

व्यावसायिक परीक्षण रिपोर्ट

संख्या/ No.: Machine-40/2762/2021

COMMERCIAL TEST REPORT (FIRST BATCH)

माह/Month: October, 2021

THIS TEST REPORT VALID UP TO : 31st October, 2026



**KUBOTA, SPV6MD, SELF PROPELLED
RIDE ON TYPE RICE TRANSPLANTER**



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

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11. TURNING ABILITY

Direction	Minimum turning circle diameter (m)	Minimum turning space diameter (m)
LHS	3.58	5.30
RHS	3.56	5.24

12. FIELD PERFORMANCE TEST**12.1 Raising Nursery**

The mat type nursery used in the Rice Transplanter was prepared over a leveled field after spreading a thin polythene sheet. The procedure as recommended by the applicant is given below.

12.2 Preparation of seeds

The healthy seeds of PR-121 variety were selected for growing the nursery. After thorough cleaning, seeds were soaked in water for 12 hours. Floating seeds were removed and only healthy seeds were covered in moist gunny bags for 24 hours to promote the uniform germination.

12.3 Preparation of seed bed

Seed bed was prepared on the leveled ground after removing all the stones, stubbles present in the field. The sandy loam soil excavated from nearby field was crushed, sieved and mixed with Farm Yard manure in 5:1 proportion.

Thin polythene sheet (strips, 1.2 × 20 m) were laid down over leveled bed. The MS frame with 580 × 280 × 3 mm size were placed over the polythene sheets and filled by the mixture of soil up to top, followed by compacting and leveling.

Then, sprouted seeds were broadcasted uniformly over the prepared seed-bed and covered with a thin layer of soil, followed by a thin cover of paddy straw. Watering twice a day was done for its irrigation, first by sprinkling (through cans) and after the germination by flooding the bed.

The nursery mats in size of 580 × 280 mm were removed after cutting the intermingled roots by a knife from the bed marked with the help of MS frame. After cutting, the nursery was transported in trays up to the planting site.

12.4 Preparation of field for transplanting

Fields were puddled by using rotavator. Transplanting was done after proper settling of soil. Condition of field and nursery is given in Annexure II and summarized in Table - 2.

Table-2

Sl. No.	Parameters	Range
Condition of field		
1	Type of soil	Sandy loam
2	Interval between last puddling and planting, h	24
3	Depth of puddle, cm	17 to 28
4	Depth of standing water over puddle, cm	2 to 7
Condition of nursery		
1	Variety of paddy	PR-126
2	Type of seed bed soil	Medium (mixture of sandy loam cow dung)

3	Average area of nursery mat, m ²	0.151 to 0.160
4	Size of nursery tray/mat, mm	550 × 280 to 570 × 280
5	Age of nursery, days	23 to 26
6	Leaf stage (no. of leaves)	4
7	Thickness of mat at root, mm	22 to 27
8	Height of seedlings, cm	10 to 23
9	Length of root, cm	3.0 to 9.6
10	Quality of germination of the nursery	Fairly uniform but having some thin patches due to improper germination.

12.5 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.

12.5.1 Transplanting

The machine was operated for 37.05 hours in field and 06 test trials were conducted in sandy loam soil. The detailed results are given in Annexure-III and summarized in Table-3.

Table-3

Sl. No.	Parameters	Range
1	Average forward speed, kmph	2.85 to 3.77
2	Engine speed, rpm	No. load 3450
3	Average depth of transplanting, cm	5.5 to 7.5
4	Average spacing between rows, cm	29.5 to 29.9
5	Average number of plants per hill (nos.)	2 to 7
6	Average spacing between hills, cm	17.7 to 17.9
7	Average total number of hills in 1 m ²	24
8	Transplanting faults in 1 m²	
	- Missed hills	0.33 to 0.67
	- Floating seedlings	0 to 0.67
	- Buried seedlings	0 to 0.33
	- Damaged seedlings	0 to 0.67
	- Total	1.33
9	Average area planted, ha/h	0.273 to 0.414
10	Time required to plant, h/ha	2.42 to 3.66
11	Fuel consumption	- l/h 2.44 to 3.08 - l/ha 6.46 to 9.63
12	Number of seedling tray consumed per ha	188 to 211

12.6 Field performance results

12.6.1 Rate of work

The average forward speed of operation was observed as 2.85 to 3.77 kmph. The average area covered was recorded as 0.273 to 0.414 ha/h. and time required to cover one hectare was observed from 2.42 to 3.66 h.

12.6.2 Quality of work

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

- The average depth of transplanting was recorded as 5.5 to 7.5 cm.
- The spacing between rows was recorded as 29.5 to 29.9 cm.
- The average number of plants per hill was recorded as 2 to 7.
- The average spacing between hills was recorded as 17.7 to 17.9 cm.
- The average total number of hill in 1 m² was recorded as 24
- The average number of missing hills in 1 m² was recorded as 0.33 to 0.67.
- The average number of floating seedlings in 1 m² was recorded as 0 to 0.67
- The average number of buried seedlings in 1 m² was recorded as 0 to 0.33.
- The average number of damaged seedlings in 1 m² was recorded as 0 to 0.67
- The total transplanting faults was recorded as 1.33.
- The average number of tray consumed was recorded as 188 to 211 per ha.

12.6.3 The hourly fuel consumption was recorded as 2.44 to 3.08 l/h and fuel required for planting of one hectare area was recorded as 6.46 to 9.63 l/ha.

12.6.4 Labour requirement

One skilled operator is required for continuous operation of machine. One helper for handling and loading nursery mat on trays which is already kept on field bund is required.

12.6.5 Operator's comfort, safety and ease of operation

- a. No noticeable difficulty was observed during test.
- b. All controls are labeled, easily identifiable and within the easy reach of the operator except the main shift lever and differential lock.
- c. Adjustments for hill spacing, taking quantity, planting depth, nursery feed seedling feed stopping provided.
- d. Fit sensor to adjust sensitivity for vertical movement of planting portion accordance with condition of field surface is provided.
- e. Hydraulic lock to prevent the planting portion from being lowered is provided.
- f. Automatic leveling control is provided to adjust and maintain the planting portion (seeding platform) in a horizontal position while planting in uneven fields.
- g. All the moving parts are adequately guarded.
- h. Safety warnings and caution notices are provided on machine.
- i. Torque limiter to stop the transplanting system, in case of obstruction to the fingers during operation is provided.

12.6.6 After completion of field tests, the transplanter was partially dismantled to check effectiveness of sealing provided against ingress of water and / or mud in various assemblies/component and the following observations were recorded.

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

14.2.5 Floats

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

14.2.6 Hydraulic system

All components of the main and lateral feeding speed control hydraulic systems were inspected visually and found to be in normal working condition.

15. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS**15.1 Engine Performance Test**

Brake power, kW	Crank shaft torque, Nm	Crank shaft speed, rpm	Specific fuel consumption, kg/kWh	Specific energy, kWh/l
Maximum power two hours test				
12.40	36.91	3200	0.275	2.97
12.11	36.02	3202	0.278	2.94*
Power at rated engine speed (3200 rpm)				
12.40	36.91	3200	0.275	2.97
12.11	36.02	3202	0.278	2.94*

* Under high ambient condition

- The maximum power of engine was recorded as 12.40 kW at 3200 rpm against manufacturer's declaration of 14.4 kW.
- The specific fuel consumption corresponding to maximum power was recorded as 0.275 kg/kWh.
- The maximum torque of the engine was recorded as 40.84 Nm.
- The back-up torque of engine was recorded as 10.64% in natural ambient condition which is normal.

15.2 Noise Level

Noise level at operator's ear level was recorded as 83.9 dB(A), which is within the danger limit of 90 dB(A) & more than warning limit of 85 dB(A), specified for continuous exposure of 8 hours. It should be looked into.

15.3 Mechanical Vibration

The amplitude of mechanical vibration on the controls and components marked as (*) are more than 100 microns. It should be looked into for dampening down the vibration to improve service life of components & operators comfort.

15.4 Field Test

15.4.1 The transplanter was operated in varying field conditions for a total period of 36.4 hours for transplanting 'PR-121' variety of paddy seedlings. The results are summarized as under.

- The average depth of transplanting was recorded as 5.5 to 7.5 cm.
- The spacing between row to row was recorded as 29.5 to 29.9 cm.
- The average number of plants per hill was recorded as 2 to 7.
- The average spacing between hills was recorded as 17.7 to 17.9 cm.
- The average total number of hill in 1 m² was recorded as 0.33 to 0.67 in 1 m².
- The missing hills was recorded in 1 m² as 0.33 to 0.67 in 1 m².
- The floating seedlings was recorded in 1 m² as 0.33 to 0.67 in 1 m².
- The buried seedlings was recorded in 1 m² as 0.33 in 1 m².
- The total transplanting faults was recorded in 1 m² as 1.33.

- The hourly fuel consumption was recorded as 2.44 to 3.08 l/h and fuel required for planting of one hectare area was recorded as 6.46 to 9.63 l/ha.
 - Time required to cover one hectare 2.42 to 3.66 h/ha.
 - The average area covered was recorded as 0.273 to 0.414 ha/h.
- 15.4.2** The quality of work was observed as satisfactory during entire transplanting operation. Overall performance of the machine was found satisfactory.
- 15.5 Components / assembly inspection**
- 15.5.1** The engine was dismantled after 86.88 hours of operation and wear of critical components were observed to be within the limits and in normal condition.
- 15.6 Safety Provisions**
The machine has the following safety provisions.
- Drive & moving parts are adequately protected.
 - A slip clutch (torque limiter) at planting arm is provided to protect the planter drive mechanism.
 - Warning and caution notices are provided on machine.
- 15.7 Ease of operation and adjustments**
- All the controls, which are required to be used frequently are within the easy reach of the operator.
 - No noticeable difficulty was observed during handling of machine.
 - The planting depth, hill spacing and number of seedling per hill can be adjusted.
 - The seedling carriers are provided on both side (i.e. LHS & RHS) of operator for holding nursery trays.
 - Main shift lever & differential lock pedal is not labeled.
- 15.8 Labour requirement**
A trained operator is required for efficient operation of the machine. One helper is required for handling and loading of mats.
- 15.9 Literature**
The manufacturer has provided following literature with the machine for reference during test.
- 1) Operator's manual, SPV6MD (English)
 - 2) Workshop manual, SPV6MD (English)
 - 3) Illustrated parts list, SPV6MD (English)
- The literature provided are found adequate, however, it is recommended to develop the literature in Hindi as well as other regional languages for users.



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

5.1	General	Previous sample tested vide test report no. IMP- 687/1668, November, 2014	Present sample
	Name and address of manufacturer :	M/s Kubota Agricultural Machinery, (Suzhou) Co. Ltd., (KAMS)	M/s Kubota Agricultural Machinery, (Suzhou) Co. Ltd., (KAMS)

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16.19	Nursery tray		
	Material	:	Plastic
	Dimensions, mm		
	Length	:	600
	Width	:	300
	Depth	:	27.5
			Bottom surface of tray is provided with the hole of 3.8 mm dia. at the distance of 19 mm.
			Bottom surface of tray is provided with the hole of 3.8 mm dia. at the distance of 19 mm.
16.20	Nursery placement scraper		
	Material	:	Plastic
	Dimensions, mm		
	Length	:	615
	Width	:	28
	Thickness	:	2.0 & 5.7

TESTING AUTHORITY

G.R. AMBALKAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 28-10-2021

Test report compiled by Sh. V.S Shinde, Senior Technical Assistant

17. APPLICANT'S COMMENTS

No specific comments received by the applicant.

