14220	R	Every motor	
10.7	Terminal Marking and Direction of Rotation	10.7	IS 14220	R	Every pumpset	
14	TEST FOR ELECTRICAL PERFORMANCE ON MOTOR FOR OPENWELL SUBMERSIBLE PUMPSET					
14.9	ROUTINE TEST					
	Insulation resistance (before HV test).	14.3	IS 14220	R	Every Motor	No further testing is required, if motor is ISI marked.
	High Voltage Test	14.4	IS 14220			
	No load running of motor and reading of current voltage, power and speed		IS 9283			
	Locked rotor reading of voltage, current and power input		IS 9283			
	Reduced voltage running up test at no load		IS 9283			
14.10	TYPE TEST					
	Insulation resistance (both before and after HV test)	14.3	IS 14220	S	Once in a month for each type and design	
	High Voltage Test	14.4	IS 14220			
	Measurement of stator resistance	14.10 (c)	IS 14220			
	Breakaway (starting) torque	14.7	IS 14220			
	Leakage Current Test	14.5	IS 14220			
	Temperature rise Test at rated voltage	14.6.5	IS 14220			

	Temperature rise test at reduced voltage	14.6.6	IS 14220	S	Once in a month for each type and design	
15	Testing for Hydraulic Performance on Pump for Open well Submersible Pumpset	15.2 to 15.4	IS 14220	S	Once in a month for each type and design	
16.	Guarantee and Tolerance on Openwell Submersible Pumpset Performance	16	IS 14220			
8	Design Features	8	IS 14220			

ANNEX-CSCOPE OF LICENCE

Name of the product : Submersible Pumpset													
Model	Delivery Size (mm)	No. of Stages	Declared Duty Point			Type of Motor: Category of Motor: Type of Duty: Rated Frequency:						Minimum Submergence	Head Range (m)
			Head (m)	Discharge (lps)	Overall Efficiency (%)	Rated Speed (rpm)	Rating (kW)	Rated Current (A)	Winding Connection	No. of Phases	Rated Voltage (V)		