

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / No.: IMP-1082/3087/2023
माह / Month: September, 2023

THIS TEST REPORT VALID UP TO : 30th September, 2030



**JAMNA, JAISPW-3
TRACTOR (PTO) OPERATED WEEDER**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि एवं किसान कल्याण विभाग

Department of Agriculture and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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Page 1 of 19

7. LABORATORY TEST

7.1 Hardness:- The surface hardness of blade was recorded as given below:

The applicant has submitted a copy of test report No. 23/Mech./2809 dated: 06.07.2023 issued by Institute for Auto Parts & Hand Tools Technology (A unit of UNDP/UNIDO Assisted Punjab Government Project), A-9, Phase-V, Focal Point, Ludhiana-141010 (India) for the hardness of weeder blade. Hence, the hardness of blade was not analyzed at this institute. However, for the sake of information of reader, the excerpts from the test results of hardness of blade test is given from said report without correction.

Description	As per IS 6690:1981 (HRC)	Hardness as observed (HRC)	Remarks
Edge portion	53 to 59	54.66 (Average)	Conforms
On shank portion	37 to 45	44.66 (Average)	Conforms

7.2 Chemical composition:- The chemical composition of blade is tabulated as given below:

The applicant has submitted a copy of test report No. 2023/Chem./4693 dated: 06.07.2023 issued by Institute for Auto Parts & Hand Tools Technology (A unit of UNDP/UNIDO Assisted Punjab Government Project), A-9, Phase-V, Focal Point, Ludhiana-141010 (India) for chemical composition of weeder blade. Hence, the chemical composition of blade was not analyzed at this institute. However, for the sake of information of reader, the excerpts from the test results of chemical composition of blade test is given from said report without correction.

Constituents	As per IS 6690:1981			Composition as observed (% of weight)	Remarks
	Carbon Steel	Silicon Manganese steel	Boron steel 28MnCrB5		
Carbon (C)	0.70 -0.85	0.50-0.60	0.24 to 0.30	0.27	Conforms
Silicon (Si)	0.10 -0.40	1.50-2.00	0.40 to 0.21	0.21	Conforms
Manganese (Mn)	0.50 -1.0	0.50-1.00	1.10 to 1.40	1.27	Conforms
Sulphur (S)	0.05 (max.)	0.05 (max.)	0.030 to 0.014	0.014	Conforms
Phosphorous (P)	0.05 (max.)	0.05 (max.)	0.030 to 0.014	0.014	Conforms

*Power weeder blade conforms to Boron steel - 28 MnCrB5

8. FIELD TEST

The field tests were conducted for 26.50 hrs. All the field tests were conducted at the accelerator setting recommended for field operation. All the five tests were conducted in cotton crop in loam soil at village Amlala, SAS Nagar (Punjab). The summary of the field tests are given in Table-2 & Annexure -I

Crop parameters :

i)	Row to row distance, m	-	0.600 to 0.650
ii)	Height of crop, m	-	0.08 to 0.130
iii)	Type of weed	-	Seasonal weeds
iv)	Height of weed, mm	-	99 to 104

TABLE-2: Summary of field performance:-

i)	Tractor used	:	Swaraj 744 XT
ii)	Gear used	:	L-2
iii)	Type of soil	:	Sandy Loam
iv)	Soil moisture, %	:	15.7 to 16.6
v)	Speed of operation, kmph	:	3.67 to 4.06
vi)	Depth of cut, cm	:	7.2 to 8.1
vii)	Width of cut, m	:	1.73 to 1.75
viii)	Area covered, ha/h	:	0.527 to 0.578
ix)	Wheel slippage, %	:	-3.11 to -2.22
x)	Fuel consumption		
		l/h :	5.13 to 6.20
		l/h :	10.23 to 11.23
xi)	Weeding efficiency, %	:	87.30 to 92.10
xii)	Field efficiency, %	:	76.10 to 81.10
xiii)	PTO Power, kW	:	17.48

8.1 Rate of work:

The rate of work is assessed by the area covered during field operation. Area covered by the machine ranged from 0.527 to 0.578 ha/h at the speed of 3.67 to 4.06 kmph.

8.2 Quality of work:

Quality of work is assessed by the depth of cut in field operation and weeding efficiency which were observed from 7.2 to 8.1 cm & 87.30 to 92.10% respectively.

8.3 Wear of blades**8.3.1 Mass basis**

The wear of the rotary weeder blades was measured after 26.50 hrs of field operation and the observation are as under:

Sr. No.	Initial mass of blade (g)	Mass after 26.50 hrs. (g)	Loss of mass (g)	Percent wear (%)	Percent wear per hours
1.	1020	980	40	3.92	0.15
2.	1031	988	43	4.17	0.16
3.	1014	975	39	3.85	0.15
4.	1006	969	37	3.68	0.14
5.	998	957	41	4.10	0.15
6.	1024	981	43	4.20	0.16

9. EFFECTIVENESS OF SEALINGS

After completion of field test for 26.50 hrs. , The implement was dismantled to check effectiveness of sealing provided against ingress of dust in various sub-assemblies and decide the condition of components of the tractor (PTO) operated weeder.

Sr. No.	Location	Whether ingress of mud and/or water was observed
1.	Primary reduction gear box	No
2.	Secondary reduction chain & sprocket	No
3.	Hub of rotor assembly	No

10. EASE OF OPERATION, ADJUSTMENTS & SAFETY

- 10.1 Universal coupling shaft is provided with safety cover.
- 10.2 The tractor (PTO) operated weeder has the provision to adjust working width according to row crop spacing.

11. DEFECTS BREAKDOWNS AND REPAIRS

No defect observed during the test.

12. SPECIAL FEATURES

- 12.1 Tractor operated.
- 12.2 Overall width of weeder is adjustable according to crop spacing.

13. CRITICAL TECHNICAL SPECIFICATIONS

Vide Ministry's communication F. No. 13-9-2019 M&T (I&P) dated 26.04.2019.

Sr. No.	Parameters	Specifications	Observed	Remarks
1.	Type	Tractor mounted, PTO Powered	PTO powered	Conforms
2.	Working width (mm)	1500 (Min.)	1635	Conforms
3.	Type of blades	Hatchet/Straight/Curved/L type	L-Type	Conforms
4.	Material of blade	Boron steel 28 MnCrB5/ High Carbon steel EN42j	Boron steel	Conforms
5.	Hardness of material, HRC	38 (Min.)	54.66	Conforms
6.	Type of primary transmission	Gear	Gear	Conforms
7.	Type of secondary transmission	Gear/chain & sprocket	Gear	Conforms
8.	Material for rotor shaft	SAE 1045 (CRS)/ EN8/EN9	EN8	Conforms
9.	No. of flanges per row	2 (Min.)	02	Conforms

IMP – 1082/3087/2023	JAMNA, JAISPW-3 TRACTOR (PTO) OPERATED WEEDER (COMMERCIAL)
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10.	Type of flanges	Square/ circular/ rectangular	Circular	Conforms
11.	No. of blades in each flange	4 (Min.)	06	Conforms
12.	No. of rotor blade	8 (Min.)	36	Conforms
13.	Thickness of rotor blade (mm)	5 (Min.)	8.0	Conforms
14.	Material of blade	Boron steel 28 MnCrB5 EN42j	28 MnCrB5	Conforms
15.	Hardness of blade, HRC	38 (Min.)	54.66	Conforms
16.	Provision for shield/cover to prevent flying of mud & stone from rotor	Must be provided	Provided	Conforms
17.	Depth control mechanism	Must be provided	Provided	Conforms
18.	Marking/Labelling of machine	The labelling plate should be riveted on the body of machine having Name and address of manufacturer, Country of origin, Make, Model, Year of manufacture, Serial Number, Type, Size, Size of prime mover (kW)	Provided	Conforms
19.	Literature	Operator manual, service manual, parts catalogue should be provided.	Provided	Conforms

14. COMMENTS & RECOMMENDATIONS

- 14.1 The rate of work is assessed by the area covered during field operation. Area covered by the machine ranged from 0.527 to 0.578 ha/h at the speed of 3.67 to 4.06 kmph.
- 14.2 Quality of work is assessed by the depth of cut in field operation and weeding efficiency which were observed from 7.2 to 8.1 cm & 87.30 to 92.10% respectively.
- 14.3 The tractor (PTO) operated weeder has the provision to adjust working width according to row crop spacing.



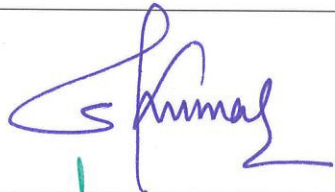

15. TECHNICAL LITERATURES

The following technical literatures were provided by the applicant during the field test:-

- (i) Operator's manual
- (ii) Service manual
- (iii) Parts catalogue

However, the manuals need to be updated as per IS 8132:1999.

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 15.09.2023

16. APPLICANT'S COMMENTS

No specific comments received from the applicant.

