



**PRODUCT MANUAL FOR
ACETYLENE GENERATORS
ACCORDING TO IS 8471:2003**

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.

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| 1. | Product | : | IS 8471:2003 |
| | Title | : | Acetylene Generators |
| | No. of Amendments | : | Nil |
| 2. | Sampling Guidelines: | | |
| a) | Raw material | : | As per clause 7.1 of IS 8471:2003 |
| b) | Grouping guidelines | : | Not applicable as Acetylene Generators are manufactured against specific orders and each generator is tested by BIS partly at the licensee's premises and finally inspected at purchaser's premises and after BIS inspection, BIS Standard Mark is applied on the Generators. |
| c) | Sample Size | : | Each Acetylene Generator – Licence is operated on FT basis |
| 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: | | Licence is granted and operated on Factory Testing basis and complete testing has to be done at Manufacturer's/ Purchaser's premises. |
| 6. | Scope of the Licence: | | Please refer ANNEX –C |

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 | Temperature (cl 4.2) | Thermometer |
| 2 | Generating chamber (cl 8) | Steel Scale, Micrometer |
| 3 | Carbide Holders (cl 9) | Weighing balance, Micrometer |
| 4 | Carbide feed mechanism (cl 10) | Steel scale |
| 5 | Automatic safety relief valve (cl 11) | Testing bench with pressure gauges, Vernier |
| 6 | Flashback arrestor (cl 12) | Micrometer, Pressure gauges, Rotameter, Thermometer. Pressure resistant test setup, Valve test setup with pressure gauges, Flame arrestor test setup, cut off valve test setup, |
| 7 | Gas holder (cl 18) | Steel scale, Micrometer, Vernier, Pressure Gauge, weighing balance |
| 8 | Performance test (cl 19) | Pressure gauges, Rotameter |
| 9 | Pneumatic test (cl 20) | Pneumatic test bench with pressure gauges |
| 10 | Hydraulic test (cl 20) | Hydraulic test bench with pressure gauges |

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 equipments.

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

3. LABELLING AND MARKING – As per the requirement of IS 8471.

4. TESTING- Complete Testing is to be witnessed for each generator by BIS (manufacturer's and buyer's premises – as applicable).

4.1 TEST BY MANUFACTURER:

4.1.1 Each generator shell, assembly and auxiliary parts, except those having seals open to the atmosphere, shall be free from leakage when tested at a pressure specified in clause 4.4 of IS 8471 applied for a period of not less than 30 minutes. Chambers and other assemblies having open seals shall be tested to determine that they are free from leakage.

4.1.2 The manufacturer shall send to the Bureau one set of drawings and design calculation for each type of the generator. The drawing needs to be approved by BIS and PESO. As and when there is any change in the drawing/design and capacity of the generator, the entire performance test as has been stated in Table 1 and at the levels of control at manufacturer's premises shall be carried out in the presence of the Inspecting Officer of the Bureau.

4.1.3 The seamless pipes used in acetylene servicing line, shall be tested hydrostatically against pressure to be specified by the manufacturer.

4.1.4 Safety valves, pressure gauges shall be duly calibrated by licensee and the records maintained.

4.1.5 Control valves shall be hydrostatically tested at 1.5 times the maximum working pressure.

4.1.6 Each generator shall bear the number of the approval letter by PESO.

4.1.7 The licensee shall inform the Bureau every time the production of a generator is taken up, giving the buyer's name and address and the details of the generator.

4.2 TEST AT BUYER'S PREMISES

4.2.1 All the operational observations and performance tests as stipulated in IS 8471 shall be done at the buyer's end after satisfactory installation by the manufacturer. The manufacturer shall satisfy the buyer by carrying out all the performance tests.

4.2.2 These operational observations and performance tests shall be witnessed by the Inspecting Officer of the Bureau also and a joint report by the BIS and the customer shall be made available to the BIS office supervising the performance of the licensee.

4.2.3 The licensee shall intimate the Bureau at least a fortnight in advance before commissioning the generator at the buyer's premises.

4.2.4 The Inspecting Officer shall witness the tests as stipulated in Levels of Control at the manufacturer's end also.

4.2.5 Acetylene generators having capacity upto & including 10m³ /h may be tested at the manufacturer's place or at buyer's place depending upon the availability of complete testing facilities. If complete facilities are not available at either place, partial testing may be carried out at manufacturer's place & partial at buyer's place.

5. 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.

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

6. 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 R: required (or) S: Sub contracting permitted | Levels of Control | | |
| Cl. | Requirement | Test Method | | | No. of Sample | Frequency | Remarks |
| | | Clause | Referen ce | | | | |
| 7 | Metal parts and coating | 7.1 to 7.3 | IS 8471 | S | One | Each Consignment | ISI marked Steel to be procured and records maintained. For other materials, no further testing is required if accompanied with a test certificate or is ISI Marked. |
| 8 | Generating chamber | 8.1 to 8.10 | IS 8471 | R | Each chamber | | |
| 9 | Carbide Holders | 9.1 to 9.11 | IS 8471 | R | Each holder | | |
| 10 | Carbide feed mechanism | 10.1 to 10.5 | IS 8471 | R | Each piece | | |
| 11 | Automatic safety relief valve | 11.1 to 11.7 | IS 8471 | R | Each piece | | |
| 12 | Flashback arrestor | 12.1 to 12.8 | IS 8471 | S | Each piece | | No further testing is required if accompanied with a test certificate or is ISI Marked. |
| 13 | Scrubbers and filters | 13.1 to 13.2 | IS 8471 | R | Each piece | | |
| 14 | Shaft and stem seals | 14.1 to 14.2 | IS 8471 | R | Each piece | | |
| 15 | Gasket and diaphragm | 15.1 to 15.4 | IS 8471 | R | Each piece | | |
| 16 | Piping | 16.1 to 16.6 | IS 8471 | R | Each piece | | |
| 17 | Pressure regulator | 17 | IS 8471 | R | Each piece | | |
| 18 | Gas holder | 18.1 to 18.10 | IS 8471 | R | Each piece | | |
| 5 | Rated capacity | 5.1 to 5.4 | IS 8471 | R | Each generator | | |

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|------|---|------|---------|---|--|---|
| 19.1 | <p>Generator and its ancillary parts shall be run for at least one full charge of a hopper to ascertain the uniform performance of the generator.</p> <p>The following observation shall be taken at the minimum and maximum pressure in the generator.</p> <p>a) Pressure in the generator and in the flash back arrestor.</p> <p>b) Temperatures in the generator.</p> <p>c) Readings at the receiver gauge and that in the adjoining water column or the flow meter (roto meter) readings.</p> | 19 | IS 8471 | R | Each generator | The readings taken as per a, b and c shall be able to convince the inspecting authority that the performance is uniform and the acetylene can be produced as and when required. |
| 19.2 | In case operating pressure is regulated by carbide feed mechanism, pressure fluctuations shall not be more than 10 per cent when the generator is operated at rates upto and including its rated acetylene producing capacity | 19 | IS 8471 | R | Each generator | |
| 19.3 | The tests observations at a, b and c above shall also be repeated at 130% of the rated capacity of the generator. | 19 | IS 8471 | R | Each generator | . |
| 20.1 | <p>Pneumatic test of generator shell, assembly and auxiliary Parts. (Tested using dry nitrogen gas and soap solution)</p> <p>Chambers and other assemblies having open seals shall be tested to determine that they are free from leakage (Plate edges and all the welds shall be suitable tested for any inconspicuous defect by non-destructive test to satisfy the inspecting Authority (preferably dye penetration test).</p> <p>Hydraulic test for each component or part at the test pressure specified before conducting pneumatic test for the assembled generator.</p> | 20.1 | IS 8471 | R | Each generator and all its ancillary parts | In case any defect is found, the same shall be repaired and further tested. |

| | | | | | | |
|------|---|------|---------|---|----------------|--|
| 20.2 | Check to determine that carbide feed mechanism is in proper working condition | 20.2 | IS 8471 | R | Each generator | Applicable for carbide to water type generator |
|------|---|------|---------|---|----------------|--|

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 CScope of the Licence

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| “Licence is granted to use Standard Mark as per IS 8471:2003 with the following scope: | |
| Name of the product | Acetylene Generators |
| Type | Water to Carbide / Carbide to Water |
| | Portable / Stationary |
| | Maximum gas generation capacity (<i>for portable</i>) |
| | Total Calcium carbide holding capacity (<i>for portable</i>) |
| | Small (production capacity -----) (<i>for stationary</i>) |
| | Large (production capacity -----) (<i>for stationary</i>) |
| | Automatic / Non-automatic |
| Low pressure / medium pressure (Max. working pressureKPa) | |