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व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / No. : IMP-627/1553
माह / Month: December, 2013



**SELF PROPELLED RIDE ON
RICE TRANSPLANTER
"KUBOTA-NSPU 68 CMD"**



सत्यमेव जयते

भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

**GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & COOPERATION)**

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
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**NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE TRACTOR NAGAR,
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14.2.1 Main & planting gear box

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

14.2.2 Planting arms

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

14.2.3 Seedling holders & platform

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

14.2.4 Chain case of planting unit

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

14.2.5 Floats

All the three floats and its linkages were examined visually for cracks, punctures, damage, etc and found in satisfactory working condition.

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 (Ps)	Crank shaft torque Nm (kgf-m)	Crank shaft speed (rpm)	Specific fuel consumption kg/kWh (kg/hph)	Specific energy kWh/l (hph/l)
Maximum power two hours test				
11.8(16.0)	37.7(3.8)	3000	0.269(0.198)	3.104(4.220)
11.7(15.9)	36.5(3.7)	3050	0.269(0.198)	3.086(4.196)*
Power at rated engine speed (3000 rpm)				
11.9(16.2)	37.9(3.9)	3000	0.269(0.198)	3.095(4.208)
11.7(15.9)	37.9(3.8)	3000	0.271(0.199)	3.086(4.195)*
Maximum torque				
11.3(15.4)	40.7(4.2)	2650	0.262(0.193)	3.173(4.314)
11.0(15.0)	40.5(4.1)	2600	0.264(0.194)	3.131(4.257)*

* Under high ambient condition.

- The maximum power of engine was recorded as 11.8 kW (16.0 Ps) at 3000 rpm against manufacturer's declaration of 12.7 kW (17.3 Ps) which is less by 7.09 % under natural ambient condition.

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- The specific fuel consumption corresponding to maximum power was recorded as 0.269 kg/kWh (0.198 kg/hph) under natural ambient condition.
- The maximum torque of the engine was recorded as 40.7(4.2) Nm (kgf-m) corresponding to 2650 engine rpm under natural ambient atmospheric condition.
- The back up torque of engine was recorded as 7.39% under natural ambient condition.
- The maximum lubricating oil temperature was recorded as 107 °C under high ambient condition which is well within the manufacturer declared limit of 135°C.

15.2 Noise Level

Noise level at Bistander/operator's ear level was recorded as 82.7/92.7 dB(A), which are well within the maximum limit of 88 dB(A)/ 98 dB(A) respectively, specified for continuous exposure of 8 hours.

15.3 Mechanical Vibration

The amplitude of mechanical vibration on all the controls and components are measured with (*) or on higher side and needs to be provided with dampening arrangements of the vibration.

15.4 Field Test

15.4.1 The transplanter was operated in varying field conditions for a total period of hours for transplanting 'PR-113 & PR-114' variety of paddy seedlings. The results are summarized as under.

- The average depth of transplanting was recorded as 2.92 to 4.0 cm.
- The variation from mean of average depth of transplanting was recorded as 1.16 to 15.61 percent.
- The spacing between row to row was fixed as 30.0 cm.
- The average number of plants per hill was recorded as 2 to 9.
- The average spacing between hills was recorded as 14.3 to 20.7cm
- The % variation from mean of spacing between hills was recorded as 5.71 to 18.29.
- The average total number of hill was recorded as 20 to 28/ m².
- The % variation from mean of total number of hill was recorded as 4.17 to 16.67/ m².
- The average number of missing hills was recorded in as 0.33 to 1.67/ m²
- The average number of floating seedlings was recorded in as Nil to 1.0/ m²
- The average no. of buried seedlings was recorded in 1 m² as Nil/ m²



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- The total number of transplanting faults was recorded in 1 m² as 1.00 to 2.00.
- The hourly fuel consumption was recorded as 2.0 to 2.20 l/h and fuel required for planting of one hectare area was recorded as 4.45 to 5.26ha/h
- Area coverage was recorded as 0.38 to 0.48 ha/h
- Time required to cover one hectare 2.08 to 2.63 h/ha.

15.4.2 During the entire field operation, no overloading of the engine was noticed.

15.4.3 The quality of puddling, uniformity in leveling of the field. Depth of standing water on puddled, uniformity of the nursery mats and presence of weeds remains in the puddle soil affect the performance of the planter to a great extent.

Therefore; to obtain best results from the machine, it is necessary to have the field well puddled and settled (for 2-3 days) with 2-4 cm depth of standing water.

15.4.4 The number of missing hills per square meter area is attributed mainly to the non uniform germination of nursery mat.

15.4.5 The quality of work was observed to be smooth during entire transplanting operation and overall performance of the machine was found satisfactory.

15.5 Components / assembly inspection

15.5.1 The engine was dismantled after 47.67 hours of operation and wear of critical components were observed to be within the max limits, with reference to the declared value by the manufacturer.

15.6 Safety Provisions

The machine has the following safety provisions.

- Bonnet above the engine and gear box.
- Drive belt protective covers.
- A slip clutch (torque limiter) at planting arm is provided to protect the planter drive mechanism.

15.7 Ease of operation and adjustments

- All the controls, which are required to be used frequently, are marked with international symbols used for agricultural machinery and 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.

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- The seedling carriers are provided on both side (i.e. LHS & RHS) of operator for holding nursery trays. If the carrier is fully loaded with mat trays operator’s vision is obstructed.
- A hydraulic system is provided to lift the seedling platform so as to enable the operator to cross over the bunds and while turning the machine (even with full load) in the field.
- Four wheel drive is provided for field work.
- Integral power steering is provided for easy working of operator.
- No other operational difficulty was noticed during the operation of the transplanter even in the smaller fields.

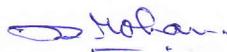
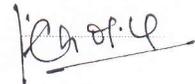
15.8 Labour requirement

A trained operator is required for efficient operation of the machine. One helper is required for safe handling and loading of mats.

15.9 Literature

The manufacturer had provided work shop manual, parts catalogue and the operator’s manual with the machine printed in English language. The literature provided is found to be adequate for guidance of the users and services personnel. However, it is recommended to develop this literature as per 8132:1983 in Hindi & other Indian regional language for the guidance of users & technicians.

TESTING AUTHORITY

(R. M. TIWARI) ASSISTANT ENGINEER (W/S)	
(P. K. CHOPRA) SENIOR AGRICULTURAL ENGINEER	
(HIMAT SINGH) - DIRECTOR -	



:: Test report compiled by B.N. Dixit, (Sr. Tech. Asstt.)

APPLICANTS COMMENTS

No specific comment was received