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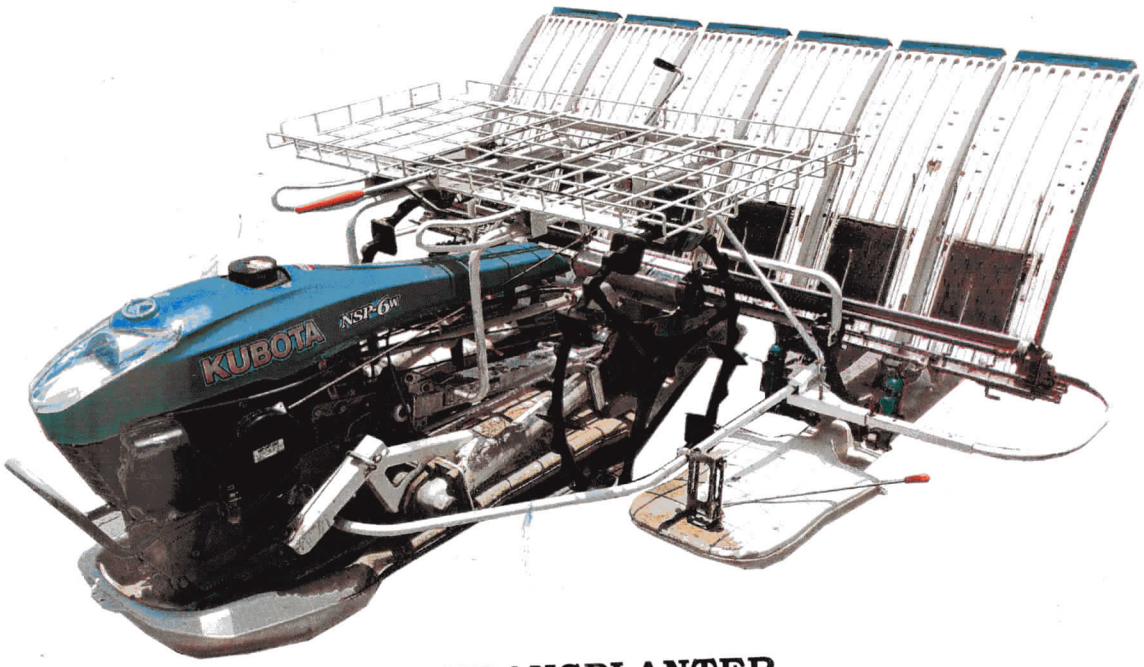
व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: Machine-09/2476/2020
माह/Month: May, 2020

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

FIRST BATCH TEST



RICE TRANSPLANTER
KUBOTA NSP-6W
(SELF PROPELLED WALK BEHIND TYPE)

सत्यमेव जयते

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
Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001
[ISO 9001:2015 CERTIFIED]

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E-mail: fmti-nr@nic.in

10. TURNING ABILITY

Characteristics	LHS	RHS
Minimum turning diameter (m):	1.34	1.34
Minimum clearance diameter (m):	3.06	3.12

11. FIELD PERFORMANCE TEST

Field test were conducts for 36.15 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	9.5 to 15.2
4	Depth of standing water over puddle, cm	2.7 to 3.5

	Condition of nursery	
1	Variety of paddy	1401
2	Type of seed bed soil	Sandy
3	Area of each tray, m^2	0.162
4	Age of nursery , days	21 to 27
5	Leaf stage (no. of leafs)	2 to 3
6	Size of seedlings (thickness at base of root), mm	NR
7	Length of root (cm)	2.0 to 4.1

Summary of performance results

Table-2

Sl. no.	Parameters	Range
1	Average forward speed, kmph	1.81 to 2.37
2	Engine speed, rpm No. load On load	 3560 3442 to 3462
3	Average depth of transplanting, cm	2.5 to 3.4
4	Average travel reduction (%)	- 0.46 to 4.43
5	Average spacing between rows, cm	28.5 to 29.7
6	Average number of plants per hill (nos.)	7 to 17
7	Average spacing between hills, cm	19.0 to 20.8
8	Average total number of hills in 1 m^2	17.0 to 20.3

9	Percentages of transplanting faults (in 1 m^2)%	
	- missed hills	0.00 to 3.00
	- Floating seedlings	0.00 to 2.00
	- Buried seedlings	0.00 to 2.00
	- Damaged seedlings	0.00 to 1.0
	- Total transplanting fault %	1.67 to 5.67
10	Average area Covered ha/h	0.283 to 0.323
11	Time required to covered 1 ha (h)	3.09 to 3.53
12	Fuel consumption	
	- l/h	0.99 to 1.12
	- l/ha	3.20 to 3.60
13	Number of seedling trays consumed per ha	160 to 183

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 0.283 to 0.323 ha/h and 3.09 to 3.53h respectively at the forward speed of 1.81 to 2.37 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 2.5 to 3.4 cm.
- The spacing between row to row was recorded as 28.5 to 29.7 cm.
- The average number of plants per hill was recorded as 7 to 17.
- The average spacing between hills was recorded as 19.0 to 20.8 cm
- The average total number of hill in 1 m^2 was recorded as 17.0 to 20.3
- The average percentage of missing hills was recorded as 0.00 to 3.0%
- The average percentage of floating seedlings was recorded as 0.00 to 2.00
- The average percentage of buried seedlings was recorded as 0.00 to 2.00
- The average percentage of damaged seedlings was recorded 0.00 to 1.00
- The total percentage of transplanting faults was recorded as 1.67 to 5.67

11.3 Fuel consumption

The hourly fuel consumption was recorded as 0.99 to 1.12 l/h and fuel required for planting of one hectare area was recorded as 3.20 to 3.60

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 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 diffculties were observed in operation and adjustment during the field test.

13. BREAKDOWNS AND REPAIRS

No noticeable defect or breakdown was observed during test.

14. COMPONENTS / ASSEMBLY INSPECTION

The engine was dismentled after 49.57 hours and the transplanter was dismentled after 36.87 hours of operation at this institute.

14.1 Engine

I. Cylinder Bore

Cylinder	Cylinder bore dia (mm)						Max. Permissible wear limit (mm)
	Top position		Middle positon		Bottom position		
	Thrust side	Non Thrust side	Thrust side	Non Thrust side	Thrust side	Non Thrust side	
1	66.03	66.02	66.03	66.03	66.03	66.02	66.15

II. Piston

Piston no.	Piston dia (mm)				Piston liner side clearance observed, mm	Max. Permissible wear limit (mm)
	At top		At skirt			
	Thrust side	Non Thrust side	Thrust side	Non Thrust side		
1	65.71	65.68	65.98	Not measured due to piston design constraint	0.05	65.9

14.3 Planter

The gears of the main gear box, planting box and planting mechanism, seedling tray oscillating mechanism, chain cases and planting arms were dismantled and inspected visually. The observations are as under :-

14.3.1 Main & planting gear box

The transmission gears, bearings and shafts were visually inspected and found no abnormal wear or damage of components was noticed. All components were found in satisfactory working condition.

14.3.2 Planting arms

All the four planting arms were dismantled and inspected visually. The arms , cams, bearings, springs and rod were found in normal working condition.

14.3.3 Seedling platform

The seedling platform were visually inspected and found in normal working condition.

14.3.4 Chain case and wheels

The chain cases of drive wheels were visually inspected. The chains, sprockets and bearings were found in normal working condition.

14.3.5 Floats

All the three floats were examined visually for cracks, punctures, etc and found in satisfactory working condition. No mud or water entered inside the floats.

14.3.6 Hydraulic system

All components of hydaulic system was inspected visually and found to be in satisfactory working condition.

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 3.02 kW at 3202 rpm against manufacturers declared power as 3.30 kW at 3200 rpm.
- The specific fuel consumption at average rated power in rating test was observed as 341 g/kWh.

Governing test

- Momentary speed change in percentage of rated speed was observed as 11.68.
- Permanent speed change in percentage of rated speed was observed as 11.53

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) respectivelly specified for contineous exposure of 8 hours.

16.3 Mechanical Vibration

The aplitude of mechanical vibration marked as (*) on the relevant chapter are on drasfically 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 49.57 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 37.80 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 not 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. Size
VIII. 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

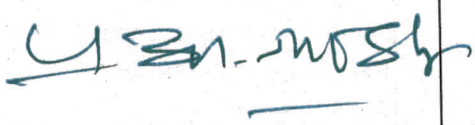
The operator's manual of machine should be updated as per IS:8132:1999

18. COMPARISON WITH SPECIFICATION AND PERFORMANCE CHARACTERISTICS OF PREVIOUS SAMPLE (Test Report No. Imp-687/1668, November, 2014 of NRFMT&TI, Hisar and PRESENT SAMPLE,

SI No.	Parameter		Previous Sample	Present Sample
1	2		3	4
18.1	**Specification:**			
18.1.1	**Rice transplanter**			
	Manufacturer	:	M/s Kubota Agricultural Machinery (Suzhow) Co. Ltd. (KAMS) 77 Uhong East Road, Industrial Park, Suzhou, Jiangsu-215026, Peoples Republic of China	M/s. Kubota Agricultural machinery (Suzhou) Co. Ltd. , (KAMS) 77, Suhong East Road, Industrial Park, Suzhou, Jiangsu-215026, Peoples Republic of China.

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. Veeranjaneyulu, Senior Technician

19. APPLICANTS COMMENTS