व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT (ICT)

संख्या / No. : IMP-766/1802/2015
माह / Month: December, 2015

ROTAVATOR
FIELDKING, FKDRTMG-175

सत्यमेव जयते

भारत सरकार
कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE & FARMERS WELFARE
(DEPARTMENT OF AGRICULTURE, COOPERATION & FARMERS WELFARE)

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सत्यमेव जयते
पुस्तकालय
हिसार

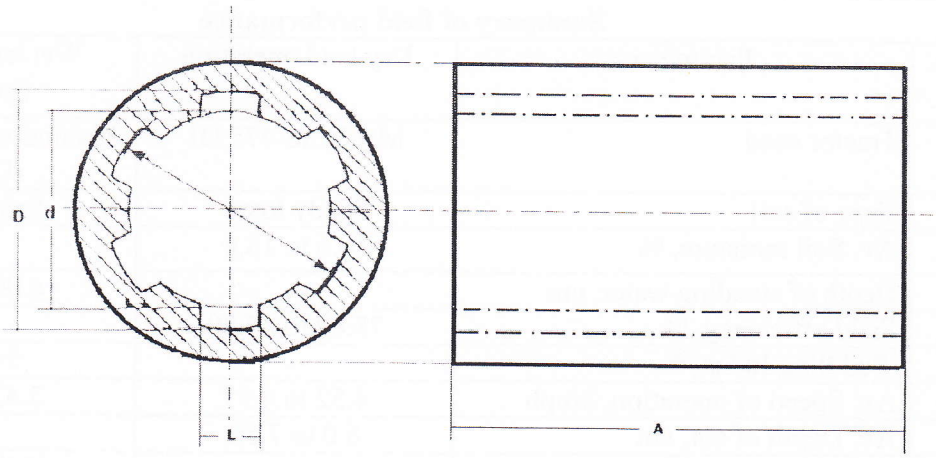

FIG. 5 PROPELLER HUB SHAFT

5. LABORATORY TEST

5.1 The hardness of blades was determined at edge and shank portion. The results of hardness test are tabulated in Table-I.

TABLE-1

Description	As per IS:6690:1981 (HRC)	Hardness as observed (HRC)	Remarks
Edge portion	53 to 59	47.4 to 48.8	**Does not conform**
On shank portion	37 to 45	47.4 to 48.8	**Does not conform**

5.2 Chemical composition

The chemical composition of blades is tabulated in Table-2

TABLE-2

Sl. No.	Material	Requirement as per IS:6690:1981 (% by weight)	As observed (% by weight)	Remark
1.	Carbon (C)	0.50 to 0.60	0.2228	**Does not conform**
2.	Silicon(Si)	1.50 to 2.00	0.2994	**Does not conform**
3.	Manganese (Mn)	0.50 to 1.00	0.7574	Conforms
4.	Sulphur (S)	0.05 (max)	Nil	Conforms
5.	Phosphorous (P)	0.05 (max)	0.0114	Conforms

6. FIELD TEST

The field tests of the implement comprising of dry and wet land operations were conducted for 21.42 & 15.09 hours respectively in different soil moisture conditions to assess the performance of the implement. The details of tractor used for field operations are given in Annexure-I.

The tractor pto speed was maintained at 540 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.

TABLE-3

Summary of field performance

Sl.No.	Parameters	Dry land operation	Wet land operation (puddling)
i)	Tractor used	Mahindra-475 DI	Mahindra Arjun 555 DI (Ultra-I)
ii)	Type of soil	Sandy loam	Sandy loam
iii)	Av. Soil moisture, %	10.6 to 18.6	--
iv)	Depth of standing water, cm	--	6.00 to 8.60
v)	Field efficiency, %	78.69 to 87.80	--
vi)	Puddling Index, %	--	74 to 82
vii)	Av. Speed of operation, kmph	4.52 to 4.57	2.43 to 2.51
viii)	Av. Depth of cut, cm	6.0 to 7.50	--
ix)	Av. depth of puddle, cm	--	11.8 to 14.70
x)	Av. Working width, m	1.79 to 1.85	--
xi)	Area covered, ha/h	0.64 to 0.72	--
xii)	Time required for one hectare, h	1.39 to 1.56	--
xiii)	Fuel consumption		
	- l/h	4.500 to 5.120	3.36 to 3.58
	- l/ha	6.560 to 7.530	--

6.1 Rate of work

6.1.1 Dry land operation

The rate of work in sandy loam soil was recorded as 0.64 to 0.72 ha/h and the forward speed as 4.52 to 4.57 kmph.

The time required to cover one hectare area was recorded as 1.39 to 1.56 h.

6.1.2 Wet land operation

Speed of operation varied from 2.43 to 2.51 kmph.

6.2 Quality of work

6.2.1 Dry land operation

The depth of operation was recorded as 6.0 to 7.50 cm.

The field efficiency was recorded as 78.69 to 87.80 %.

6.2.2 Wet land operation

Depth of puddle was recorded as 11.8 to 14.70 cm.

Puddling index was recorded as 74 to 82 %.

6.3 Wear of blades

6.3.1 On mass basis

Wear of hatchet blades (mass basis) after 36.51 hrs. of field operation is tabulated in Table-4

9. SOUNDNESS OF CONSTRUCTION

No breakdown occurred during 36.51 hrs. of operation in the field.

10. COMMENTS & RECOMMENDATIONS

10.1 The dimensions of three point linkage of the implement does not conform to IS:4468 (Part-I):1997. Standard three point linkage system should be used at regular production level.

10.2 It is recommended to have provision for change in rotor speed to suit wider range of soil and soil moisture conditions.

10.3 Maneuverability of tractor with rotavator and quality of work were observed to be satisfactory.

10.4 Dimensions of power input shaft of rotavator does not conform to IS: 4931:1995. The shaft with specification comply with BIS standard under reference should be used at regular production level.

10.5 The hardness of hatchet blades in the edge portion and in the shank portion was 47.4 to 48.8HRC against the requirement of 53 to 59 HRC (edge portion) and 37 to 45 HRC (on shank portion) as per IS:6690:1981. This calls for improvement at production level for hardness of rotor blade at its shank portion.

10.6 The percentage wear of hatchet blades on mass basis during field operation 36.51 hrs, ranged from 1.30 to 1.64 % which is normal.

10.7 The percentage wear of hatchet blades on dimensional basis after field operation 36.51 hrs, ranged from 3.81 to 6.75 % and 0.88 to 2.12 % respectively at edge and at 65 mm from edge.

10.8 The PTO power requirement of rotavator was observed from 15.80 to 21.94 kW in dry land operation; however tractor of pto power as 28.3 kW (corresponding to 540 rpm) was used during field test. Hence, 55.83 to 77.53 % of pto power was utilized.

10.9 An identification plate is provided on trailing board of rotavator. The mass of implement & power requirement may be added on it.

10.10 The safety bolt is provided in propeller shaft to protect from overloading.

10.11 Carbon & silicon content of rotar blade are lower than that the limit as specified in IS:6690:1981 and therefore this should be taken care in future at regular production level.