

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: Machine-08/2475/2020

माह/Month : May, 2020

THIS TEST REPORT VALID UP TO : 31st May, 2025

FIRST BATCH TEST



**RICE TRANSPLANTER
KUBOTA NSP-4W
(SELF PROPELLED WALK BEHIND TYPE)**



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

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[ISO 9001:2015 CERTIFIED]

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		Rear	700*	300*
4	Head light	Centre	300*	310*
5	Gear shifting lever		500*	600*
6	Main clutch lever		500*	800*
7	Planting clutch lever	Transport lock	300*	700*
8	Accelerator lever		1300*	1500*
9	Planting arm shaft		1600*	400*
10	Quantity of seedling adjusting lever		1500*	1800*
11	Seedling tray carrier		1900*	2100*
12	Float	Left	600*	500*
		Middle	700*	400*
		Right	800*	300*
13	Engine mounting base		1000*	2400*

* Amplitude of mechanical vibration is on higher side.

10. TURNING ABILITY

Characteristics	LHS	RHS
Minimum turning diameter (m):	1.34	1.46
Minimum clearance diameter (m):	2.02	2.14

11. FIELD PERFORMANCE TEST

Field test were conducted for 36.07 hours. Field were Puddle by using tractor operated rotavator followed by leveler. Total six test trials were conducted in sandy soil. Conditions of test plot and nursery & the field performance results are given Annexure-I & Annexure-II and summarized in table-1 & table-2

Summary of condition of field and nursery

Table-1

Sl. No.	Parameters	Range
	Condition of field	
1	Type of soil	Sandy
2	Interval between last puddling and planting, hours	01
3	Depth of puddle, cm	12.9 to 14.7
4	Depth of standing water over puddle, cm	2.1 to 3.1
	Condition of nursery	
1	Variety of paddy	1401
2	Type of seed bed soil	Sandy
3	Area of each tray, m ²	0.140
4	Age of nursery, days	21 to 27
5	Leaf stage (no. of leaf)	2 to 3
6	Size of seedlings (thickness at base of root), mm	NR
7	Length of root (cm)	1.3 to 4.0

Summary of performance results

Table-2

Sl. no.	Parameters	Range
1	Average forward speed, kmph	2.12 to 2.54
2	Engine speed, rpm	
	No. load	3200 (full throttle)
	On load	3010 to 3031
3	Average depth of transplanting, cm	2.63 to 3.50
4	Average travel reduction (%)	-0.68 to 0.83
5	Average spacing between rows, cm	28.03 to 29.87
6	Average number of plants per hill (nos.)	8 to 16
7	Average spacing between hills, cm	18.33 to 22.67
8	Average total number of hills in 1 m ²	16.33 to 19.67
9	Percentages of transplanting faults (in 1 m ²)%	
	- missed hills	Nil to 2.0
	- Floating seedlings	Nil to 1.0
	- Buried seedlings	Nil to 0.67
	- Damaged seedlings	Nil to 0.67
	- Total transplanting fault %	0.67 to 3.00
10	Average area Covered ha/h	0.202 to 0.236
11	Time required to covered 1 ha (h)	4.24 to 4.95
12	Fuel consumption	
	- l/h	0.91 to 1.05
	- l/ha	3.85 to 4.90
13	Number of seedling trays consumed per ha	203 to 217

After loading the transplanter fully (full loading of the nursery on the seedling platform and carrier), the transplanting operation was done. Arrangements for loading the nursery mats was made at the ends of the plot. All the trials were conducted at the full accelerator setting of the engine as recommended by the applicant.

11.1 Rate of work

The average area covered and time required to cover one hectare area recorded as 0.202 to 0.236 ha/h and 4.24 to 4.95 h respectively at the forward speed of 2.12 to 2.54 kmph..

11.2 Quality of work

The quality of work was assessed by taking into consideration of the following parameters :-

- The average depth of transplanting was recorded as 2.63 to 3.50 cm.
- The spacing between row to row was recorded as 28.03 to 29.87 cm.
- The average number of plants per hill was recorded as 8 to 16.
- The average spacing between hills was recorded as 18.33 to 22.67 cm
- The average total number of hill in 1 m² was recorded as 16.33 to 19.67
- The average percentage of missing hills was recorded as Nil to 2.0%
- The average percentage of floating seedlings was recorded as Nil to 1.00
- The average percentage of buried seedlings was recorded as Nil to 0.67
- The average percentage of damaged seedlings was recorded Nil to 0.67
- The total percentage of transplanting faults was recorded as 0.67 to 3.00



11.3 Fuel consumption

The hourly fuel consumption was recorded as 0.91 to 1.05 l/h and fuel required for planting of one hectare area was recorded as 3.85 to 4.90.

11.4 Labour requirement

One skilled operator's is required for continuous operation of machine. One person is required for feeding nursery mats to machine and two persons for handling the nursery trays.

11.5 Ingress of water and/or mud

After completion of field tests, the transplanter was partially dismantled to check the effectiveness of sealing provided against ingress of water and / or mud in various assemblies / components.

S. No.	Locations	Whether ingress of mud and / or water was observed
1	Engine oil	No
2	Main gear box	No
3	Planting gear box	No
4	Planting arm drive	No
5	Hydraulic system	No
6	Drive wheel chain case	No
7	Planting arms	No

12. EASE OF OPERATION AND ADJUSTMENT

No noticeable difficulties were observed in operation and adjustment during the test period.

13. DEFECTS AND BREAKDOWNS

Breakdown			Machine Run Hours
No noticeable difficulties were observed in operation and adjustment during the test period. However on one occasion during the field test, due to invisible, inappropriate field conditions the machine got deep down into the field. On the request of applicant vide letter No KAI/HSR/NSP4W-batch/05, dated 13.07.2019 permission was granted to replace the following parts.			8.38 h
Sr. No	Parts	Parts No.	
1.	Head gasket	LEP02-00630	
2.	Fuel filter	PG001-88510	
3.	Spark plug	LEP02-00300	
4.	Air cleaner sponge (Element)	LEP02-01570	
5.	Carburetor	LEP02-02402	
6.	Engine oil change	Kubota gasoline oil (SAE 10 W 30), 625 ml.	



15. CRITICAL TECHNICAL SPECIFICATION

Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020-M&T, (I&P) dated 24.04.2020

16. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS**16.1 Engine rating test**

- The average rated power in rating test of engine was observed as 2.67 kW at 3003 rpm against manufacturers declared power as 2.39 kW at 3000 rpm.
- The specific fuel consumption at average rated power in rating test was observed as 370 g/kWh.

Governing test

- Momentary speed change in percentage of rated speed was observed as 7.48.
- Permanent speed change in percentage of rated speed was observed as 7.05

16.2 Noise Level

Noise level at operator's ear level was recorded as 82 dB(A), and noise level at bystander level was recorded 72 dB (A). which is well within the maximum and danger limit of 85dB(A)/ 90 dB(A) respectively specified for contineous exposure of 8 hours.

16.3 Mechanical Vibration

The aplitude of mechanical vibration marked as (*) on the relevant chapter are on drasficlly 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.

16.4 Field Test

The summery of field test is given chapter 12 of this report.

16.5 Components / assembly inspection

16.5.1 The engine was dismantled after 67.19 hours of operation and wear of critical components were observed to be within the limits.

16.5.2 The main gear box, planting box, planting arm drive mechanism and bearings were dismantled after 36.87 hours of operation and found in satisfactory working condition.

16.6 Safety Provisions

The machine has the following safety provisions.

- A front bumper.
- Front and rear bonnet above the engine and gear box.
- Drive belt protective covers.
- A slip clutch (torque limiter) inside the planting arm case to protect the planter drive mechanism.
- A jump clutch provided at the end of propeller shaft for planting case drive.

16.7 Ease of operation and adjustments

- All the controls, which are required to be used frequently are within the easy reach of the operator.
- The handling of machine was easy and stable and the operator can work continuously for about two hours.
- The planting depth, hill spacing and number of seedling per hill can be adjusted quickly.

- The seedling carrier is provided just above the engine for holding nursery trays. If the carrier is loaded fully with mat trays operator's vision was obstructed.
- No other operational difficulty was noticed during the operation of the transplanter even in the smaller fields.
- One touch hydraulic swing system is provided to enable the operator to cross over the bunds and while turning the machine (even with full load) in the field.
- The machine is fitted with rubberized steel wheels and is stable in the field as well as on the road transportation.
- Two folding type markers are provided and can be operated by the operator while planter is in motion. One centre marker at bonnet is provided to guide the operator to drive planter in straight direction.
- The machine is provided with reverse field speed so that planting at corners / missing area can easily be done

16.8 General Comments

- Make & model of Hydraulic pump is not specified. It should be looked into.
- Maximum permissible wear limit of Piston ring side clearance is specified. It **Must** be specified.
- Valve spring stiffness is not specified. It should be looked into.
- Horn is not provide. It should be provided.

16.9 The particulars provided on the marking/labeling plate are not adequate. It is therefore recommended to provide the following terms.

- I. Make
- II. Model
- III. Serial No.
- IV. Year of manufacture
- V. Manufacture's address
- VI. Engine No.
- VII. Country of origin
- VIII. Size
- IX. Required size of prime mover kW/hp

17. TECHNICAL LITERATURE

The following literatures are provided by the manufacturer.

- i. Operator's manuals
- ii. Illustrated parts list
- iii. Workshop manual
- iv. Comparison specification of Transplanter



The operator's manual of machine should be updated as per IS:8132:1999



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18.2.4	Mechanical vibration		
	Maximum amplitude of vibration at (microns)		
	Gear shifting lever	143	600
	Steering handle	86	310
	Main clutch lever	108	800
	Planting clutch lever	117	700
	Accelerator lever	85	1500
	Quantity of seedling Adjusting lever	39	1800
18.2.5	Adequacy of literature	Work shop manual, operator's manual	Operator's manual Illustrated parts list, workshop manual, Comparison specification sheet

TESTING AUTHORITY

RINKU PRASAD GUPTA TECHNICAL ASSISTANT	
P.K. PANDEY DIRECTOR	

Test report compiled by C. Veeranjanyulu, Senior Technician

19. **APPLICANTS COMMENTS**

