व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ **No.: REAPER.B-07/2378/2019**

माह/**Month: December, 2019**

THIS TEST REPORT VALID UP TO : 31st DECEMBER, 2026

BCS 290 IS SELF PROPELLED RIDE ON WHEAT REAPER CUM BINDER

सत्यमेव जयते

भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि, सहकारिता एवं किसान कल्याण विभाग

Department of Agriculture, Cooperation and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

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[ISO 9001:2015 CERTIFIED]

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11. AIR CLEANER OIL PULL OVER TEST

Date : 03.09.2019
Range of atmospheric conditions:
- Temperature(^{0} C) : 39.5 to 40.3
- Pressure (kPa) : 97.6
- Relative humidity (%) : 52.6 to 54.1

Mass of oil in the air cleaner assemblies when filled with recommended grade of oil 5% in excess than marked level (g) : 181.5

	Position	Slope (degree)	Loss of oil (g)	Oil pull over (%)	Remarks if any
i)	Horizontal	0^{0}	0.3	0.17	None
ii)	Tilted longitudinally with front end up	15^{0}	0.2	0.11	
iii)	Tilted longitudinally with rear end up	15^{0}	0.1	0.06	
iv)	Tilted laterally with right side up	15^{0}	0.2	0.11	
v)	Tilted laterally with left side up	15^{0}	0.1	0.06	

12. FIELD TEST

The reaper binder was operated in field for 25.6 hours (including running in 0.42 hours) only in wheat harvesting.
The crop parameters recorded during the test with wheat crop are as given in Annexure-I and summarized in Table -2

Table-2 : Crop parameter

Parameter	Wheat
Variety	HR 2968 and HB2967
Plant height (cm)	74 to 110
Plant population (No of tillers per m^2)	315 to 565
Straw grain ratio	1.28 to 4.37
Moisture (%) Grain Straw	 9.0 to 12.0 NR

The results of field performance test are given in Annexure – II and are summarized in Table-3

Table 3 : Summary of field Test:

S. No.	Observation	Wheat harvesting
1	Speed of operation, kmph	3.53 to 3.81
2	Area covered, ha/h	0.325 to 0.376
3	Width of cut, m	1.28 to 1.30
4.	Fuel consumption l/h l/ha	0.77 to 1.10 2.12 to 3.35
5	Losses	
	a) Pre harvest losses (kg/ha)	3.7 to 10.7
	b)Uncut crop cutter bar (kg/ha)	1.9 to 7.21
	c) Grain loss due to shattering by cutter bar unit, conveyor unit and handling unit (kg/ha)	21.82 to 34.23
	d) Post harvest loss (kg/ha) b+c	23.72 to 39.78
6	Stubble height after harvesting,(cm)	6 to 12
7	Time required to cover 1 ha. area (h)	2.28 to 3.08
8	Field efficiency (%)	68.1 to 77.0
9	Average weight of bundle, kg	3.3 to 3.8
10	No. of bundles per hours	1852 to 2456
11	Percentage of unknotted bundles	Nil

12.1	**Rate of work :**
i)	During the tests the rate of work varied from 0.325 to 0.376 ha/h in wheat harvesting.
ii)	The fuel consumption varied from 0.77 to 1.10 l/h in wheat harvesting.
iii)	The fuel consumption per unit area harvested varied from 2.12 to 3.35 l/ha in wheat harvesting.
12.2	**Quality of work :**
i)	During wheat harvesting, cutter bar losses varied from 1.9 to 7.21 kg/ha.
ii)	Stubble height after harvesting was observed from 6.0 to 12.0 cm.
iii)	Percentage of unknotted bundles was observed as Nil.
12.3	**Time required for daily maintenance :** About 15 minutes are required for daily servicing and maintenance of reaper binder with one man only.
12.4	**Labour requirement:** Two person including driver are required for smooth operation of the machine in the field. Additional labour are required for collection of the sheaves (bundles).
12.5	**Twine consumption :** About one bundle of twine is required for one acre field.

14.4 Ring side clearance (mm) :

Rings	Ring side clearance	Maximum permissible wear limit
1st Comp .ring	0.11	0.25
2nd Comp. ring	0.07	0.20
oil Ring	0.06	0.15

14.5 Main bearing:

Bearing No.	Diametrical clearance (mm)	Crank shaft end float, mm	Maximum permissible wear limit	
			Diametrical	Crank shaft end float
I	0.09	0.25	0.25	0.8
II	0.07			

14.6 Big end bearing :

Bearing No.	Diametrical clearance (mm)	Axial clearance, mm	Maximum permissible wear limit, mm	
			Diametrical clearance	Axial clearance
I	0.08	0.60	0.15	1.0

14.7 Valve guides and valve springs: Maximum permissible wear limit mm

Valve and valve guide clearance, mm

Inlet valve : 0.06 — 0.15

Exhaust valve : 0.06 — 0.15

Valve spring rate, n/mm

Inlet valve : 0.653 — **Discard limit**

Exhaust valve : 0.683 — **Not specified**

No noticeable defect was observed for valve guide and valve spring.

14.8 Timing gear :

No noticeable defect was observed.

14.9 Clutch :

Overall thickness of clutch plate, mm : 7.6 to 8.1

No noticeable defect was observed

14.10 Brake :

Thickness of brake shoe/ring, mm

LHS : 5.32 to 7.38

RHS : 5.50 to 7.43

No noticeable defect was observed

15. SUMMARY OF OBSERVATION,COMMENTS AND RECOMMENDATION

15.1 Engine performance test

i) The maximum power of the engine was observed as 7.2 kW against the declaration of 7.35kW.

ii) The specific fuel consumption during two hour maximum power test was observed as 343 g/kWh, against declared value of 279 g/kwh which is 22.9 % higher than the declaration. **The variation between observed value and declared value is too much, and therefore MUST be looked into for corrective measure.**

iii) During test, the maximum engine oil temperature was recorded as 181° C against the declaration 140° C. This should be looked into.

15.2 Field test

i) The area covered varied from 0.325 to 0.376 ha/h.

ii) The fuel consumption varied from 0.77 to 1.10 l/h and 2.12 to 3.35 l/ha.

iii) Post harvest loss were observed as 23.72 to 39.75 kg/ha.

15.3 Ease of operation & adjustment

No noticeable difficulties was observed during the test.

15.4 Assessment of wear :

No noticeable defect was observed in engine and machine components.

15.5 Hardness and chemical composition :

i) The hardness of knife blade and knife guard does not conform to the requirement of IS: 6025-1982.

ii) The carbon content of knife blade is not within the required limit specified as per IS:6025-1982.

iii) Carbon content of knife back is not within the requirement specified in IS:10378-1982. Use of materials for knife blade and knife back meeting BIS requirement is recommended.

15.6 Dimensional requirement of cutter bar assembly:

i) **The specifications of knife section, knife back and knife guard does not conform to IS: 6025-1999, IS: 10378 and IS: 6024-1983 respectively. This should be looked into at production level.**

15.7 Mechanical vibration:

The amplitude of mechanical vibration of components marked as (*) in chapter 10 of this report may be consider on higher side. This calls for providing suitable remedial measures to dampen the vibration in order to improve the operational comfort and service life of various components & sub assemblies.

15.8 Labeling plate

Labeling plate is provided on machine. The following information should also be provided on labeling plate:-

i) Engine make and model
ii) Maximum power (kW)
iii) Specific fuel consumption (g/kwh)

15.9 Hydraulic oil change period is not specified. It MUST be specified for proper maintenance by user.

15.10 Safety against accidental start of engine is not provided. It MUST be provided as per IS: 8133-1983

15.11 The accelerator lever, engine stop lever and other controls does not meet the requirement of IS: 8133-1983. It should be looked into for corrective action.

16. TECHNICAL LITERATURE

The following literature was supplied with the machine during the course of test.

i) Owner's manual instruction book of reaper binder

ii) Parts catalogue of Reaper binder

ii) Maintenance manual of engine.

The operator's manual provided needs to be updated as per IS: 8132-1999.

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY **DIRECTOR**	

17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comment
17.1	15.1	These points have been taken up with our principals to take corrective action.
17.2	15.5, 15.6, 15.7, 15.9, 15.10, 15.11	Corrective actions are being taken.
17.3	15.8	In future all supply we will provide labeling plate as per recommendation.