

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: Powerweeder-130/2775/2022

माह/Month: January, 2022

THIS TEST REPORT VALID UP TO : 31st January, 2027



**XTRA POWER, 1160 D
POWER WEEDER**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture, Cooperation and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001

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[ISO 9001:2015 CERTIFIED]

Website: <http://nrfmtti.gov.in/>

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10.2 Table 5 : Chemical analysis of rotary blade

Elements	Requirements as per IS: 6690-1981 (%)	As observed (%)	Remarks
1.	2.	3.	4.
Carbon	0.50 to 0.60	0.46	Does not conform
Manganese	0.50 to 1.00	0.82	Conforms
Silicon	1.50 to 2.00	0.56	Does not conform
Phosphorous	0.05 (Max.)	0.008	Conforms
Sulphur	0.05 (Max.)	0.055	Conforms

11. RUNNING IN

The Power weeder was run-in for 0.50 hour before Field performance test as recommended by the applicant. All the fasteners were checked and tightened thereafter.

12. FIELD TEST

The field tests under dry land condition were conducted for 25.72 h. The field performance tests were conducted at the rated 3600 rpm. In all, 5 tests trials were conducted in sandy loam soil at the NRFMTTI farm, Hisar. The result of the field test for dry land operation is summarized in table-6.

Crop parameters

- | | |
|------------------------|------------------|
| i) Type of weed | - Seasonal weeds |
| ii) Height of weed, cm | - 2.5 to 11.3 |

Table 6: SUMMARY OF FIELD PERFORMANCE TEST

Sl. No.	Parameter	Range
i)	Type of soil	Sandy loam
ii)	Average Soil moisture, %	17.33 to 17.57
iii)	Average Bulk density of soil, g/cc	1.69 to 1.75
iv)	Average Speed of operation, kmph	2.04 to 2.09
v)	Average depth of cut, cm	5.40 to 5.98
vi)	Average Width of cut, m	1.32 to 1.40
vii)	Average Area covered, ha/h	0.219 to 0.234
viii)	Average Time required for one ha	4.28 to 4.57
ix)	Average Fuel consumption	
	l/h	0.75 to 0.90
	l/ha	3.28 to 4.20
x)	Average Weeding efficiency, %	71.99 to 80.21
xi)	Average Field efficiency, %	75.78 to 81.55

13. ADJUSTMENT, DEFECTS, BREAKDOWNS & REPAIR

No noticeable breakdown occurred during test.



14. COMPONENTS/ASSEMBLY INSPECTION AND ASSESSMENT OF WEAR**14.1 Engine :**

The Engine and other assemblies were dismantled after 33 hours of engine operation.

14.1.1 Cylinder :

Cylinder bore dia. (mm)						Max. permissible wear limit
Top Position		Middle position		Bottom Position		
Thrust	Non-thrust	Thrust	Non-thrust	Thrust	Non-thrust	
88.00	88.00	87.98	87.97	87.98	87.96	88.15

14.1.2 Piston:

Piston diameter (mm)						
Top position		At Skirt			Max. permissible wear limit (mm)	
Thrust side	Non-thrust side	Thrust side	Non-thrust side	Piston to cylinder clearance (mm)	Piston dia. At skirt	Piston to cylinder clearance
87.49	87.45	87.45	Not measured due to piston design constraint	0.51	0.18	--

14.1.3 Piston Rings end gap:

Ring No.	Ring end gap (mm)			Max. permissible wear limit (mm)
	At top	At middle	At bottom	
1 st compression ring	0.20	0.20	0.20	0.7
2 nd compression ring	0.65	0.65	0.60	0.7
Oil ring	0.30	0.35	0.40	0.7

14.1.4 Big end bearing

Dia. of crank pin(mm)	Dia. of bearing (mm)	Clearance (mm)		Max. permissible wear limit (mm)	
		Diametrical	Axial	Diametrical	Axial
39.93	40.09	0.08	0.41	0.08	1.20

14.1.5 Main bearing of crank shaft:

Sr. No.	Dia. of main journal(mm)	Dia. of main bearing (mm)	Diametrical Clearance of main bearing	End float of crank shaft	Max. permissible wear limit (mm)	
					Diametrical	End float of crank shaft
Ball bearing is provided hence not applicable						



14.1.6 Piston Rings groove clearance:

Ring No.	Ring groove clearance (mm)	Max. permissible wear limit, mm
1 st compression ring	0.09	1.00
2 nd compression ring	0.03	1.00
Oil ring	0.02	1.00

14.1.7 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
6.98	6.97	6.96	6.95	0.02	0.02	0.10	0.12

14.2 Valve guides and valve springs

Valve spring stiffness, Kgf/mm :

Inlet valve : 2.06

Exhaust valve : 2.06

Discard limit

1.33 (Kgf/mm)

14.3 Timing gears: No noticeable defect observed.**14.4 Clutch :** No noticeable defect observed.**14.5 Transmission :** No noticeable defect observed.**14.6 Rotary drive unit :** No noticeable defect observed.**14.7 Wear of blades:****14.7.1 Mass basis:**

The wear of the rotary weeder blades was measured after 26.72 hrs. of field operation and the observations are as under:

Sl. No.	Initial mass (g)	mass after 26.72 hrs.(g)	Loss of mass (g)	Percent wear (%)	Percent wear per hour
1	351.75	350.4	1.35	0.38	0.01
2	346.81	345.0	1.81	0.52	0.02
3	353.25	351.5	1.75	0.50	0.02
4	353.25	351.9	1.35	0.38	0.01
5	346.47	344.3	2.17	0.63	0.02
6	346.65	344.4	2.25	0.65	0.03
7	348.35	346.9	1.45	0.42	0.02
8	345.57	344.1	1.47	0.43	0.02
9	353.81	352.4	1.41	0.40	0.01
10	349.44	347.5	1.94	0.56	0.02



15. CRITICAL TECHNICAL SPECIFICATIONS

Vide ministry's letter no. 13-9/2019- M&T (I&P)- Part dated 26.04.2019 and F.No. 9-4/2019
M&T (I&P) dated 20.08.2019.

Sr. No.	Parameters	Specifications	Observed	Remarks
1.	Type	Self-propelled, walk behind	Self propelled, walk behind type	Conforms
2.	Working width, mm	300-1500	1500	Conforms
3.	Type of engine	Compression/Spark ignition	Compression	Conforms
4.	Starting method	Manual/recoil/self-starting	Recoil/Self start	Conforms
5.	Type of clutch	Dry/Wet	Wet	Conforms
6.	Type of primary gear box	Sliding/constant mesh or combination of both	Sliding mesh	Conforms
7.	Type of secondary gear box	Gear type, chain & sprocket type	Gear type	Conforms
8.	Material for rotor shaft	SAE 1045 (CRS) / EN8 / EN9	High Carbon steel	Conforms
9.	No. of flanges	4 - 10	5	Conforms
10.	Types of flanges	Square/circular/rectangular	Square	Conforms
11.	Distance between consecutive flanges, mm	80 to 150	135	Conforms
12.	No. of blades in each flange	3-6	04	Conforms
13.	No. of rotor blade	12 (min.)	40	Conforms
14.	Thickness of rotor blade, mm	5 (min.)	5.8	Conforms
15.	Material of blade	Boron (28MnCrB5) / High carbon steel EN 42j	High Carbon steel	Conforms
16.	Hardness of Blade, HRC	38 (min.)	43.52 (Average)	Conforms
17.	Shape of rotor blade	C / J shape	J shape	Conforms
18.	Provision for handle height adjustment	Must be provided	Provided	Conforms
19.	Provision for handle rotation	Must be provided	Provided	Conforms
20.	Provision for emergency stop of engine	Must be provided	Provided	Conforms
21.	Provision for easy start of engine	Must be provided	Provided	Conforms
22.	Provision for shield/cover to prevent flying of mud & stone from rotor	Must be provided	Provided	Conforms

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23.	Depth control mechanism	Must be provided	Provided	Conforms
24.	Provision for transport wheels	Must be provided	Provided	Conforms
25.	Provision for cover on exhaust	Must be provided	Provided	Conforms
26.	Direction of exhaust emission away from operator	Must be provided	Provided	Conforms
27.	Marking/labeling machine	The labeling plate should be riveted on the body of machine having Name and address of manufacturer & Applicant, Country of origin, Make, Model, Year of manufacturer, Serial number, Engine number, Engine HP, rated rpm & SFC.	Provided	Conforms
28.	Literature	Operator manual, service manual and Parts catalogue should be provided.	Provided	Conforms

16. COMMENTS & RECOMMENDATIONS

16.1 Engine performance

- i) The maximum power of engine was observed as 6.73 kW against the declared power 9.00 kW.
- ii) Rated power is observed as 4.89 kW against the declared power 7.5 kW.
- iii) Specific fuel consumption corresponding to maximum power was observed as 806.25 g/kWh against declared 295 g/kWh

16.2 Mechanical vibration

The amplitude of mechanical vibration marked as (*) on the relevant chapter, are on drastically higher side. It is not just directly concerned with operator's health, safety and comfort, but also adversely affect the useful life of the components. In view of above, this deserved to be given top priority for corrective action.

16.3 The chemical composition of blades does not conform in toto, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.

16.4 The hardness of blades does not conform in toto, to the requirements of IS: 6690-1981. This needs to be looked into for corrective action.

16.5 Rated rpm & SFC are not mentioned on labeling plate. It **MUST** be specified.



17. TECHNICAL LITERATURE

The following literatures are provided by the applicant during the test.


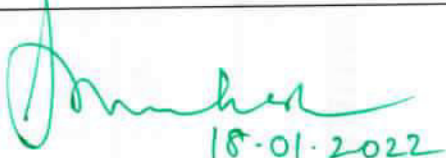
Operator's manual

Part catalogue

Engine parts catalogue

However, the Operator's manual needs to be updated as per IS: 8132-1999.

TESTING AUTHORITY

SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 18-01-2022

Draft test report compiled by Er. Dharmendra Kumar, Technical Assistant

18. APPLICANT'S COMMENTS

All modifications/improvement as per directions by authority will be made to meet the non-complementary

