



**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	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	Materials for Components – <i>Clause. 7.1</i> of IS 14220 Gaskets, Seals and Packings – <i>Clause. 5.2</i> of IS 5120
b)	Grouping guidelines	:	Each Type of Openwell Submersible Pumpsets shall be tested for GoL/CSoL
c)	Sample Size	:	One Pumpset
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
6.	Scope of the Licence	:	Please refer ANNEX – C

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ANNEX - A
List of Test Equipments

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 & <i>Clause 10.4</i> 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. 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 – As per the requirements of IS 14220: 2018.

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. 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

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	No further testing is required, if accompanied with test certificate or ISI marked
	Gaskets, Seals and Packings	7.2	IS 14220				
10	GENERAL REQUIREMENTS						
10.1	General Requirements	17	IS 5120 IS 9283	R	Every Pumpset / Every motor		
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	R	One sample of each identical type and design (Out of every 100 pump sets or every month whichever is earlier)	
	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	R	One sample of each identical type and design (Out of every 100 pump sets or every month whichever is earlier)	
15	Testing for Hydraulic Performance on Pump for Open well Submersible Pumpset	15.2 to 15.4	IS 14220	R	One sample of each identical type and design (Out of every 100 Pumpsets or every month whichever is earlier)	
16.	Guarantee and Tolerance on Openwell Submersible Pumpset Performance	16	IS 14220			
8	Design Features	8	IS 14220			

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

NOTE-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX-C

SCOPE 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)		