व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / **No. : IMP-704/1700/2015**
माह / **Month: January, 2015**

ROTAVATOR
"NEW JASWANT-766"

सत्यमेव जयते

भारत सरकार
कृषि मंत्रालय
कृषि एवं सहकारिता विभाग)

उत्तरी क्षेत्र कृषि यन्त्र प्रशिक्षण एवं परीक्षण संस्थान
सत्यमेव जयते
पुस्तकालय
हिसार

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

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
ट्रैक्टर नगर, सिरसा रोड़, हिसार- 125001 हरियाणा)

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE
TRACTOR NAGAR, SIRSA ROAD, HISAR-125001 (HARYANA)

दूरभाष / **Phones: 01662-276172**
फैक्स स0. / **Fax No. 01662-276984**

वेबसाईट / **Website: http://nrfmtti.dacnet.nic.in**
ई-मेल@ **E-mail: fmti-nr@nic.in**

4.11 **Overall Dimensions, mm** (Ref. Fig.4)

Length	:	1070
Width	:	2390
Height	:	1030
4.11.1 Mass, kg	:	478
4.12 **Labeling plate**	:	Not provided

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	56 to 57	Conforms
On shank portion	37 to 45	24 to 26	**Does not conform**

5.2 **Chemical composition**

The chemical composition of blades is tabulated in Table-2

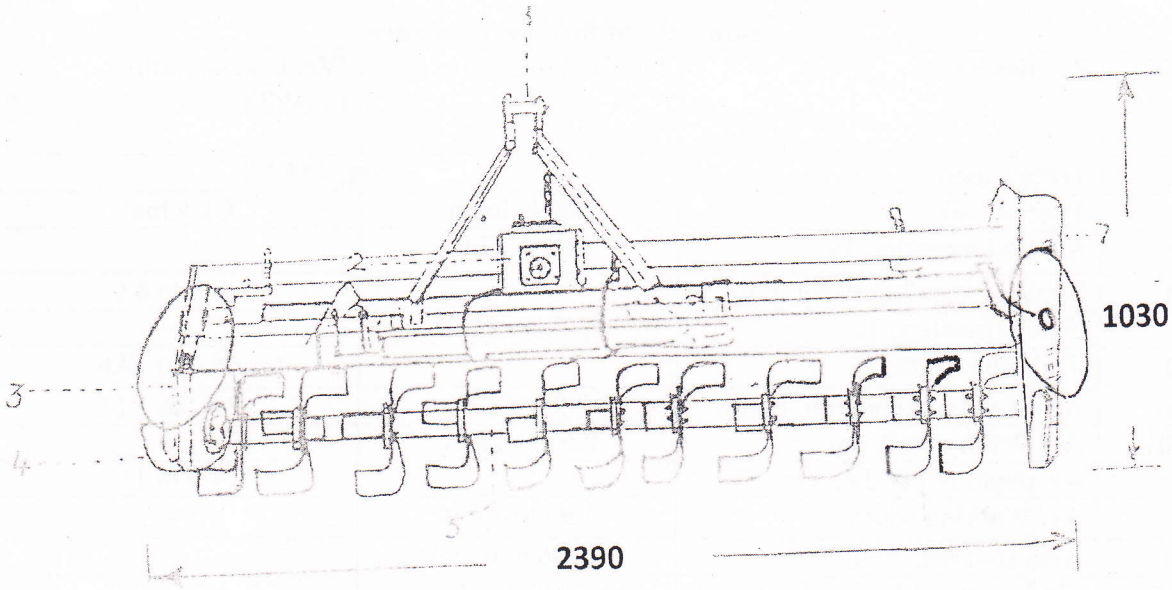
TABLE-2

Sl. No.	Material	Requirement as per IS:6690:1981(% by weight)	As observed (% by weight)	Remark
1.	Carbon I	0.50 to 0.60	0.3186	**Does not conform**
2.	Silicon(Si)	1.50 to 2.00	0.2761	**Does not conform**
3.	Manganese (Mn)	0.50 to 1.00	1.1058	**Does not conform**
4.	Sulphur (S)	0.05 (max)	Nil	Conforms
5.	Phosphorous (P)	0.05 (max)	0.0148	Conforms

6. FIELD TEST

The field tests of the implement comprising of dry and wet land operations were conducted for 20.3 & 15.83 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.



All dimension in, mm

1. THREE POINT LINKAGE
2. PRIMARY REDUCTION GEAR BOX
3. SIDE SUPPORT
4. SKID
5. ROTOR SHAFT
6. HATCHET BLADE
7. SECONDARY DRIVE GEAR BOX

Fig. 4: OVERALL DIMENSIONS OF ROTAVATOR
(NEW JASWANT-766)

TABLE-3

Summary of field performance

Sl.No.	Parameters	Dry land operation	Wet land operation (puddling)
i)	Tractor used	Swaraj 855 FE	
ii)	Type of soil	Sandy loam	Clay loam
iii)	Av. Soil moisture, %	9.0 to 13.0	--
iv)	Depth of standing water, cm	--	5.3 to 6.9
v)	Field efficiency, %	73.77 to 84.71	--
vi)	Puddling Index, %	--	68.4 to 78.6
vii)	Av. Speed of operation, kmph	2.91 to 2.96	2.42 to 2.55
viii)	Av. Depth of cut, cm	8.67 to 11.11	--
ix)	Av. depth of puddle, cm	--	14.0 to 14.6
x)	Av. Working width, m	1.99 to 2.044	--
xi)	Area covered, ha/h	0.436 to 0.504	--
xii)	Time required for one hectare, h	1.98 to 2.29	--
xiii)	Fuel consumption		
	- l/h	3.85 to 4.80	3.33 to 3.67
	- l/ha	8.16 to 10.19	--

6.1 Rate of Work

6.1.1 Dry land operation

-The rate of work in sandy loam soil was recorded as 0.436 to 0.504 ha/h and the forward speed as 2.91 to 2.96 kmph.

-The time required to cover one hectare area was recorded as 1.98 to 2.29 h.

6.1.2 Wet land operation

-Speed of operation varied from 2.42 to 2.55 kmph.

6.2 Quality of work

6.2.1 Dry land operation

-The depth of operation was recorded as 8.67 to 11.11 cm.

-The field efficiency was recorded as 73.77 to 84.71 %.

6.2.2 Wet land operation

-Depth of puddle was recorded as 14.0 to 14.6 cm.

-Puddling index was recorded as 68.4 to 78.6 %.

Sl.No.	Location	Whether ingress of mud and/or water was observed
1.	Primary reduction gear box.	No
2.	Secondary reduction chain; drive	No
3.	Hub of rotor assembly	No

8.0 EASE OF OPERATION, ADJUSTMENTS & SAFETY

8.1 Propeller shaft is provided with safety bolt as its safety device.

8.2 The propeller shaft has telescopic sections with universal joints, to adjust the length of drive shaft, which is adequate.

8.3 Depth adjustment can be made by raising or lowering the skids.

8.4 Implement does not have provision to vary rotor shaft speed to cater to different soil and moisture conditions.

8.5 Operator has to get down from tractor to make adjustments in rotavator

9.0 SOUNDNESS OF CONSTRUCTION

No breakdown was observed during 36.13 hrs of operation in the field.

10.0 COMMENTS & RECOMMENDATIONS

10.1 The dimensions of three point linkage of the implement partly 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 56 to 57 HRC and 24 to 26 HRC respectively 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 at shank portion of rotar blade.

10.6 The percentage wear of hatchet blades on mass basis during field operation 36.13 hrs, ranged from 2.26 to 3.56% which is normal.

10.7 The percentage wear of hatchet blades on dimensional basis after field operation 36.13 hrs, ranged from 14.20 to 24.75 % and 7.50 to 9.91 % respectively at edge and at 65 mm from edge. Wear on tip portion of blade is on higher side. This should be taken care in future at regular production level

10.8 The PTO power requirement of rotavator was observed from 9.16 to 11.10 kW in dry land operation; however tractor of pto power as 32.4 kW (corresponding to 540 rpm) was used during field test. Hence, 28.3 to 34.3 % of pto power was utilized.

10.9 An Labelling/ identification plate with following detail should be provided on chassis of rotavator.

i) Make
ii) Model
iii) Sl. No.
iv) Year of manufacture
v) Weight & Size

10.10 Chemical composition of rotar blade are not conforming the limit as in IS: 6690-2007 hence these should be looked into in future at regular production level.

11. **LITERATURE** The manufacturer has not submitted any literature regarding repair, adjustment, parts catalogoue of rotavator. Therfore the manufacturer should develop the literature in Hindi, English& other regional languages as per IS: 8132-1999 for the guidance of users & technical personnel.

TESTING AUTHORITY

G.R. AMBALKAR **Agricultural Engineer**	
R.K. NEMA **Senior Agricultural Engineer**	
HIMAT SINGH **Director**	

Test report compiled by: **Sh. B. N. Dixit, Sr. Tech. Assitant**

12. **APPLICANT'S COMMENTS**

No comments received from applicant.