व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / **No. : IMP-687/1668/2014**
माह / **Month: November, 2014**

RICE TRANSPLANTER
'KUBOTA-NSP 6W'
(SELF PROPELLED-WALKING TYPE)

सत्यमेव जयते

भारत सरकार
कृषि मंत्रालय
(कृषि एवं सहकारिता विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & COOPEARATION)

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14.2.6 Hydraulic system

All components of the main and lateral feeding speed control hydraulic systems were inspected visually and found 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				
3.18 (4.32)	9.5 (0.97)	3200	0.339 (0.250)	2.169 (2.947)
Power at rated engine speed (3200 rpm)				
3.12 (4.24)	9.3 (0.95)	3200	0.348 (0.256)	2.115 (2.875)
Maximum torque				
2.51 (3.41)	10.0 (1.02)	2400	0.324 (0.238)	2.276 (3.092)

- The maximum power kW(Ps) of eninge was recorded as 3.18 (4.32) at 3200 rpm againsts manufacturer's declared power of 3.3 (4.5) Ps, as observed which is within limit.
- The specific fuel consumption kg/kWh (kg/hph) corresponding to maximum power was recorded as 0.339 (0.250) which is higherside that of the declared value of 0.299 (0.220).
- The maximum torque N-m (kgf-m) of the engine was recorded as 10.0 (1.02)
- The back up torque of engine was recorded as 7.53% which is wihin limit.
- The maximum lubricating oil temperature was recorded as 120 ^{0}C which is considered to be normal against the manufacturer declared limit of 150^{0}C.

15.2 Noise Level

Noise level at operator's ear level was recorded as 84.1 dB(A), and noise level at bistander level was recorded 74.2 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.

15.3 Mechanical Vibration

The amplitude of mechanical vibration on all the controls and components are more than 100 microns.

15.4 Field Test

15.4.1 The transplanter was operated in varying field conditions for 36.61 hrs. (including 1.17 h as running in) hours to tranplant 'PUSA-123, PUSA-114 & PR-144' veriety of paddy seedlings. The results are summarized as under.

- The average depth of transplanting was recorded as 2.33 to 4.95 cm.
- The variation from mean of average depth of transplanting was recorded as 12.53 to 22.56 percent.
- The spacing between row to row was recorded as 29.60 to 29.95 cm.

- The coefficient variation in row spacing from the fixed setting of 300 mm was observed as 0.93 to 2.11%.
- The average number of plants per hill was recorded as 1 to 7.
- The average spacing between hills was recorded as 17.15 to 17.80 cm.
- The percentage variation from mean of spacing between hills was recorded as 1.97 to 4.95%
- The average total number of hill per square meter was recorded as 26.10 to 27.10
- The percentage variation from mean of total number of hill per square meter was recorded as 2.73 to 7.55%
- The percentage of missing hills was recorded as 3.21 to 6.43% per square meter area.
- The percentage of floating seedlings was recorded per square meter as Nil.
- The percentage of buried seedlings was recorded per square meter as Nil
- The percentage of damaged seedlings was recorded per square meter as Nil to 0.71.
- The total number of transplanting faults was recorded as 3.21 to 6.78 per square meter
- The hourly fuel consumption was recorded as 0.704 to 0.898 l/h and fuel required for planting of one hectare area was recorded as 2.708 to 3.508.

15.4.2 During the field operation, at no stage any momentary overloading of the engine was noticed.

15.4.3 The quality of puddling, uniformity in leveling of the field. Standing water over puddle, uniformity of the nursery mats and presence of weeds remained in the puddle soil affected the performance of the planter to a great extent.

To obtain best results from the machine, it is necessary to have the field well puddled and subsequently allow to settle for 2-3 days field 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 overall performance of the machine was found satisfactory.

15.5 Components / assembly inspection

15.5.1 The engine was dismantled after 72.36 hours of operation and wear of critical components were observed to be within the limits.

15.6 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.

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.
- 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.

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.

16. LITERATURE

The manufacturer had provided work shop manual 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 in Hindi & other Indian regional language to meet the regional requirement.

TESTING AUTHORITY

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17. APPLICANTS COMMENTS

No specific comments received from applicant.