व्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

एक कदम स्वच्छता की ओर

संख्या/No.: Machine 115/486
माह / Month: March 2024

**THIS TEST REPORT IS VALID UPTO 31.03.2031**

# SECHANAM AIW-10 POWER WEEDER

सत्यमेव जयते

भारत सरकार
GOVT OF INDIA
कृषि एवं किसान कल्याण मंत्रालय
MINISTRY OF AGRICULTURE & FARMERS WELFARE
कृषि एवं किसान कल्याण विभाग
DEPARTMENT OF AGRICULTURE AND FARMERS WELFARE

## उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान
## NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE

विश्वनाथ चारिआलि, जिला-विश्वनाथ (असम)
BISWANATH CHARIALI: BISWANATH: ASSAM, PIN - 784 176
[AN ISO 9001:2015 CERTIFIED INSTITUTION]

Ph. No. 03715-222094 Website: http://nerfmtti.nic.in E-Mail: fmti-ner@nic.in

## 4. SPECIFICATIONS

### 4.1 General:

| | | |
|---|---|---|
| Make | : | SECHANAM |
| Model | : | AIW-10 |
| Name and address of manufacturer | : | **Chongquing Senci Wugu Agriculture Machinery Import & Export Company Limited, Longfei Road, Dongchen Street, Tongliang District, Chongqing, China-402560** |
| Name and address of applicant | : | **Aquatix India, Madan Mohan Lane,1646/B, Near Binayak Steel, Gosala Road, Cuttack-753004, Odisha** |
| Name of machine | : | Power Weeder |
| Type of machine | : | Self propelled, Walk behind |
| Working size of machine (mm) | : | 1390 |
| Year of manufacture | : | 2023 |
| Serial no. of machine | : | 2022 IW |

### 4.2 Details of prime mover:

| | | |
|---|---|---|
| Make | : | Not specified |
| Model | : | 186FA |
| Type | : | 4 stroke, Single cylinder, Air cooled, Diesel Engine |
| Year of manufacture | : | 2023 |
| Serial Number | : | F13BBAJ0027 |
| Country of origin | : | **China** |
| Recommended high idle speed (rpm) | : | 3200 ± 100 |
| Recommended low idle speed (rpm) | : | 1600 ± 100 |
| Recommended rated speed (rpm) | : | 3000 |
| Maximum power observed (kW) | : | **5.03** |
| Maximum power declared (apa) (kW) | : | 7.55 |

## 10. AIR CLEANER OIL PULL OVER TEST

Date of test : 13.10.2023

**Range of atmospheric conditions :**

Temperature (°C) : 29.2 to 30.2

Pressure (kPa) : 100.1 to 100.2

Relative humidity (%) : 57.5 to 65.1

Mass of oil before test (g) : 34.34

| Sl. No. | Position of Power Weeder | Loss of oil (g) | Oil pullover (%) |
|---|---|---|---|
| 1 | Parked on level ground | 0.00 | Nil |
| 2 | Tilted to 15° laterally with RHS up | 0.01 | 0.03 |
| 3 | Tilted to 15° laterally with LHS up | 0.01 | 0.03 |
| 4 | Tilted to 15° longitudinally with front end up | 0.00 | Nil |
| 5 | Tilted to 15° longitudinally with rear end up | 0.00 | Nil |

## 11. HARDNESS AND CHEMICAL COMPOSITION OF ROTOR BLADE

### 11.1 Hardness of rotor blades :

The surface hardness of blade was recorded as under :

| | As per IS 6690:1981 (Reaffirmed 2012) | As observed (HRC) | Remarks |
|---|---|---|---|
| At edge portion | 56 ±3 HRC | 50.0 | **Does not conform** |
| At shank portion | 37 to 45 HRC | 49.6 | **Does not conform** |

### 11.2 Chemical composition of rotor blades :

| Constituents | As per IS 6690:1981 (Reaffirmed 2012) | | Composition as observed (% by weight) | Remarks |
|---|---|---|---|---|
| | Carbon Steel (%) | Silicon Manganese Steel (%) | | |
| Carbon ( C ) | 0.70 -0.85 | 0.50-0.60 | 0.711 | Conforms |
| Silicon (Si) | 0.10 -0.40 | 1.50-2.00 | 0.798 | **Does not conform** |
| Manganese (Mn) | 0.50 -1.0 | 0.50-1.00 | 0.876 | Conforms |
| Sulphur (S) | 0.05(max) | 0.05(max) | 0.009 | Conforms |
| Phosphorous (P) | 0.05(max) | 0.05(max) | 0.022 | Conforms |

## 12. FIELD PERFORMANCE TEST

The field tests were conducted for 26.92 hours of field operation for testing the said power weeder. The field tests were conducted at rated speed of 3000 rpm. The detailed test results are represented in the Annexure and summarized in the ensuing table:

| Sl .No. | Parameters | | Observations |
|---|---|---|---|
| 1 | Type of soil | : | Light |
| 2 | Soil moisture (%) | : | 8.27 to 10.97 |
| 3 | Bulk density of soil (g/cc) | : | 1.48 to 1.54 |
| 4 | Forward Speed of operation (kmph) | : | 1.09 to 1.19 |
| 5 | Depth of cut (cm) | : | 5.40 to 5.80 |
| 6 | Width of cut (m) | : | 1.39 to 1.43 |
| 7 | Area covered (ha/h) | : | 0.116 to 0.130 |
| 8 | Time required for one ha (h) | : | 7.69 to 8.62 |
| 9 | Field efficiency (%) | : | 70.30 to 78.31 |
| 10 | Weeding efficiency (%) | : | 71.19 to 75.66 |
| 11 | Fuel consumption | | |
| | l/h | : | 0.82 to 1.20 |
| | l/ha | : | 7.07 to 9.23 |

**12.1 Rate of work:**

- Rate of work was recorded as 0.116 to 0.130 ha/h and the forward speed of operation was recorded from 1.09 to 1.19 kmph.
- Time required to cover one hectare was recorded as 7.69 to 8.62 h.

**12.2 Quality of work:**

- Depth of cut was recorded as 5.40 to 5.80 cm.
- Working width was observed as 1.39 to 1.43 m.
- Field efficiency was found as 70.30 to 78.31 %.
- Weeding efficiency was found as 71.19 to 75.66 %.

**12.3 Adequacy of power of prime mover:**

The power of prime mover was found adequate.

**12.4 Wear Analysis of rotor blades:**

| Blade No. | Initial mass(g) | Final mass (g) | Loss of mass (g) | Percentage wear of rotor blades | |
|---|---|---|---|---|---|
| | | | | After 26.92 h | Per hour |
| L-1 | 310.0 | 307.5 | 2.5 | 0.81 | 0.03 |
| L-2 | 300.0 | 297.0 | 3.0 | 1.00 | 0.04 |
| L-3 | 293.0 | 289.5 | 3.5 | 1.19 | 0.04 |
| L-4 | 305.0 | 302.5 | 2.5 | 0.82 | 0.03 |
| L-5 | 303.0 | 298.5 | 4.5 | 1.49 | 0.06 |
| R-1 | 311.0 | 308.0 | 3.0 | 0.96 | 0.04 |
| R-2 | 308.0 | 304.0 | 4.0 | 1.30 | 0.05 |
| R-3 | 307.0 | 304.5 | 2.5 | 0.81 | 0.03 |
| R-4 | 312.0 | 310.0 | 2.0 | 0.64 | 0.02 |
| R-5 | 306.0 | 302.5 | 3.5 | 1.14 | 0.04 |

The hourly rate of wear of blade on mass basis after field operations was recorded as 0.02 to 0.06%.

Condition of bearing: Normal

**15.1.6 Main bearing:** One No. of ball bearing 6308 was used.

| Bearing No. | Diametrical clearance, (mm) | Crankshaft end float, (mm) | Max. permissible clearance limit,(mm) | |
|---|---|---|---|---|
| | | | Diametrical clearance | Crankshaft end float |
| Bush bearing | 0.09 | 0.02 | Not specified | 0.30 |

**15.1.7 Valve guide clearance**

| Valve guide diameter (mm) | | Valve stem diameter (mm) | | Valve guide clearance (mm) | | Max. Permissible wear limit (mm) | |
|---|---|---|---|---|---|---|---|
| Inlet | Exhaust | Inlet | Exhaust | Inlet | Exhaust | Inlet | Exhaust |
| 6.99 | 6.99 | 6.94 | 6.95 | 0.05 | 0.04 | Not specified | Not specified |

**Valve, guide and timing gear:-**

| | | |
|---|---|---|
| Any marked sign of overheating of valves | : | None |
| Pitting of seat/faces of valves | : | Normal |
| Any visual damage to teeth of timing gears | : | None |
| Condition of ignition coil & magneto | : | Normal |

**15.2 Clutch:** No noticeable defect was observed.

**15.3 Transmission gears:** No noticeable defect was observed.

**15.4 Rotary drive unit:**
The rotary drive unit was dismantled and all the components were found in normal condition.

## 16. COMMENTS & RECOMMENDATIONS

**16.1** The maximum power was observed as 5.03 kW against the declared value of 7.55 kW by the applicant/manufacturer. This shall be looked into for corrective action.

**16.2** The specific fuel consumption (SFC) of engine corresponding to maximum power was recorded as 269 g/kWh under natural ambient condition against the declared value of 390 g/kWh by the manufacturer. This shall be looked into for corrective action.

**16.3** Noise at operator's ear level was observed on higher side against danger limit of 90 dB (A) as specified by International labour Organization (ILO) for continuous exposure of 8 hours per day. **This calls for reduction in noise level to improve the operator's comfort & safety.**

**16.4** The amplitude of mechanical vibration marked as (*) is on drastically higher side and is

directly concerned with operator's health, safety and comfort. Besides, it is also adversely affect the useful life of the component in view of above this deserves to be given top priority for corrective action.

**16.5** The hardness and chemical composition of rotary blades does not conform to the requirement of IS 6690:1981 (Reaffirmed 2012). This may be looked into for corrective action.

**16.6** Machine maneuverability while taking turns during field operation was not comfortable. It shall be looked into for ease of operation for the operator.

**16.7** Working width of the machine and type of engine (Petrol/Diesel) should be provided on the labeling plate of the machine. This should be looked into for corrective action.

**16.8** On labeling plate of the machine, manufacturer's address and maximum power have been mentioned wrongly. This should be looked into for corrective action.

**16.9 Adequacy of Literature**

The following literature in English language was provided for reference during testing:

- Operator's/ Service manual
- Parts catalogue

It is recommended to bring out the manual in Hindi and other vernacular languages as per IS: 8132-1999.

**TESTING AUTHORITY**

**(M.R. PATIL)**
**AGRICULTURAL ENGINEER**

**(Dr. P.P. RAO)**
**DIRECTOR**

Draft test report compiled by - **Shri Khagendra Bora, STA**

## 17. APPLICANT'S COMMENTS

| Para No | Our Reference | Applicant's Comments |
|---|---|---|
| 17.1 | 16.1 to 16.9 | As per comments and recommendations necessary precautionary measures will be taken during future products. |