

व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या / No. : Imp- 509/1337  
माह / Month : April, 2011



WHEAT STRAW REAPER  
'VISHAVKARMA -741'



सत्यमेव जयते

भारत सरकार  
कृषि मंत्रालय  
(कृषि एवं सहकारिता विभाग)



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

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## 8 LABORATORY TESTS:

A	Hardness of knife blades (HRC)	As per IS: 6025-1999	As observed	Remarks
	a. Hardened Zone :	48 to 58	48	Conforms
	b. Remainder Zone :	20 to 35	12	Does not conform
B	Hardness of chaffer drum blade (HRC)	As per IS: 6025-1999	As observed	Remarks
	Hardened Zone :	48 to 58	56	Conforms
	Remainder Zone :	20 to 35	19	Does not conform
C. Chemical composition of Knife blades				
		As observed	As per IS:6025-1999	Remarks
	Carbon %	0.80	0.70 to 0.95	Conforms
	Manganese %	0.68	0.30 to 0.50	Does not conform
D. Chemical composition of chaffer Drum blades				
		As observed	As per IS:6025-1999	Remarks
	Carbon %	0.82	0.70 to 0.95	Conforms
	Manganese %	0.67	0.30 to 0.50	Does not conform

## 9. FIELD TEST

The straw reaper fitted with Sonalika 60 DI tractor at engine throttle setting corresponding to 1700 rpm was tested in the field for 51.4 hours for reaping of left over straw stubbles after harvesting by grain combine harvester. The tractor front was fitted with a wire mesh box type structure to prevent dust deposition on radiator. During tests field performance of straw reaper was assessed with regard to quality of work, rate of work, fuel consumption, safety and soundness of construction etc. The crop parameters, atmospheric conditions and performance parameters as observed during field tests are also given in Annexure-II. The detail of the tractor used for field operation are given in Annexure-I

### 9.1 Rate of work and fuel consumption

The "split straw percentage" is defined as the percentage of straw splitted to the total weight of straw sample collected after passing through the machine. The quantity of straw collected is expressed in terms of straw recovery percentage which is defined as the percentage of difference of straw weight before and after machine operation to the initial weight of straw in the randomly selected sample area of test field.

During straw field tests, output of the machine varied from 0.408 to 0.486 ha/h. The forward speed varied from 2.31 to 2.94 kmph in L-1 gear. Fuel consumption varied from 5.01 to 5.61 l/h

The results of field performance tests are summarized in Table-1 and detail is given in Annexure-II.

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**TABLE -1 : SUMMARY OF FIELD PERFORMANCE TEST**

Wheat Crop variety	Forward speed (kmph)	Rate of work		Fuel consumption		Av. Length of straw (mm)	Straw split (%)	Straw recovery (%)
		(ha/h)	(h/ha)	(l/h)	(l/ha)			
HD-2932	2.31 to 2.94	0.411 to 0.486	2.06 to 2.44	5.01 to 5.43	10.92 to 12.92	13.8 to 19.9	97.3 to 98.0	72.3 to 81.0
WH-711	2.37 to 2.89	0.408 to 0.456	2.19 to 2.44	5.10 to 5.61	12.07 to 12.82	15.5 to 20.1	97.4 to 98.3	79.6 to 84.1
PBW-343	2.81 to 2.88	0.459 to 0.474	2.12 to 2.18	5.50 to 5.59	11.70 to 12.18	16.4 to 17.6	97.0 to 98.7	72.9 to 75.8

### 9.3 Quality of work :

#### 9.3.1 Wheat straw harvesting:

During the field test straw split & straw recovery ranged from 97.0 to 98.3 % and 72.3 to 84.1 % respectively.

The length of straw in wheat varied from 13.8 to 20.1 mm. The straw recovery mainly depends upon the height of left over straw stubbles in the field harvested by the combine harvester. The length and splitting of straw so formed is considered to be satisfactory as animal feed.

### 10 EASE OF HANDLING DURING OPERATION.

No specific problem was observed in handling during operation of straw reaper.

### 11 LABOUR REQUIREMENTS.

Prior to each test, one man hour was required for daily maintenance of tractor and straw reaper for operation, Otherwise one skilled operator is needed to operate tractor with straw reaper. Additional man hours are required for handling and transportation of straw.

### 12 WEAR OF CRITICAL COMPONENTS

The wear of serrated blades of chaffer cylinder and concave was measured after completion of 51.4 hours of wheat straw harvesting.

Percentage wear on mass basis was computed and the results are given below:-

#### 12.1 Wear of Chaffer cylinder blades

Sl.No	Initial mass (g)	Final mass (g)	Wear (%)
1.	68.6	68.0	0.87
2.	69.9	69.1	1.14
3.	73.0	72.1	1.23
4.	71.7	71.2	0.69
5.	68.5	68.0	0.73
6.	74.1	73.7	0.54
7.	71.2	70.5	0.98

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8.	69.9	69.0	1.28
9.	71.2	70.6	0.84
10.	73.9	73.2	0.95
11.	72.6	72.0	0.82
12.	70.9	70.2	0.99
13.	71.9	71.3	0.83
14.	78.8	78.2	0.76
15.	69.7	69.0	1.00
16.	70.8	70.6	0.28

## 12.2 Wear of Concave blades

Sl.No.	Initial mass (g)	Final mass (g)	Wear (%)
1.	89.8	89.0	0.89
2.	92.2	91.8	0.43
3.	84.0	93.8	0.21
4.	96.2	95.8	0.42
5.	92.7	92.0	0.76
6.	820.4	82.0	0.49
7.	84.1	83.7	0.48
8.	79.4	79.0	0.50
9.	84.5	84.2	0.36
10.	80.7	79.7	1.24

The blades of chaffer cylinder & concave after 51.4 hours of operation had wear in the range of 0.28 to 1.28 % & 0.21 to 1.24 % respectively.

## 13 SOUNDNESS OF CONSTRUCTION

No breakdown was observed during 51.4 hrs. of field tests.

## 14 SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS:

### 14.1. Rate of work and fuel consumption:

On the basis of field tests, output of the machine varied from 0.408 to 0.486 ha/h. The forward speed of tractor Sonalika 60 DI (BT) varied from 2.31 to 2.94 kmph in L-1 gear. Fuel consumption of tractor varied from 5.01 to 5.61 l/h (10.92 to 12.92 l/ha).

### 14.1.2 Quality of work:

Quality of straw is expressed in terms of split straw percentage and length of straw. The split straw was observed as 97.0 to 98.3 %. The average length of straw observed from 13.8 to 20.1 mm. The straw recovery was from 72.3 to 84.1 %.

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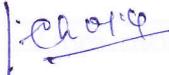
#### 14.3 COMMENTS AND RECOMMENDATIONS:

1. Quality of wheat straw was observed to be satisfactory and is considered to be satisfactory as animal feed.
2. It is recommended to incorporate the safety device in drive shaft.
3. It is recommended to have safety guards on belt pulley of transmission system
4. The Straw split percentage was observed from 97.0 to 98.7. This is considered to be normal.
5. Hardness of knife blades and chaffer drum blades in reminder zone was observed as 12 and 19 HRC respectively against the specified value of 20 to 35 HRC which do not conform to relevant Indian Standard (IS: 6025-1999). This should be incorporated at regular production level.
6. The chemical composition of the knife and chaffer drum blades are not conforming with IS: 6025-1999.
7. An identification plate should be provided on each unit at regular production level.

#### 15. LITERATURE

Inadequate literature in form of booklet was provided with machine. It is recommended that operator cum service manual, having Spare part catalogue and tool kit etc. should be brought out as per IS: 8132-1983 for guidance of users & service personnel.

### TESTING AUTHORITY

(J.P. MANDAL) AGRICULTURAL ENGINEER	
(P. K. CHOPRA) SENIOR AGRICULTURAL ENGINEER	
(A. N. MESHARAM) DIRECTOR	

#### APPLICANT'S COMMENT

No comments received.